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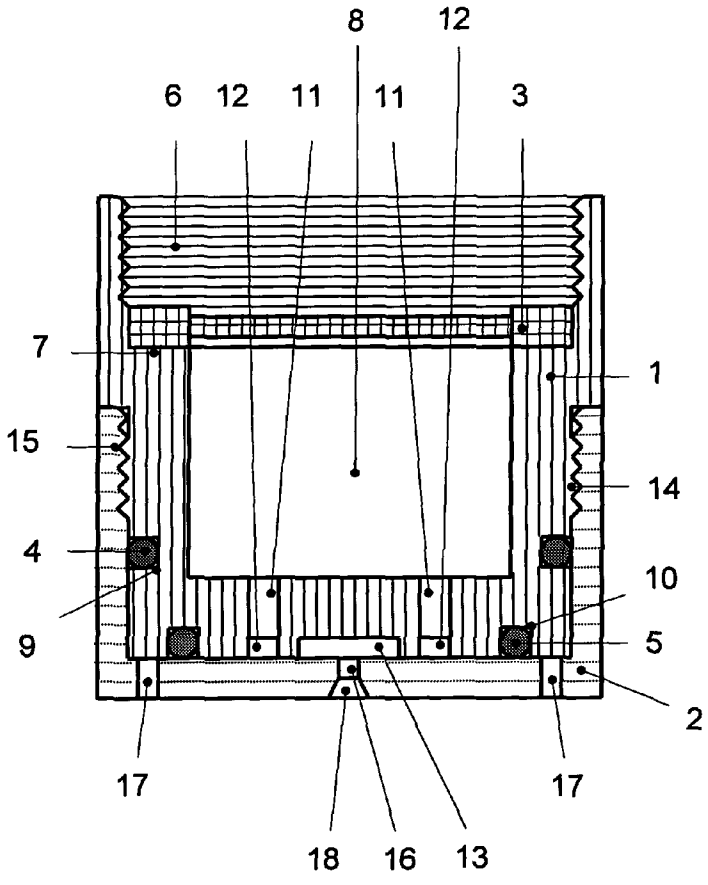
(54) Title: SAVING HEAD FOR WATER TAP OR SHOWER SWITCHABLE BETWEEN STANDARD AND ECONOMICAL MODE



(57) Abstract: The present invention provides a saving head comprising a cylindrical (tubular) body member (1), which is on its upper part equipped with connecting thread (6) for connection to the water tap or shower. Under the thread (6) is situated a seal with a sifter (3) and at least one inlet duct (11), built in a body member (1) or an embedded whirling peg (21). An inlet duct (11) is equipped with whirling member for bringing the water into a whirling chamber (13), and a body member (1) is equipped with connecting member movably linked to the hollow tubular housing (2) with a bottom wall and a accommodating connecting member for switching between standard and economical mode. A bottom wall of the hollow tubular housing (2) is equipped with at least one central outlet opening (16) situated under a whirling chamber (13), while a diameter of a central outlet opening (16) for exit of water in the economical mode is 0,1 to 3,0 mm, and at least one peripheral outlet opening (17) for exit of water in the standard mode. Between bottom surface of the body member (1) and inner surface of the bottom wall of the housing (2) is placed an annular separating wall (10, 5 or 22) for separation and sealing of the area of a whirling chamber (13) and at least one central outlet opening (16) from the area of peripheral outlet openings (17), at the economical mode..

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Specification

Saving head for a water tap or shower reversible between standard and economical mode

Technical Field

The invention concerns a saving head, reversible between standard (fast) and economical mode, suitable for personal hygiene and manual wash-up with considerable water saving, falling within the area of public health engineering, used in administration buildings, households, public and sanitary conveniences, in restaurants and canteens.

Background Art

At present, water saving is solved by the utility model SK-4630, in which an economical spraying head for a water tap is described. Its nature consists in that it comprises a body, in which a flow limiter is located allowing a limited amount of water to flow through it via two head channels into inlet grooves, which are located at the bottom side of the flow limiter and which further direct water to opposite sides of a whirl chamber, where the water starts to whirl and is forced out through an outlet orifice at the bottom part of the body in the form of fine water mist and in the shape of a straight circular cone. This solution brings up to 93 % of water saving personal hygiene (hand washing, face washing, shaving with a blade, teeth cleaning, and the like) in comparison with fully open economical aerator (for example from the firm Neoperl PCA CASCADE, which has the maximum flow rate limited to 6 l/min, and about which the firm Neoperl insists that it saves 50 % of water and energy in comparison with conventional aerators), 83 % of water saving compared with fully open Neoperl PCA SPRAY (shower for public laundries having the maximum flow rate of 1.7 l/min, which is at the moment the most economical water saver at the German market), and in comparison with the English patented reversible water saver TAPMAGIC CARTRIDGE (WO9958775 or US2006151635), fully open in the low flow mode (maximum flow rate in this mode is about 2 l/min). A disadvantage of the spraying head described in the utility model SK-4630 is that it is exclusively specialized to hygiene, because it can be used only in the economical mode. It is suitable to be used only in water taps for wash-basins in bathrooms, public lavatories and on bidets. If anybody wanted to fill any container or wash-basin with a greater amount of water, it would take a long time, because the flow rate of the economical spraying head (SK 4630) is 0.25 l/min and it cannot be changed. Because of the low flow rate, the economical spraying head is not suitable to be used in a kitchen.

A further technical solution concerning water saving consists in aerators, for example, CS 116319 and CZ utility model 16096. The essential feature of an aerator is that it consists of a device, which first accelerates the water flow flowing through it, and then it splits it. The split and accelerated water flow sweeps through the side orifices on the aerator body air, which is mixed with water. The aerated water flow is then slowed down by stacked special sifters, which ensure its proper effusion into free space. Thanks to this, the water flow is thinner and softer compared with the full water flow. According to manufacturers, 10 to 20 % of water saving is achieved in this way compared with non-aerated full water flow. A disadvantage of an aerator is that when using it, for example at hand washing, most of water flows unused into the sewer system and thus, water saving is not maximal.

The primary aim of the present invention was to create a saving head which would be economical when required, but also fast after reverting it, whereby its usage will be more universal and there will be several possibilities of its usage.

Disclosure of the Invention

The above mentioned disadvantages are substantially eliminated by a saving head for a water tap or shower, reversible between the fast and economical mode, comprising a cylindrical body, which is in its upper part equipped with connecting thread for connecting it to the water tap or shower. Under the connecting thread, there are situated a seal with a sifter and at least one inlet channel, possibly equipped with a whirl means to bring water into the whirl chamber. The inlet channel may be formed either in the body or in an inserted whirl pin. The nature of the saving head is the fact that the body is equipped with a connecting means, with which a hollow cylindrical housing with a bottom wall is movably joined, and with a corresponding connecting means for reverting between the fast and economical mode, and the bottom wall of the hollow cylindrical housing is equipped with at least one central outlet orifice located under the whirl chamber, the central outlet orifice for water outlet in the economical mode having a diameter of 0.1 to 3.0 mm, and at least one peripheral outlet orifice for water outlet in the fast mode, and between the bottom face of the body and inner face of the bottom wall of the housing, there is arranged an annular dividing wall for separating and sealing the area of the whirl chamber and the at least one central outlet orifice from the area of the at least one peripheral outlet orifice when reverted to the economical mode.

According to one embodiment, the whirl means may be at least one inlet groove heading tangentially to the whirl chamber, formed at the bottom face of the body or at the bottom face of the whirl pin.

According to a further embodiment, the whirl means may be at least one oblique inlet channel opening tangentially directly into the whirl chamber, or at least one obliquely terminated or oblique inlet channel or at least one oblique inlet groove located at a side of the whirl pin arranged in the body.

The annular dividing wall may be formed by at least one bottom groove and at least one bottom seal inserted into it, wherein the bottom groove may be formed in the body and/or in the opposite inner face of the bottom wall of the housing, and the bottom seal laps over the edge of the bottom groove by 0.05 to 0.15 mm.

According to another embodiment, the annular dividing wall may be formed by at least one bottom groove and at least one bottom seal inserted into it, wherein the bottom groove may be formed in the body and/or in the opposite inner face of the bottom wall of the housing, and the bottom seal laps over the edge of the bottom groove by 0.05 to 0.8 mm.

The annular dividing wall according to a further embodiment may be formed as a labyrinth dividing wall, comprising at least one circular protrusion and at least one cooperating bottom groove, which are formed on mutually opposite faces, i. e. on the bottom face of the body and on the inner face of the bottom housing wall or vice versa.

It is preferred, when each of the central outlet orifices is equipped with a recess allowing the water spraying from the central outlet orifice to scatter wider and more freely. The angle of the recess may be 120° and its depth about 1 mm. The upper diameter may be 2.5 mm.

