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(54) **BURNER TAP**

(57) The invention concerns a gas burner tap (10), wherein the tap (10) comprises a body (15) of the tap (10) inside which there is a gas inlet (20) into the tap (10), and wherein the aforesaid tap (10) comprises a pierced disc (78) which has at least one first hole (78') which forms a first gas outlet for the tap (10), wherein the aforesaid first hole (78') is in fluidic communication with the gas inlet (20) through a first inner annular chamber (90), characterized in that the aforesaid pierced disc (78) has at least one second hole (78") which forms a second gas outlet for the tap (10), wherein the aforesaid second hole (78") is in fluidic communication with a second outer annular chamber (92) fluidically connectable to the first inner annular chamber (90) or to the gas inlet (20), through a passage channel (60) that can be shut off by using a selector pin (70) depending on the type of gas with which the tap (10) operates.

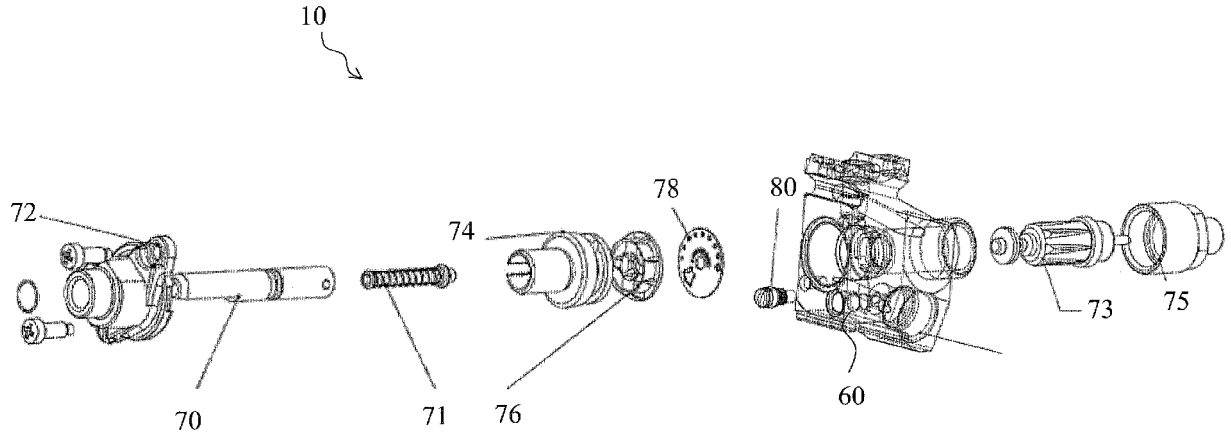

FIG.4

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a burner tap.

[0002] More specifically, the present invention relates to a tap able to adjust the inflow of various gas typologies to a respective gas burner, such as for example a "dual fuel" type tap, i.e. designed for alternately operating with natural gas (NG), for example essentially methane, or with liquefied petroleum gases (LPGs) usually containing propane and/or butane.

[0003] Although reference is made herein and hereunder to the use of the tap described herein with natural gas (NG) and with liquefied petroleum gases (LPGs), as the expert of the field can well understand, such tap can in principle operate with any other pair of fuel gases having different physical-chemical characteristics and/or which are distributed in the network at different pressures.

KNOWN PRIOR ART

[0004] Taps, for example for gas cookers, designed to be able to operate alternatively with different types of gas, are known. Different types of use involve having to adapt the gas passage section inside the tap to the type of gas, due for example to the different physical conditions of distribution (such as the pressure) and to the calorific value required for each type of gas.

[0005] Among these, taps specifically designed to be able to operate alternatively with natural gas (NG) or liquefied petroleum gases (LPGs) are also known.

[0006] In particular, the Italian patent N° 102017000057665 illustrates a gas valve assembly that can operate alternatively with natural gas, for example methane, or with LPG.

[0007] This known valve assembly comprises a body provided with an inlet fluidically connectable to a gas source, and at least one outlet, a main chamber defined at least in part inside said body and put in fluidic communication with said gas inlet and provided with a main outlet hole put in fluidic communication with said outlet.

[0008] The valve assembly further comprises one disc-shaped element housed inside the main chamber and provided with at least one through opening, which through opening defines at least two areas having a mutually different passage section to put said main chamber in communication with the main outlet hole.

[0009] The disc is rotatably movable inside said chamber by acting on a driving rod.

[0010] The disc can thus move between at least one closed position, in which said main outlet hole is fully covered by a full portion of the disc, and at least two distinct open positions, in each of which a corresponding and distinct passage area, defined by the through opening of the disc, is facing, such as to allow the passage of the gas from the main chamber to the main outlet hole through the passage area.

[0011] The main chamber further has an auxiliary outlet hole, which cannot be closed by the disc-shaped element and which communicates with the gas outlet through a further bypass chamber, thus constituting a bypass circuit of the disc-shaped element.

[0012] This bypass circuit can be closed or open, also in a controlled way, by varying the axial position of an adjusting screw housed inside the bypass chamber.

