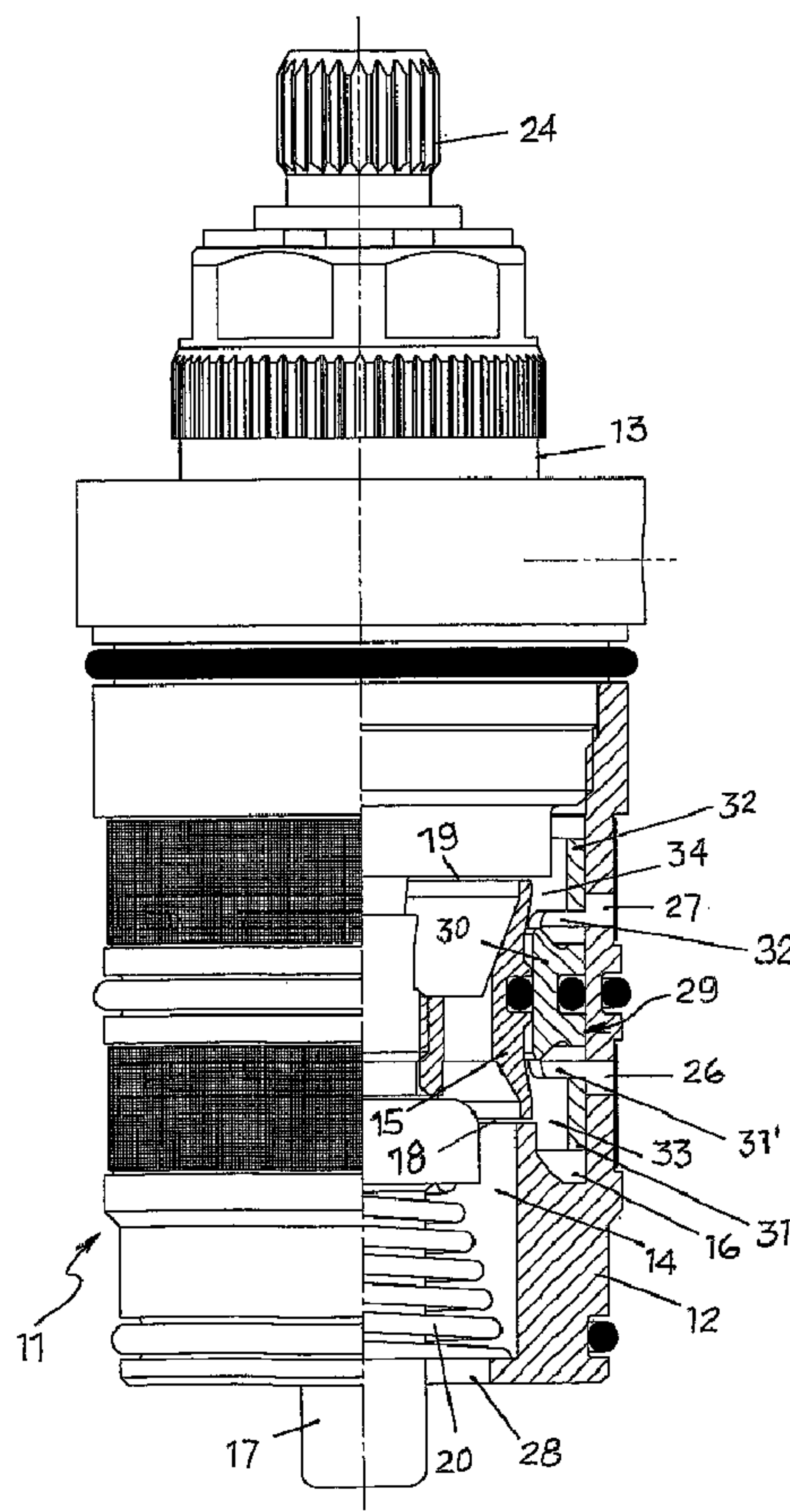




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(72) Inventeur/Inventor:
FERABOLI, ENRICO, IT
(73) Propriétaire/Owner:
ARTIS S.A.S. DI OTTELLI CARLO, IT
(74) Agent: ROBIC

(54) Titre : ROBINET MELANGEUR THERMOSTATIQUE AVEC EGALISATEUR DE PRESSION
(54) Title: THERMOSTATIC MIXER VALVE WITH PRESSURE BALANCER



(57) Abrégé/Abstract:

The invention concerns a thermostatic mixer valve which houses a pressure balancer (29) positioned inside the valve body (11) coaxially between said body (12) and the mixing device (15) associated with the thermostatic bulb. The pressure balancer is the



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piston type and placed in a balancing chamber provided in the valve body in communication with the two radial separated hot and cold water inlet passages (26, 27) and with two radial passages (18, 19) defining the mixer device for feeding the water to the mixing chamber.