The connecting means for mutual connection of the body and housing may be formed by an outer thread on the body and an inner thread on the housing or vice versa. The connecting means may be created also in the form of a two-position bayonet joint, wherein in the lower position the head is in the flow mode and in the upper position in the saving mode.

According to a preferred embodiment, a peripheral side seal inserted in the peripheral side groove may be arranged under the connecting means to prevent uncontrolled water leakage and to stabilize the body position. This side seal may be embedded in the peripheral side groove of the body or in the inner or outer peripheral side groove of the housing.

The central outlet orifice may have a diameter of 0.1 to 0.5 mm for use with a water tap or 0.5 to 3.00 mm for use with a shower.

According to a further embodiment, the whirl chamber may be alternatively located on the upper face of the bottom housing wall.

The connecting thread may be also an outer thread for direct connection of the head with an outlet arm of the water tap with inner thread. Under the connecting thread, there is a seal with a sifter located on a carrying surface which traps small impurities from water and seals the connection between the body and outlet arm of the water tap. This seal with a sifter may be created integrally so that the sifter is inserted into a groove located on the inner periphery of the seal. A further possibility consists in locating the sifter under at least one seal or inserting the sifter between at least two seals.

From the bottom part of the body interior or from the upper part of the whirl pin, there is running at least one vertical inlet channel which opens at the bottom wall of the body or of the whirl pin into at least one inlet groove, which tangentially enters periphery of the whirl chamber. A further possibility consists in that from the bottom part of the body interior or of the whirl pin, there is running at least one oblique inlet channel, inclined at 45°, directly to peripheral wall of at least one whirl chamber. In this case it is not necessary to make an inlet groove. In both above cases, only one inlet channel would be also functional, but it is more preferred to use at least two such channels. The solution with an oblique inlet channel gives the possibility to omit creation of the whirl chamber as such, because the function of the whirl chamber may be replaced by the space delimited by at least one bottom seal, placed in at least one bottom groove on the bottom face of the body or on the upper face of the inner wall of the housing. The only necessary requirement in this case is that the bottom seal must lap over the groove edge by 0.5 to 0.8 mm. In this case, the bottom face of the body and the upper face of the bottom wall of the housing need not, after reverting to the economical mode, fully abut against each other.

In the embodiment, in which two mutually parallel vertical inlet channels are created, the whirl chamber should be located exactly in the middle between the two inlet channels. The aim of the two inlet channels is to let through a limited amount of accelerated water and direct it into the inlet grooves. The inlet grooves lead the water into the whirl chamber having the shape of a hollow cylinder with missing bottom, there the water starts to rotate and then it is forced out through the central outlet orifice. The bottom of the whirl chamber in the

economical mode, after full tightening, is created by the upper face of the bottom housing wall.

The nature of the saving head according to the first embodiment of the present invention consists in that a housing having the shape of a hollow cylinder with open top is movably connected with the body. Simultaneously, the housing is a part of the dividing wall, the aim of which is to revert the head from the economical to the flow mode, and which comprises the bottom housing wall having exactly in the middle at least one central outlet orifice or, the diameter of which may range from 0.1 mm to 0.4 mm for water taps, for example in Europe and everywhere, where normal water pressure (4 to 6 bar) is used, or from 0.5 to 0.8 mm for the places, where water is kept in water tanks on housetops - for example in Arabic states. Greater diameters from 0.9 to 2.5 mm are suitable when used in showers. The optimum for water taps is from 0.3 mm to 0.4 mm. The housing further exhibits on its periphery (in at least one circular line) located peripheral outlet orifices. There are possible various variants of shapes, dimensions and number of the orifices. At least one central outlet orifice is located under at least one whirl chamber, which may be located on the bottom face of the body or on the upper face of the bottom housing wall. The whirl chamber has further parts of the annular dividing wall created around the openings of the inlet channels. These parts are: at least one bottom groove having the shape of a ring and at least one bottom seal, also in the shape of a ring, placed in it, which must lap over the groove edge by 0.05 to 0.15 mm. This exactly defined oversize allows to perfectly seal the whirl chamber area and, simultaneously, full abutment of the bottom body wall with the upper face of the bottom housing wall after reverting to the economical mode. It is further necessary for the width of the bottom groove to be smaller by 0.2 to 0.3 mm than the width of the bottom seal. Thanks to this the bottom seal does not drop out from the bottom groove of the body. As a thrust element, the upper face of the bottom housing wall is used which, after full tightening, thrusts the bottom seal completely into the bottom groove, thus preventing water penetration to the peripheral outlet orifices, and simultaneously, it maximally closes the whirl chamber, creating a complete hollow cylinder. The annular dividing wall creates the seal between the area of the at least one whirl chamber and the at least one peripheral outlet orifice in the economical – mist mode. These parts of the dividing wall, bottom groove and bottom seal, may be alternatively located also on the upper face of the bottom housing wall. In this case, it is necessary to make the bottom housing wall thicker, or they may be simultaneously on both mentioned faces with different diameters of grooves and seals. This dividing wall may alternatively be formed by at least one groove of annular shape on the bottom body face and at least one exactly fitting circular protrusion of annular shape on the upper face of the bottom housing wall, or they may be interchanged, the protrusion on the bottom face of the body and the

groove on the upper face of the bottom housing wall. The groove and protrusion may have an angular, semicircular or triangular cross-section. A rubber seal may be placed in the groove. However, necessary requirement is that the seal must seal the space between the groove and circular protrusion and, simultaneously, it must allow perfect abutment of the bottom wall of the body against the upper face of the bottom housing wall after reverting to the economical mode.

It is preferred, if the movable connection between the body and housing consists of an inner thread on the housing, which is situated in the upper housing part, and of an outer thread on the body, which is located over the at least one side groove with a seal. Such connection is preferred both from the point of view of simple handling and from the production point of view.

The body may be equipped also with an inlet orifice. Its function is, in the case of a metallic product, to lower the product weight without affecting its functionality. In the case of a plastic product, the orifice should lower the amount of material used. In both cases it lowers the production costs. Furthermore, this inlet orifice may serve also for placing a flow regulator and sifters.

The product, namely the body and housing, may be produced of stainless steel, brass or resistant plastic, or they may be possibly surface-treated to suit aesthetic requirements of the users.

The outer periphery of the housing and body may be equipped with fluting or knurling for better handling at reverting. It is further possible to make cuttings for a fork wrench on the body periphery to facilitate mounting.

It is preferred, if the ratio of diameters of the whirl chamber and the central outlet orifice ranges from 25:1 to 10:1. This ratio ensures that water will be optimally atomized to microfine water mist.

According to the preferred embodiment, the whirl chamber may have a diameter of 3 to 5 mm and depth of, for example, 1.2 mm, the inlet groove may have a width of, for example, 1.5 mm and depth of 1.2 mm. The inlet channel may have a diameter of, for example, 1.5 mm, the central outlet orifice may have a depth of 1 mm and the bottom housing wall may be 2 to 3 mm thick, but also 4.5 to 5.5 mm.

The main advantage of the saving head according to the present invention is considerable saving of water with the same comfort preserved, for example at personal hygiene, dish rinsing or fruits and vegetables washing. The water saving with an aerator depends on the intensity of the water flow adjusted. In our experiments aimed at comparison of water amount necessary to wash hands with a common aerator, adjusted to the flow rate of 1.3 l/min (first person) or 2.2 l/min (second person) (these are low values, typical for parsimonious people), and with the saving, reversible spraying head according to the present invention we have obtained the following results:

	Aerator	Spraying head	Saving
1st person	4.25 dl	0.8 dl	81 %
2nd person	7.25 dl	0.8 dl	89 %

The method of hand washing was as follows: open the tap - wet the hands - soap the hands - wash the soap off hands - close the tap. The measured flow rate for the saving head in the economical mode is 0.25 l/min. Furthermore, this head for a water tap has an advantage compared with the saving spraying head according to SK4630 that it is possible to revert it to the fast-flow mode, in which water flows from the tap with much higher speed. In this mode, the flow rate is over 5 l/min, and it can be controlled by the water tap. Thanks to this, the usage area for the head according to the present invention is considerably wider, because one can choose the saving (spraying) or fast (flow) mode as needed.

Further advantages of the saving and reversible spraying head according to the present invention are: structural simplicity and the consequent undemanding production, low production costs and simple and quick replacement instead of aerators without any additional mounting costs.

An overview of figures in the drawings

The invention will be explained in more detail by means of drawings which show the spraying head for a water tap and its parts according to the present invention.

Fig. 1 is a sectional front view of the whole saving head for a water tap or shower according to the first embodiment in the economical-spraying mode.

Fig. 2 is a sectional front view of the whole saving head for a water tap or shower according to the first embodiment in the fast-flow mode.

Fig. 3 is a sectional front view of the body.

Fig. 4 is a top view of the body.

Fig. 5 is a bottom view of the body.

Fig. 6 is a sectional front view of the housing.

Fig. 7 is a top view of the housing.

Fig. 8 is a bottom view of the housing.

Fig. 9 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment.

Fig. 10 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment.

Fig. 11 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment.

Fig. 12 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment.

Fig. 13 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment.

Fig. 14 is a front view (detail) of the whirl pin with obliquely terminated side inlet channels.

Fig. 15 is a top view (detail) of the whirl pin with obliquely terminated side inlet channels.

Fig. 16 is a front view (detail) of the whirl pin with oblique side inlet channels according to a further embodiment.

Fig. 17 is a top view (detail) of the whirl pin with oblique side inlet channels according to a further embodiment.

Fig. 18 is a sectional front view of the whirl pin with a vertical and at its end bifurcated inlet channel and an oblique inlet groove according to a further embodiment.

Fig. 19 shows the whole saving head for a water tap or shower according to a further embodiment.

Fig. 20 is a front view of the whirl pin with vertical side inlet channels and inlet grooves and the whirl chamber at the bottom face.

Fig. 21 is a top view of the whirl pin with vertical side inlet channels and inlet grooves and the whirl chamber at the bottom face.

Fig. 22 is a bottom view of the whirl pin with vertical side inlet channels and inlet grooves and the whirl chamber at the bottom face.

Figs. 23 to 32 are sectional front views of various possibilities of the solutions for the dividing wall.

Fig. 33 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment (a version with oblique inlet channels and with the whirl chamber moved to the upper face of the bottom housing wall).

Fig. 34 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment (a version with the whirl pin and with the whirl chamber moved to the upper face of the bottom housing wall).

Fig. 35 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment (a version with the whirl pin with vertical inlet channels, with inlet grooves and with the whirl chamber at the bottom face).

Fig. 35a shows the whirl pin with oblique inlet channels and with the whirl chamber at the bottom face. It can replace the whirl pin of Fig. 35.

Fig. 36 is a front view of one of possible embodiments of fluting at the periphery of the saving head body and housing.

Fig. 37 is a sectional front view of the whole saving head for a water tap or shower according to a further embodiment (a version with reversible economical and fast shower).

Fig. 38 is a bottom view of the bottom face of the saving head housing for a water tap or shower in a version with reversible economical and fast shower.

Examples

The saving head for a water tap or shower, reversible between the fast and economical mode, according to Figs. 1 to 8 consists of body 1 and housing 2 having the shape of a hollow cylinder with open top, with inner thread 15 in its upper part for connection to body 1. Exactly in the middle of the bottom wall of housing 2, there is created central outlet orifice 16 with a diameter of 0.3 mm, which is provided with recess 18 at the outer side. The bottom wall of housing 2 is peripherally, in one circular line, equipped with peripheral outlet orifices 17. At the outer periphery of housing 2 or at least at a part of it, there may be formed fluting or knurling 20 to prevent slipping of the housing when reverting from the position of the economical mode to the position of the flow mode. Housing 2 is connected with body 1, which has at its upper part formed the inner thread 6 for connecting to water tap. Under the connecting thread 6, a seal with sifter 3 is located on a supporting surface 7 for trapping small impurities from water and for sealing the connection between body 1 and outlet arm of the water tap (not shown). Under the seal with sifter 3, there is created inlet orifice 8 in body 1. From the bottom of the inlet orifice 8, two vertical and parallel to each other inlet channels 11, opening at the bottom wall of body 1, are running into inlet grooves 12, heading tangentially into the whirl chamber 13, which is located exactly in the middle between the inlet channels 11. One inlet groove 12 connects to one edge of the whirl chamber 13, the second one to the other edge. The whirl chamber 13 has the shape of a flat hollow cylinder with missing bottom, for example with a diameter of 5 mm and depth of 1 mm. Around the openings of inlet channels 11 at the bottom wall of body 1, there is created a bottom groove

10 of circular shape, in which the bottom seal 5 is placed and both together separate the area of whirl chamber 13 from peripheral outlet orifices 17. Side groove 9 is created at the outer periphery of body 1, in which groove the side seal 4 is placed stabilizing the position of body 1 and sealing the connection between the walls of body 1 and housing 2. Over the side groove 9, the outer thread 14 is formed, which connects body 1 with housing 2. Upper fluting or knurling 19 may be formed on the outer periphery of body 1 at the height of connecting thread 6.

The function of the saving head for a water tap or shower according to the present invention in the economical-spraying mode is as follows: supplied water from the tap goes through the seal with sifter 3 into the inlet orifice 8, from where the inlet channels 11 let through only a smaller part of the water and simultaneously they accelerate and direct it into the inlet grooves 12, which lead the water into whirl chamber 13 to its opposite borders, whereby the water in whirl chamber 13 starts to rotate (whirl) and is forced through the central outlet orifice 16 on the bottom wall of housing 2 in the form of fine mist and in the shape of a straight circular cone with the scattering angle of 40 to 45 degrees.

The function of the saving head for a water tap or shower according to the present invention in the fast-flow mode is as follows: supplied water from the tap goes through sifter 3 into the inlet orifice 8, from where the inlet channels 11 let through only a smaller part of the water and simultaneously they accelerate and direct it into the gap between the bottom face of body 1 and bottom of housing 2, and from there it is forced through the central outlet orifice 16 and peripheral outlet orifices 17, located in the bottom of housing 2, in the form of water flows which depend on the shape and arrangement of peripheral outlet orifices 17.

The saving head for a water tap or shower is reverted from the economical-spraying mode to the fast-flow mode so that housing 2 is rotated to the left, whereby the bottom part of housing 2 moves away from the area of whirl chamber 13 and from the bottom seal 5, thus allowing water to flow to the peripheral outlet orifices 17, through which is the water forced out to the outside space. By rotating the housing 2 to the right and tightening the head is reverted again to the economical-spraying mode.

Fig. 9 shows the whole saving head as in Figs. 1 to 8, except that it does not contain the inlet orifice 8, and therefore, it is considerably shorter.

Fig. 10 shows a further embodiment of the head similar to that shown in Fig. 9, but housing 2 is oriented upside down. It is a version with turned-over housing 2, with inner thread 15 on

body 1 and with outer thread 14 on housing 2, with the side groove 9 with side seal 4 located on the outer periphery of housing 2.

Fig. 11 shows a further embodiment of the head according to the present invention, which comprises oblique inlet channels 11, opening tangentially directly into the whirl chamber 13.

The embodiment shown in Fig. 12 comprises whirl chamber 13 as a limited space inside bottom seal 5, placed in bottom groove 10. In this case the lap of the bottom seal 5 over the edge of the bottom groove 10 should be greater than that for the embodiment of Figs. 1 to 8, and it is 0.5 to 0.8 mm.

Fig. 13 shows a version of the saving head with whirl pin 21, inserted from top into body 1. Inserted whirl pin 21 may contain inlet channels 11 with oblique termination, as shown in Fig. 14, or oblique inlet channels 11 (Fig. 16) or a vertical inlet channel 11a, split at the end and having oblique inlet grooves 12 (Fig. 18).

Fig. 19 shows the whole saving head according to a further embodiment, containing whirl pin 21 with vertical inlet channels 11, with inlet grooves 12 and whirl chamber 13 at the bottom face, which are visible in Figs. 20 to 22.

Fig. 23 shows a dividing wall formed by the bottom groove 10, created in body 1, with inserted bottom seal 5.

Fig. 24 shows the bottom groove 10 with inserted bottom seal 5, formed in housing 2.

Fig. 25 shows an annular dividing wall, formed by bottom grooves 10 with inserted bottom seals 5, which are also located on both body 1 and housing 2, wherein the bottom seal 5, inserted in body 1, has a different diameter from that of the bottom seal 5, inserted in bottom groove 10, located on housing 2.

The dividing wall shown in Fig. 26 is formed by bottom grooves 10 with the same diameter, created both in body 1 and in housing 2 with one inserted bottom seal 5.

The dividing wall shown in Fig. 27 has been created as a labyrinth wall, formed by the bottom groove 10 in body 1 and the corresponding circular projection 22 on housing 2, while the inverted solution is shown in Fig. 28.

Fig. 29 shows a labyrinth dividing wall with several bottom grooves 10 and the corresponding circular projections 22 on housing 2 and body 1.

Labyrinth walls shown in Figs. 30 to 32 correspond with those shown in Figs. 27 to 29 with the exception that bottom seal 5 is inserted between the bottom groove 10 and circular projection 22, or the depth of bottom grooves 10 is adapted to that.

The saving head shown in Fig. 33 corresponds with that of Fig. 11 with the difference that the whirl chamber 13 is formed on the bottom wall of housing 2.