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[IT/IT]; c/o ARTIS SAS DI OTTELLI CARLO, Via L. Abbiati 42, I-25131 BRESCIA (IT).

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(74) Agent: SANGIACOMO, Fulvia; C.so Matteotti, 42, I-25122 Brescia (IT).

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(71) Applicant (for all designated States except US): ARTIS

S.a.s. di OTTELLI CARLO [IT/IT]; Via L. Abbiati, 42, I-25131 Brescia (IT).

(72) Inventor; and

(75) Inventor/Applicant (for US only): FERABOLI, Enrico

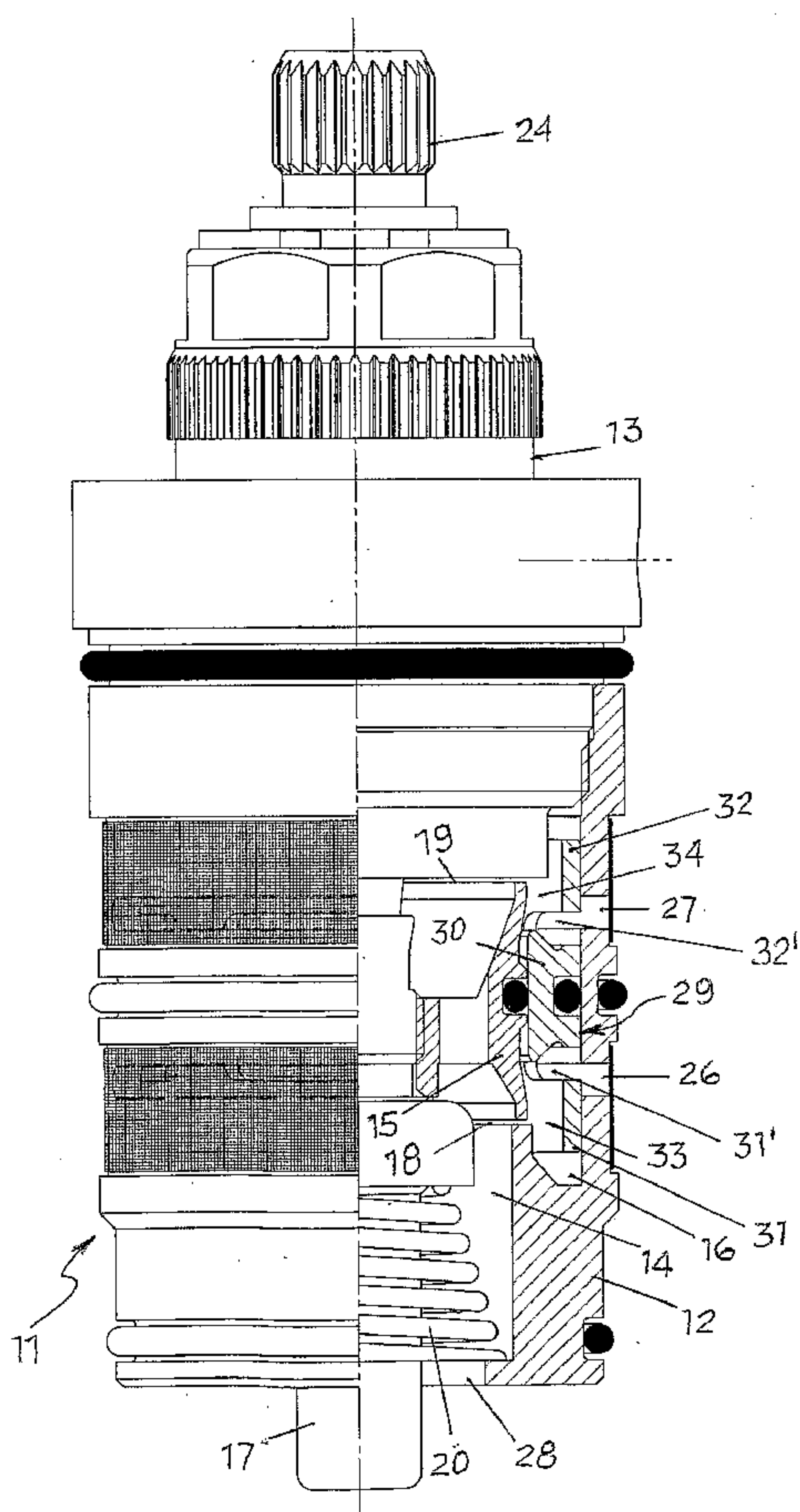
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(54) Title: THERMOSTATIC MIXER VALVE WITH PRESSURE BALANCER