The saving head shown in Fig. 34 corresponds to that of Fig. 13 with the difference that the whirl chamber 13 is formed on the bottom wall of housing 2.

The function of the saving head shown in Fig. 35 corresponds to that of saving heads shown in Figs. 1 to 8 with the difference that inlet channels 11, inlet grooves 12 and whirl chamber 13 are created on the whirl pin 21, inserted from below.

Fig. 35a shows whirl pin 21 with at least one oblique inlet channel 11 and whirl chamber 13 to be inserted into body 1 from below instead of the whirl pin 21 shown in Fig. 35. Then the function of the saving head would correspond to that of the saving head shown in Fig. 11.

Fig. 36 shows upper fluting 19 of body 1 and bottom fluting 20 of the housing along the head periphery.

Figs. 37 and 38 show a further embodiment, differing from the previous ones in that it does not contain any whirl means, only a whirl chamber 13, created in the same way as in the embodiment shown in Fig. 12. Housing 2 contains in this case five central outlet orifices 16 and eight peripheral outlet orifices 17.

Industrial applicability

Device according to the present invention is intended to be used in households, administration buildings, at sports centres, in hotels, lodging-houses, in public and sanitary conveniences, in canteens and restaurants; everywhere, where normal water pressure (4 to 6 bar) is used, and where is the need to save water. The saving head for a water tap or shower may become a part of less expensive personal hygiene and washing. It might bring up a small revolution in public health engineering by its economical and ecological impact.

List of reference signs

1	body
2	housing
3	seal with sifter
4	side seal
5	bottom seal
6	connecting thread
7	supporting surface
8	inlet orifice
9	side groove
10	bottom groove
11	inlet channel
12	inlet groove
13	whirl chamber
14	outer thread
15	inner thread
16	central outlet orifice
17	peripheral outlet orifice
18	recess
19	upper fluting
20	bottom fluting
21	whirl pin
22	circular projection

C L A I M S

1. Saving head for a water tap or shower, reversible between fast and economical mode, comprising a cylindrical body (1), which is in its upper part equipped with connecting thread (6) for connecting it to the water tap or shower, under which thread there is placed a seal with sifter (3) and at least one inlet channel (11), possibly equipped with a whirl means, wherein the inlet channel (11) is formed in body (1) or in an inserted whirl pin (21) for bringing water into a whirl chamber (13), c h a r a c t e r i z e d i n t h a t a body (1) is equipped with a connecting means, to which a hollow cylindrical housing (2) is movably attached with a bottom wall and a corresponding connecting means for reverting between the fast and economical mode, wherein the bottom wall of the hollow cylindrical housing (2) is equipped with at least one central outlet orifice (16) located under the whirl chamber (13), which central outlet orifice(s) (16) for water outlet in economical mode has(ve) a diameter of 0.1 to 3.0 mm, and at least one peripheral outlet orifice (17) for water outlet in fast mode, and between the bottom face of body (1) and inner face of bottom wall of housing (2), there is arranged an annular dividing wall (10, 5 or 22) for separating and sealing the area of whirl chamber (13) and the at least one central outlet orifice (16) from the area of the at least one peripheral outlet orifice (17) when reverted to economical mode.

2. Saving head for a water tap or shower, reversible between fast and economical mode, according to claim 1, c h a r a c t e r i z e d i n t h a t a whirl means is an inlet groove (12) running tangentially to whirl chamber (13), created on the bottom face of body (1) or on the bottom face of whirl pin (21).

3. Saving head for a water tap or shower, reversible between fast and economical mode, according to claim 1, c h a r a c t e r i z e d i n t h a t a whirl means is at least one oblique inlet channel (11) opening tangentially directly into whirl chamber (13).

4. Saving head for a water tap or shower, reversible between fast and economical mode, according to claim 1, c h a r a c t e r i z e d i n t h a t a whirl means is at least one obliquely terminated or oblique inlet channel (11) or at least one oblique inlet groove located on a side of whirl pin (21) arranged in body (1).

5. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, c h a r a c t e r i z e d i n t h a t an annular dividing wall is formed by at least one bottom groove (10) with at least one bottom seal (5) inserted

into it, wherein the bottom groove (10) is formed in body (1) and/or in the opposite inner face of the bottom wall of housing (2), and bottom seal (5) laps over the edge of bottom groove (10) by 0.05 to 0.15 mm.

6. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 3, characterized in that an annular dividing wall is formed by at least one bottom groove (10) with at least one bottom seal (5) inserted into it, wherein the bottom groove (10) is formed in body (1) and/or in the opposite inner face of the bottom wall of housing (2), and bottom seal (5) laps over the edge of bottom groove (10) by 0.5 to 0.8 mm.

7. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, characterized in that an annular dividing wall is formed as a labyrinth dividing wall, consisting of at least one circular protrusion (22) and at least one cooperating bottom groove (10), which are formed on mutually opposite faces, i. e. on the bottom face of body (1) and on the inner face of the bottom wall of housing (2) or vice versa.

8. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, characterized in that each central outlet orifice (16) is provided with a recess (18).

9. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, characterized in that a connecting means is formed by the outer thread (14) of body (1) and inner thread (15) of housing (2) or vice versa.

10. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, characterized in that a connecting means is created in the form of a 2-position bayonet joint.

11. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, characterized in that a body (1) is provided with an inlet orifice (8) located under the seal with sifter (3).

12. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1 or 9, characterized in that a peripheral side

seal (4) is arranged under the outer thread (14) of body (1) and inner thread (15) of housing (2) to prevent uncontrolled leakage of water.

13. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, c h a r a c t e r i z e d i n t h a t a peripheral side seal (4) is inserted in a peripheral side groove (9) of body (1) or in an inner or outer peripheral side groove (9) of housing (2).

14. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, c h a r a c t e r i z e d i n t h a t a central outlet orifice (16) has a diameter of 0.1 to 0.5 mm for use with water taps.

15. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, c h a r a c t e r i z e d i n t h a t a central outlet orifice (16) has a diameter of 0.5 to 3.0 mm for use with a shower.

16. Saving head for a water tap or shower, reversible from fast to economical mode and vice versa, according to claim 1, c h a r a c t e r i z e d i n t h a t a whirl chamber (13) is alternatively located on the upper face of the bottom wall of housing (2).