(57) Abstract: The invention concerns a thermostatic mixer valve which houses a pressure balancer (29) positioned inside the valve body (11) coaxially between said body (12) and the mixing device (15) associated with the thermostatic bulb. The pressure balancer is the piston type and placed in a balancing chamber provided in the valve body in communication with the two radial separated hot and cold water inlet passages (26, 27) and with two radial passages (18, 19) defining the mixer device for feeding the water to the mixing chamber.



WO 2007/072526 A1

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THERMOSTATIC MIXER VALVE WITH PRESSURE BALANCER

Field of Invention

This invention concerns in general the tap sector and in particular to the hot and cold mixer valves with a thermostatic regulator for sanitary plumbing.

State of the Art

In the tapware field taken into consideration, mixer valves in the form of cartridges, insertable in a tap body, designed to house two separate hot and cold water inputs and having devices for opening and closing the water inputs so as to adjust the flow and vary the mixer ratio of the two types of water depending on the temperature of the mixed water to be delivered through the output, are well known.

Said mixer valves can be with or without a thermostatic regulator. When they are without a thermostatic regulator, opening and closing, delivery adjustment, including the variation in the mixer ratio of the water is carried out manually using the control lever. On the other hand, in valves equipped with thermostatic regulators, the variation in the mixer ratio of hot and cold water is autonomous due to the automatic control of the temperature of the mixed water delivered.

Furthermore, also known is the application of a hydraulic pressure balancer on said valves with hot and cold water inputs and suitable to compensate the pressure variations of the water coming from the water mains and in this way to prevent fluctuations in flow so as to maintain the ratio of the delivery of hot and cold water feeding the mixer valve, constant.

Moreover, according to the state of the technique, the pressure balancer is a separate unit that connects up to the mixer valve directly or

by the interposition of hydraulic connections, increasing however the overall size and complexity of the group.

Only in the case where mixer valves without a thermostatic regulator has a solution been proposed and achieved, where the balancer is positioned and housed in a part of the body of the valve itself, even though in a position transversal to the axis of said body. As far as is known, the hot and cold water thermostatic mixer valves have never been provided with an incorporated balancer.

10 Aims and Summary of the Invention

One of the objectives of this invention is therefore to propose and achieve a hot and cold water mixer valve with a pressure balancer positioned advantageously in the valve body, between the latter and the mixing device, associated with the thermostatic unit, so as not to have complementary devices either external to the valve itself or added to it.

Another objective of the invention is to propose and realise a thermostatic hot and cold water mixer valve, which incorporates a pressure balancer without altering its functionality and without increasing the dimensions and consequently the usual overall dimensions.

Still another objective of the invention is to supply a hot and cold water valve mixer, with or without a thermostatic unit, complete with a coaxial pressure balancer, all in the form of a cartridge having overall sizes that allow universal use and insertion, without the need for modifications, in the bodies of taps for bathtubs, showers and the like, instead of and/or in substitution of the traditional thermostatic mixer valves without pressure balancers.

A further objective of the invention is supply a hot and cold mixer valve complete with coaxial balancer and which can be equipped with or without its own water flow opening and closing devices in output and possibly associated also with a two-way distributor.

These objectives and implicit advantages deriving from them are achieved with a hot and cold water thermostatic valve as disclosed hereinafter.

More specifically, the invention as claimed is directed to a mixer valve comprising a valve body made up of a bottom element and a top element coupled to each other and a pressure balancer, where said valve body internally delimits a mixing chamber and has separate inlet passages for hot and cold water and an outlet passage for delivery of a mixed water to at least one delivery point, and where said mixing chamber houses a mixing device for mixing water establishing feed openings of hot and cold water delivered by said inlet passages, connected to a thermostatic bulb and subject to axial movements with respect to said feed openings in order to control an opening/closing position depending on temperature variations acting on said thermostatic bulb, characterized in that said pressure balancer is arranged inside said valve body, coaxially between said bottom element and said mixing device, said pressure balancer having a form of an annular piston free to float axially and arranged to slide on the same axis of said mixing device.