FIG.1

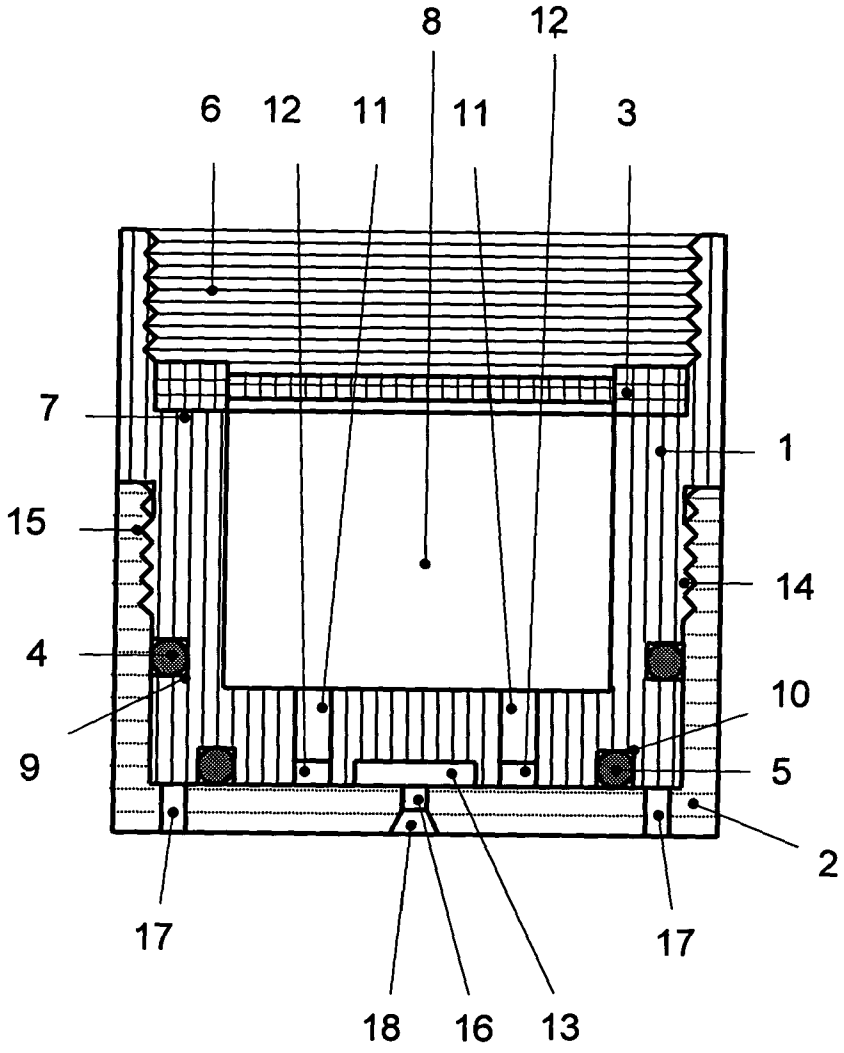


FIG. 2

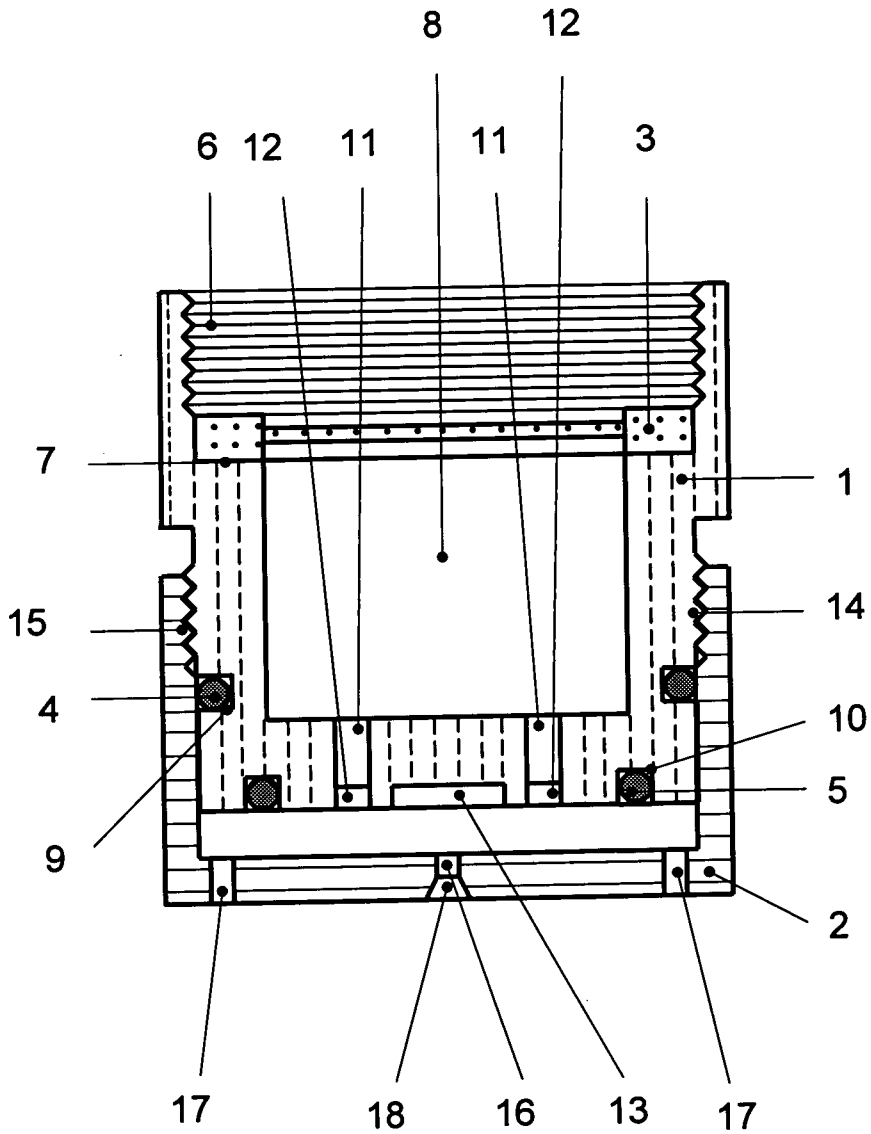


FIG.3

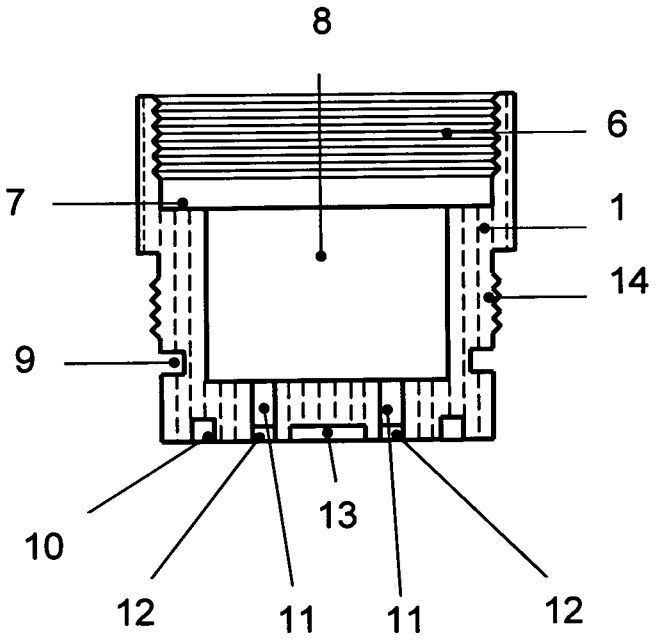


FIG.4

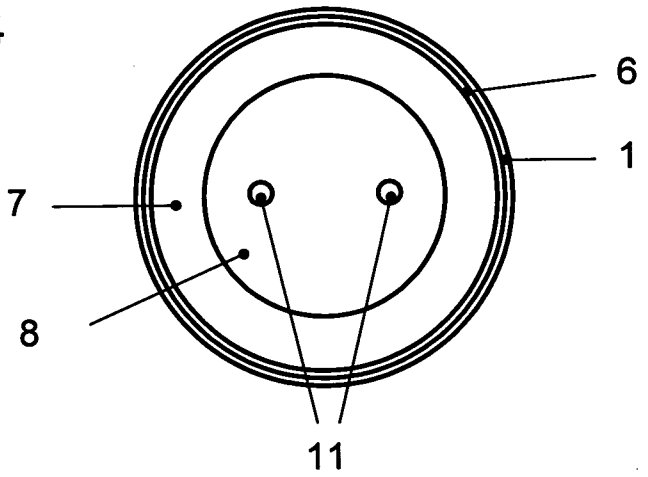


FIG.5

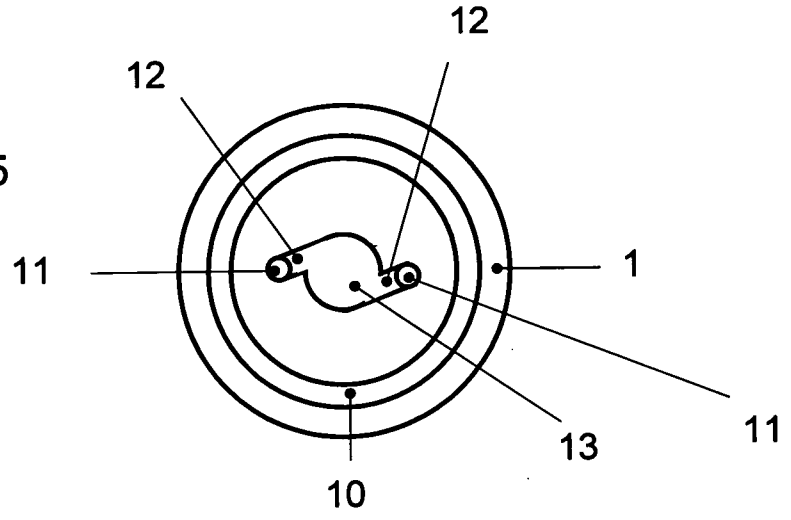


FIG.6

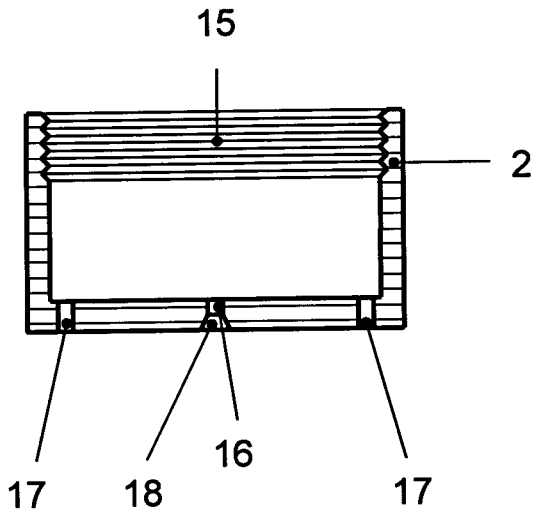


FIG.7

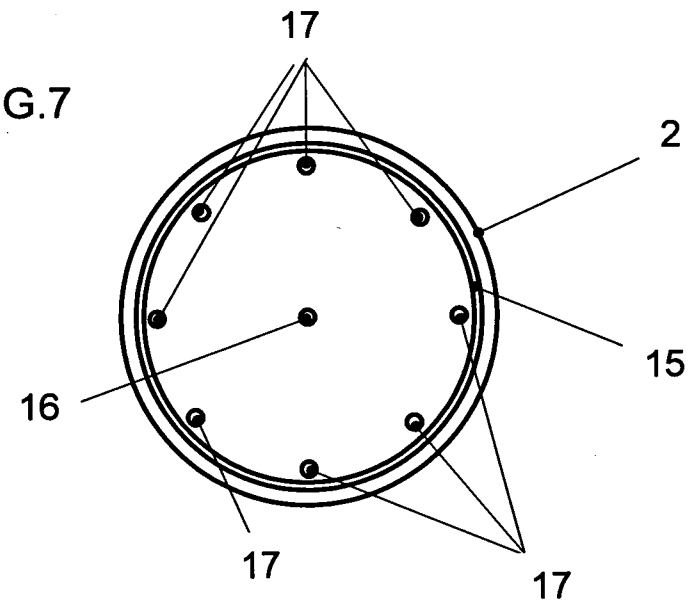


FIG.8

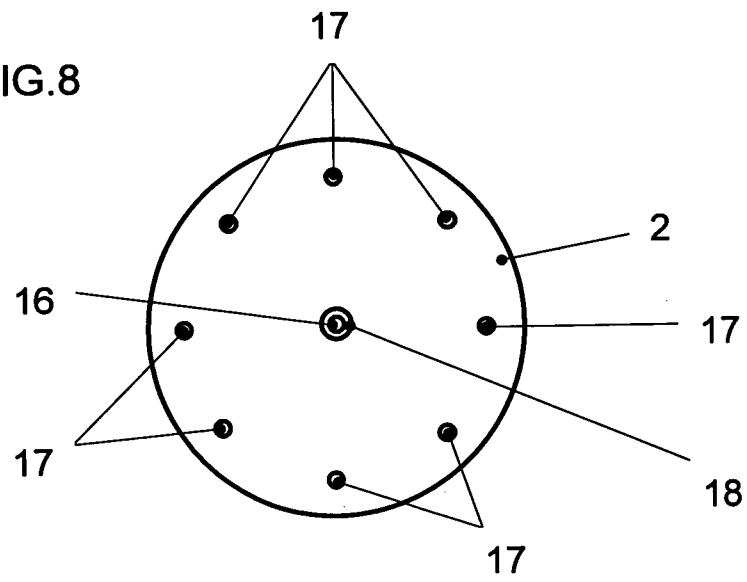


FIG.9

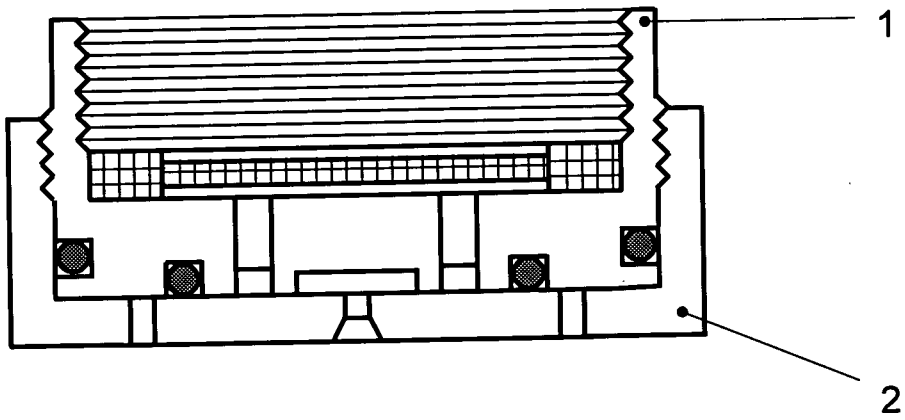


FIG.10

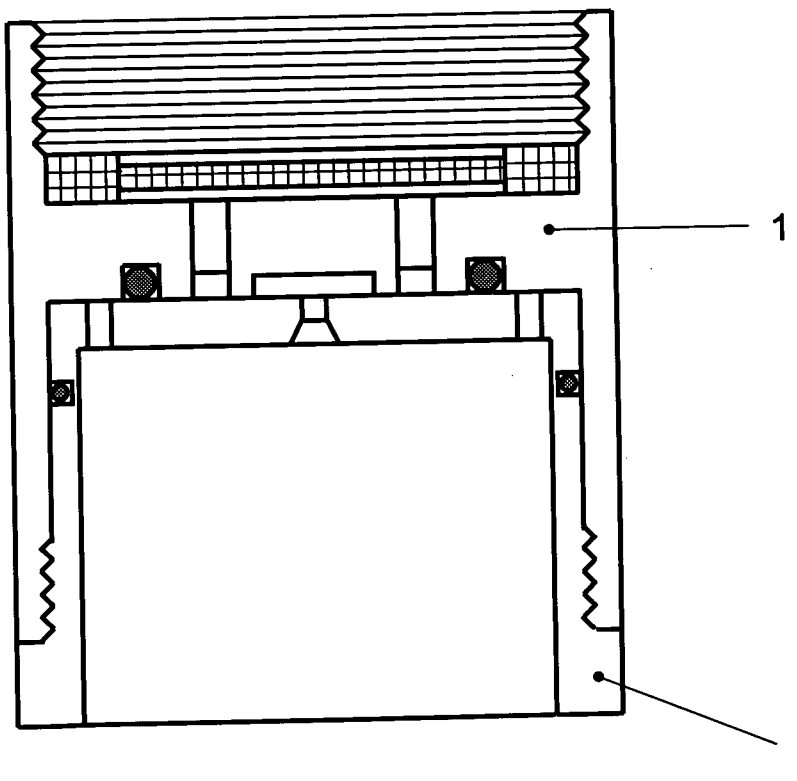


FIG.11

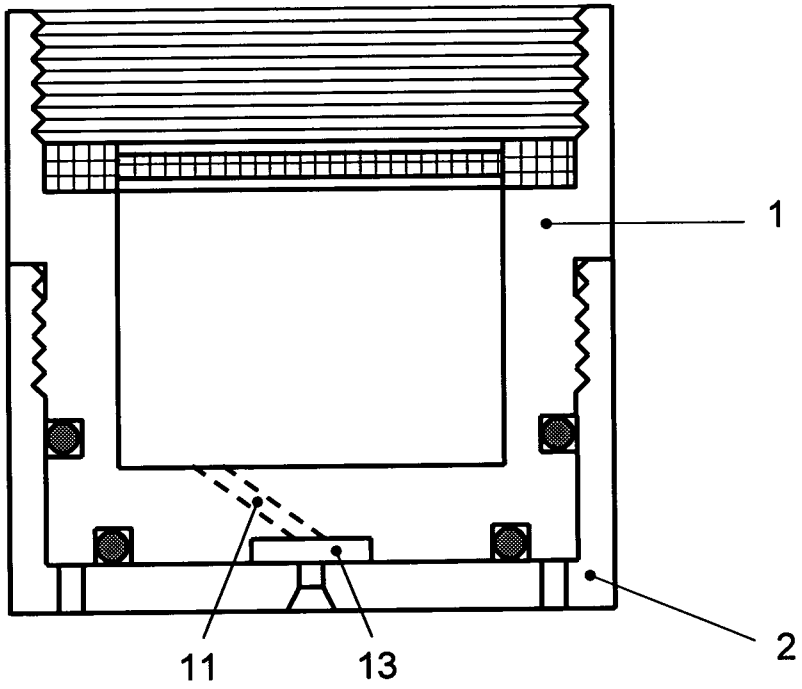


FIG.12

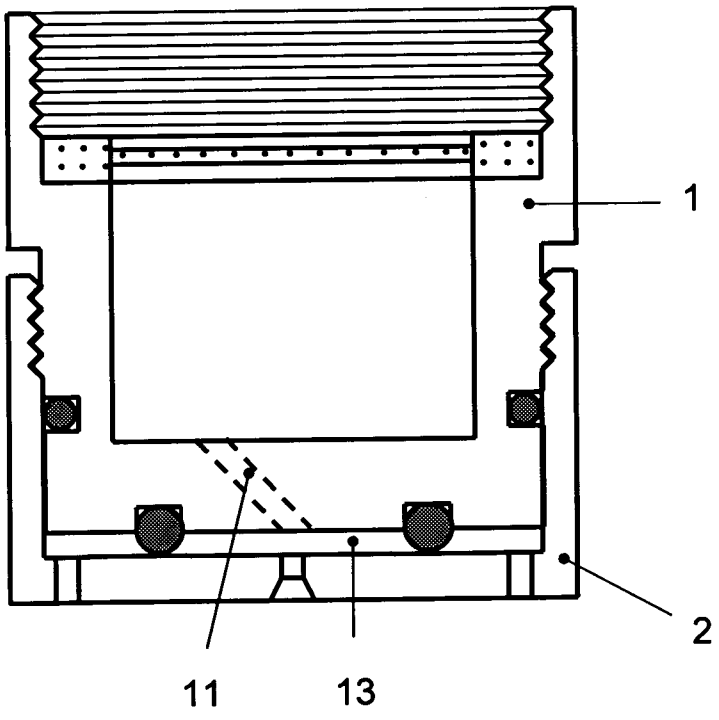


FIG.13

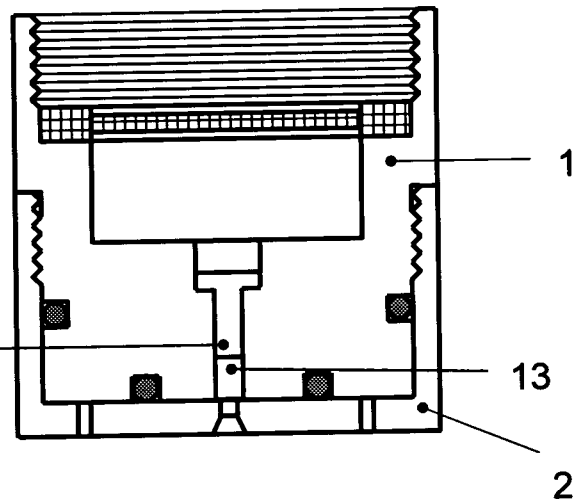


FIG.14

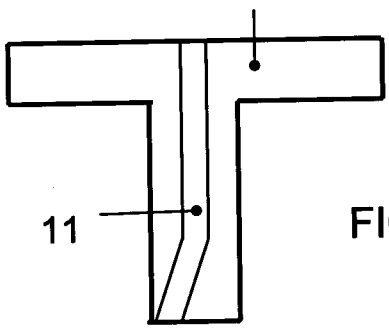


FIG.16

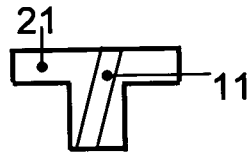


FIG.15

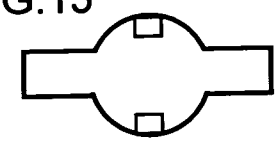


FIG.17

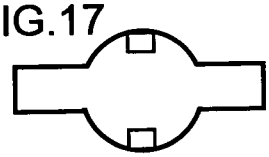