Brief Description of Drawings

The invention will however be illustrated and become more evident in the continuation of this description made in reference to the enclosed indicative and not limiting drawings, in which:

Fig. 1 shows an enlarged partial section of the mixer valve complete with pressure balancer;

Fig. 2 shows a cross section view of the valve inserted in a valve body; and

Figs. 3, 4 and 5 show output systems with two, three or four way water distribution.

Detailed Description of the Invention

As shown, the mixer valve in question is configured and equipped as a cartridge to be inserted as a whole in the body of a tap 10. It comprises a body valve 11 made up of a bottom element 12 and a second top element 13, seal fitted and housing the operating components of the mixer valve.

5 The body 11 delimits internally a mixing chamber 14 housing a mixer device 15 and temperature control of the mixed water delivered. The bottom device 12, delimits a balancing chamber 16 open towards the mixer chamber and consequently towards the mixer device 15.

10 The mixer device 15 is associated, in the known way, with a thermostatic bulb 17 and is subject to axial movements in answer to the variations in temperature the thermostatic bulb is subjected to in order to differently open and close the two water input openings 18, 19 to the mixing chamber.

15 The movements of the mixer device 15 are opposed by two different contrasting springs 20, 21 respectively associated with the device itself and a hood 21 which rests on the summit of the thermostatic bulb 17.

20 The temperature of the mixed water can be set as required by turning a second knob 23, fixed to a turning shaft 24 associated with the thermostatic bulb 17 by means of a slider 25 which engages with the top spring 21 and, by means of this, with the hood 22 over the bulb.

25 The bottom element 12 of the body of the valve 11 has laterally, at different levels, some separate input passages 26, 27 for the hot and cold water respectively, and a bottom with an outlet passage of the water towards the delivery point. The hot and cold water reach the feed openings 26, 27 receiving the water to be delivered according to arrows C and F respectively, through passages connected to the body of tap 10.

30 The balancing chamber 16 houses a pressure balancer 29 in the form of a piston free to float axially. It has an intermediate portion 30 connected by opposite parts to two annular portions, one lower 31 and one higher 32, with a smaller internal diameter and each crossed by holes or

radial slots 31', 32', respectively, on a level with the inlet passages 26, 27. The external surface of the balancer is guided on the internal surface of the bottom element 12 with the interposition of at least one gasket, whereas the internal surface of the intermediate portion 30 is guided on the external surface of the mixer device, with the interposition of another gasket. The holes or input slots 31', 32' are on the opposite sides of said intermediate portion 30, above and below the fitted gaskets.

The intermediate portion 30 of the pressure balancer 29 subdivides the balancing chamber 16 into two so-called small chambers with variable volumes: a first lower small chamber 33 for balancing the hot water; a second top small chamber 34 for balancing the cold water. The first small chamber 33 receives from one side, through the radial holes or slots 31', the hot water from the inlet passage 26 and on the other side it is in communication with the radial openings 18 feeding hot water into the mixer valve 14. In the same way, the second small chamber 34 receives from one side, through the radial holes or slots 32', the cold water from the inlet passage 28 and on the other side it communicates with the radial openings 19 feeding cold water into said mixer valve.

As said above, the mixer device 15 sets the feed water inputs 18, 19 to the mixing chamber and is movable axially by the thermostatic bulb 17. This thermostatic bulb 17 is in contact and is influenced by the temperature of the water passing through the mixing chamber and, by dilating differently depending on the temperature of the water, causes the movements of the mixer device which in this way opens/closes said openings 18, 19 corresponding to the different quantities of the two types of mixed water to maintain the temperature of the water delivered when mixed, constant.

When the pressure of the hot and cold water on entering the passages 26, 27 are the same, the floating piston of the balancer 16 remains in a balanced position and the deliveries of the hot and cold inlet

water are even. Consequently, the ratio of hot and cold water to be mixed does not change and there are no variations in the temperature of the mixed water delivered.

The position of the floating piston changes only when the pressure
5 of the hot and/or cold input water changes. In fact, if the pressure of the hot water that enters the balancing chamber 33 increases, the floating piston of the balancer moves in the direction to close, more or less pronouncedly with its first annular portion 31, the respective inlet passage of the hot water 26, whereas, from the opposite side, the second annular
10 portion 32 of the piston opens more or less pronouncedly the cold water input passage 28. With an increase in the pressure of the cold water we have the opposite; the ratios of the quantities of the cold water are changed to maintain the temperature of the mixed water delivered, constant.