FIG.18

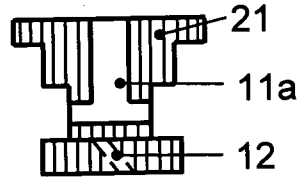


FIG.19

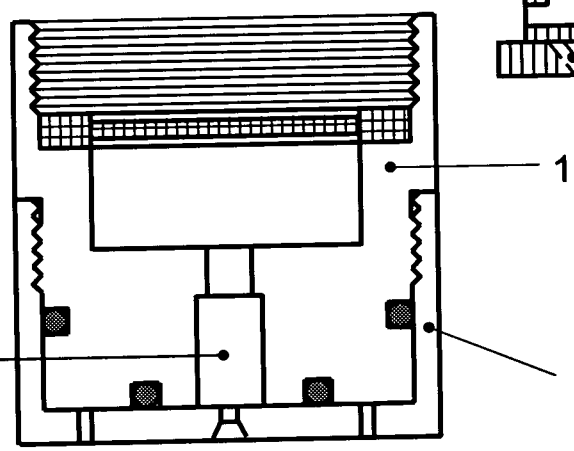


FIG.20

FIG.21

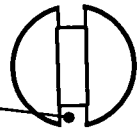


FIG.22

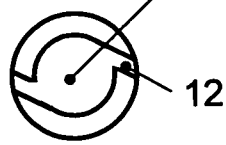


FIG.23

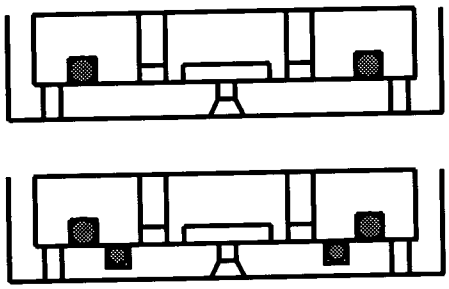


FIG.24

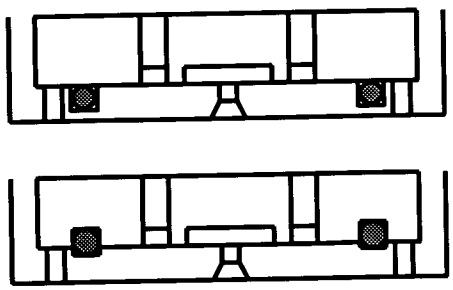


FIG.25

FIG.26

FIG.27

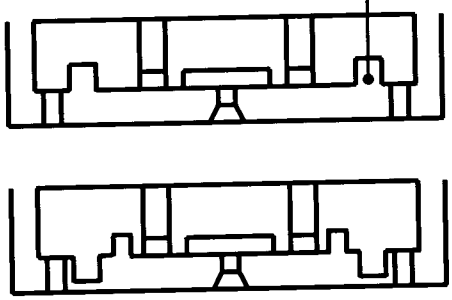


FIG.28

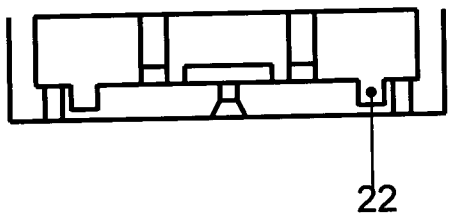


FIG.29

FIG.30

FIG.31

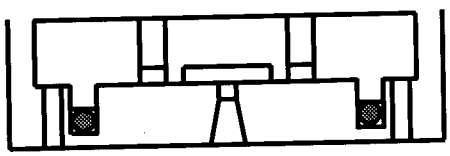


FIG.32

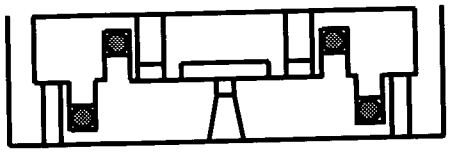


FIG.33

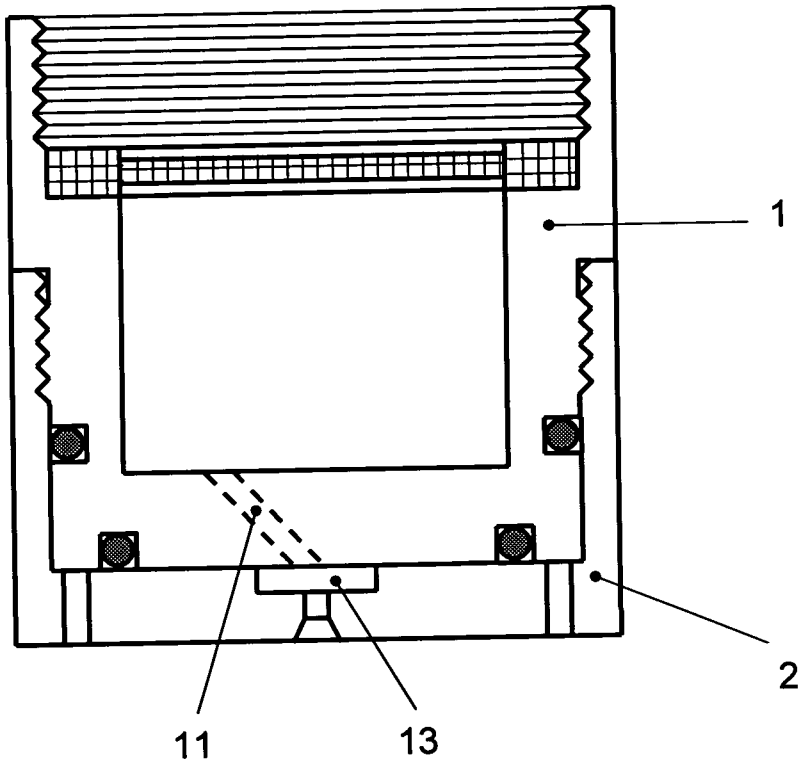


FIG.34

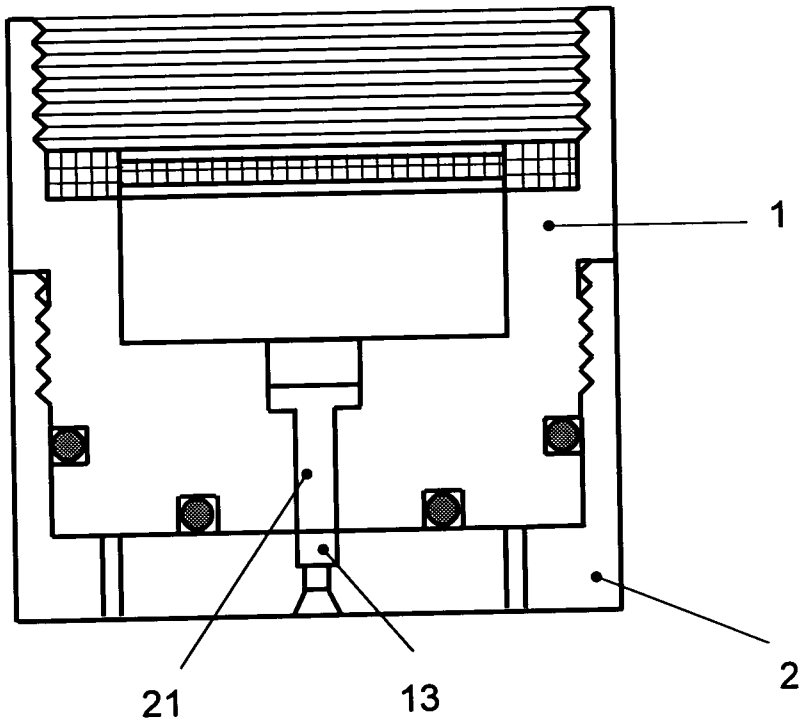


FIG.35

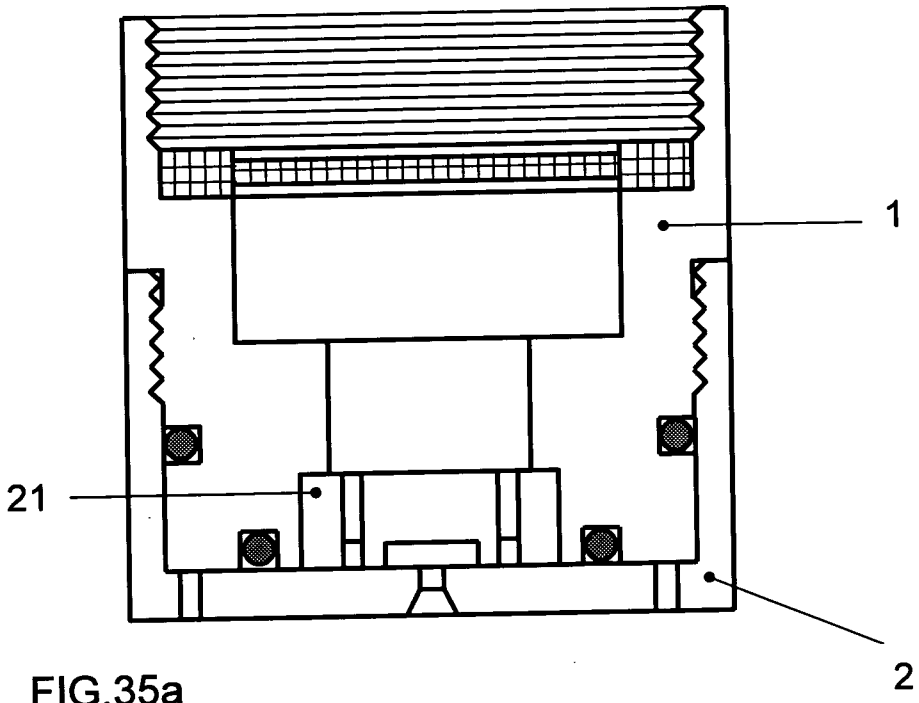


FIG.35a

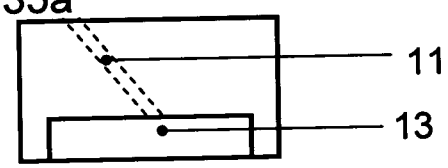


FIG.36

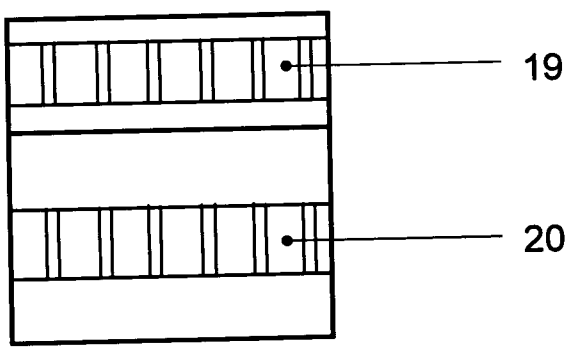


FIG.37