15 Worthy of note is the fact that the thermostatic mixer valve housing a coaxial pressure balancer such as the one described beforehand may also be the type provided with a closing system, and regulation and/or distribution of the water to be delivered in its base as shown in Fig. 2. Such a system can be made up of a fixed plate 37 and a mobile plate 38 resting
20 and turning above the fixed one. Said plates 37, 38 are associated with the bottom passage 28 of the bottom element 12 and can be held by a covering 39 enclosing the valve body 11.

On one side, the fixed plate can have, for example, two 40, three 41, or even four 42 output passages, as shown respectively in Figs. 3, 4 and 5
25 for the delivery of water to an equal number of different user outlets, using a distributor 43 with the same number of branches.

On the other side the movable plate 38 is attached to the bottom element 12 of the valve body and has a split or slot 44 which can be selected and positioned in correspondence with each of the exit passages
30 40, 41, 42 following rotation of the movable plate 38 moved by said bottom

element and carried out using a second knob 45 fixed to the top part of the valve body 11. Furthermore, the movable plate 38 can be turned and stopped on the fixed one in a position at a distance from each output passage so as to close the valve and stop delivery of water. Each position
5 of the mobile plate can be established by a spring loaded stop 46 which engages with a stop notch 47.

CLAIMS

1. Mixer valve comprising a valve body (11) made up of a bottom element (12) and a top element (13) coupled to each other and a pressure balancer (29), where said valve body (11) internally delimits a mixing chamber (14) and has separate inlet passages (26, 27) for hot and cold
5 water and an outlet passage (28) for delivery of a mixed water to at least one delivery point, and where said mixing chamber (14) houses a mixing device (15) for mixing water establishing feed openings (18, 19) of hot and cold water delivered by said inlet passages (26, 27), connected to a thermostatic bulb (17) and subject to axial movements
10 with respect to said feed openings (18, 19) in order to control an opening/closing position depending on temperature variations acting on said thermostatic bulb (17), characterized in that said pressure balancer (29) is arranged inside said valve body (11), coaxially between said bottom element (12) and said mixing device (15), said pressure
15 balancer (29) having a form of an annular piston free to float axially and arranged to slide on the same axis of said mixing device (15).
2. Mixer valve according to claim 1, in which said bottom element (12) of said valve body (11) delimits a balancing chamber (16) open towards
20 the mixing device (15) and in communication with said separate radial hot and cold water input passages (26, 27) and said radial water delivery openings (18, 19) in the mixer chamber (14), and in which said pressure balancer (29) in the form of a piston positioned in said balancing chamber (16) is moved between an internal surface of one of
25 said bottom element (12) of said valve body (11) and an external surface of said mixing device (15) and being movable to control said

opening/closing position of said radial passages (26, 27) according to a pressure variations of hot and cold water in input.

3. Mixer valve according to claim 1 or 2, in which the pressure balancer piston (29) has an intermediate section (30) connected from opposite sides with two annular sections (31, 32), with an inferior internal diameter and each one crossed by radial bores or slots (31', 32') which can be positioned on a level with said radial hot and cold water passages (26, 27), the intermediate section (30) of the balancer piston (29) being guided on the external surface of the mixer device (15) in a field lying between said water feed radial openings (18, 19) to the mixing chamber (14), whereas the external surface of the balancer piston (29) is guided on the internal surface of the valve body (11) with the interposition of gaskets.
4. Mixer valve according to claim 3, in which the intermediate section (30) of the piston balancer (29) subdivides the balancing chamber (16) into two small variable volume chambers, where a first chamber (33) is in communication on one side with the hot water input radial passage (26) and on the other side with the hot water feed opening (18) to the mixer chamber (14), and a second small chamber (34) is in communication with the part with cold water input radial passage (27) on the other side with the cold water feed opening (19) to the mixer chamber.
5. Mixer valve according to any one of claims 1 to 4, in which the valve body (11) forms at least part of the balancing chamber (16) housing the pressure balancer (29).

6. Mixer valve according to any one of claims 1 to 5, comprising besides a water flow closing, regulation and distribution system associated with the output passage (28) of the valve body, said system being made up of a fixed plate (37) and a mobile plate (38) resting above the fixed one and turning together with the valve body for partial or total closing or opening of the valve.
7. Mixer valve according to claim 6, in which said plates are held by a shell enveloping the valve body, and in which the fixed plate has two, three or more outlets towards the same number of delivery points, whereas the moving plate has a slot or opening which can be positioned in line with each of the said outlets as required.