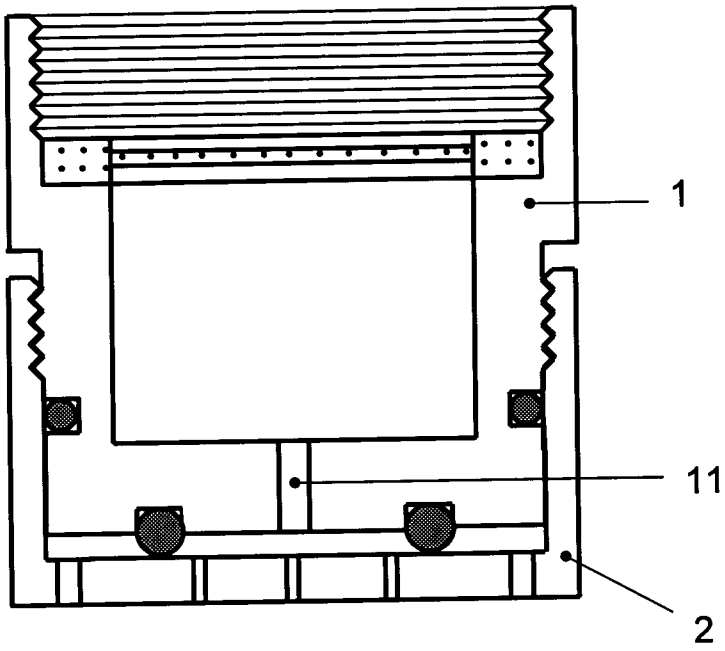
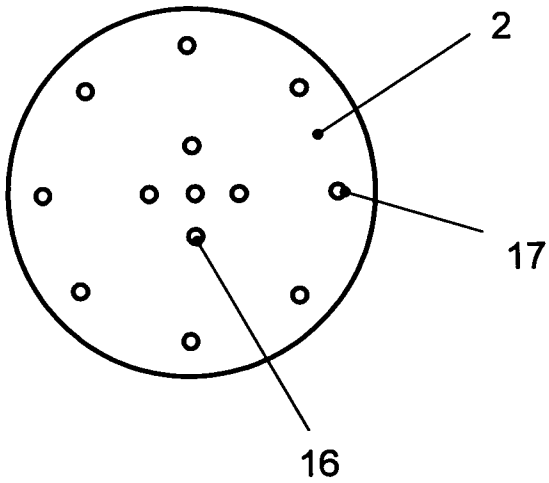


FIG.38



INTERNATIONAL SEARCH REPORT

International application No
PCT/SK2007/050023

A. CLASSIFICATION OF SUBJECT MATTER
INV. B05B1/34 B05B1/16
ADD. B05B1/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B05B E03C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	GB 1 327 156 A (CHAMPION R) 15 August 1973 (1973-08-15) figures 1,2	1,9, 11-16 2-4
X	DE 23 24 077 A1 (GROHE ARMATUREN FRIEDRICH) 28 November 1974 (1974-11-28) figures 6,7 page 3, paragraph 3	1,5
X	US 3 876 151 A (KATVA ILMARI) 8 April 1975 (1975-04-08) figures 3,4,8	1,8
X	EP 0 021 860 A (CHAMPION R ETS [FR]) 7 January 1981 (1981-01-07) figures 1-3	1,9, 12-16

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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Date of the actual completion of the international search	Date of mailing of the international search report
31 March 2008	11/04/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Roldán Abalos, Jaime

INTERNATIONAL SEARCH REPORT

International application No
PCT/SK2007/050023

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 25 11 429 A1 (HERMANUS HEINRICH) 23 September 1976 (1976-09-23) figures 1,2	1
X	US 3 383 050 A (BUCKLEY CRIST ET AL) 14 May 1968 (1968-05-14) figures 1,2,5	1
A	DE 39 03 800 A1 (WILDFANG DIETER KG [DE] WILDFANG DIETER GMBH [DE]) 16 August 1990 (1990-08-16) figure 1	1
A	EP 0 743 056 A (DUHM S D SOCIETE A RESPONSABIL [FR]) 20 November 1996 (1996-11-20) column 7, line 44 - column 8, line 19; figures 6,7	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/SK2007/050023

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