[0013] The adjusting screw operates as a gas exchange screw.

[0014] More in detail, whenever LPG is used, the adjusting screw is fully tightened inside the bypass chamber such as to fully cut off the flow of gas crossing the bypass circuit and reaching the outlet, which outlet is thus only reached by the main gas flow that crosses the main outlet hole and is controlled by the disc-shaped element.

[0015] Whenever methane gas is used, the adjusting screw is appropriately unscrewed such as, in addition to the main gas flow that crosses the main outlet hole and is controlled by the disc-shaped element, a flow of bypass gas that crosses the bypass circuit and is not controlled by the disc-shaped element also reaches the outlet.

[0016] Such tap of the known prior art suffers from the inconvenient of being complex to make and is thus not always reliable, being unable to finely adjust the gas coming out, in addition to seeming uneconomical.

[0017] Object of the present invention is to implement a burner tap that can be used with a plurality of gases having different typologies, and thus with different fluid dynamic and thermodynamic conditions, and in particular that can be used for both gases requiring large flow sections and gases requiring smaller or reduced flow sections, and which is simple and cheap to be implemented.

[0018] Illustrative but not limitative examples of the invention potential, of such different gas typologies for which the tap is designed, are natural gas (NG) and liquefied petroleum gases (LPGs).

BRIEF SUMMARY OF THE INVENTION

[0019] These and other objects are achieved by a gas burner tap of the type usable with different types of gas, wherein the tap comprises a body of the tap inside which there is a gas inlet into the tap and wherein the aforesaid tap comprises a pierced disc which has at least one first hole which forms a first gas outlet for the tap, wherein the aforesaid first hole is in fluidic communication with the gas inlet through a first chamber, characterized in that the aforesaid pierced disc has at least one second hole which forms a second gas outlet for the tap, wherein the aforesaid second hole is in fluidic communication with a second chamber, the second chamber being fluidically connectable to the first chamber or to the gas inlet through a passage channel, wherein the aforesaid passage channel can be shut off, at least in part, by using a selector pin depending on the type of gas with which the tap operates.

[0020] As will be understood, the first chamber and the second chamber are intended to be fluidically separated from each other, except whenever they are connected to each other by the passage channel and the selector pin allows the opening of such passage channel.

[0021] The selector pin, as will become clear, is in fact able to cut off, allow or choke the flow of gas through the passage channel such as to allow or prevent the inflow, even partial, of gas into the second chamber, whether such gas comes from the first chamber or whether it comes directly from the gas inlet inside the tap.

[0022] An advantage of such implementation is that it allows to adapt the burner tap to operate with natural gas (NG) or with liquefied petroleum gas (LPG) or, in general, to operate with two fuel gases having different characteristics or chemical-physical conditions (for example delivery pressure), by acting on an adjustable choking element, thus avoiding the use of bypass circuits complex and costly to be manufactured and which are also difficult to adjust.

[0023] Given the substantially cylindrical development of the tap, the one skilled in the art understands that a chamber is arranged on the inside and is preferably cylindrical, substantially circular or annular, while the other chamber is arranged on the outside and is preferably annular, concentric to the inner chamber.

[0024] According to a preferred aspect of the present invention, the fixed disc is provided with a first series of first holes arranged along a first circle arc, as well as with a second series of second holes arranged along a second circle arc placed outside with respect to the first circle arc of the first series of holes.

[0025] An advantage of this solution is just given by the presence of the dual hole series that are tailored on the gas typology and on the burner power such to make the burner operation progressive also when switching from a gas to another.

[0026] The proper passage section is easily provided in the tap according to the type of gas selected and an optimal adjustment of the flow coming out is made available for each type of gas by allowing a type of gas, for example LPG, to reach the first plurality of first holes only and a different type of gas, for example natural gas, to reach both the plurality of first and second holes.

[0027] According to a further embodiment of the invention, the holes of each series of holes are progressively increasing, decreasing or constant in size.

[0028] An advantage of this solution is that it allows to gradually graduate the inflow of gas. In this regard, the section of one or more of the first and/or second holes can be circular, elliptical or of any other appropriate shape.

[0029] Further characteristics of the invention can be deduced from the dependent claims.

BRIEF DESCRIPTION OF THE FIGURES

[0030] Further characteristics and advantages of the invention will become clear from reading the following description provided by way of non-limiting example, with the aid of the figures depicted in the accompanying drawings, wherein:

- figure 1 is a plan view of the tap according to an embodiment of the present invention;
- figure 2 is a sectional view according to the plane A-A of figure 1 of the tap of the invention;
- figure 3 is a sectional view according to the plane B-B of figure 1 of the tap of the invention;
- figure 4 is an exploded view of the tap of the invention;
- figure 5 is a sectional view of the central body of the tap of the invention;
- figure 6 is a plan and sectional view of a gasket of the tap of the invention; and
- figure 7 is a sectional plan view of a fixed disc of the tap of the invention.

DETAILED DESCRIPTION OF SOME EMBODIMENTS OF THE PRESENT INVENTION

[0031] With reference firstly to figure 1-3, an axonometric view of a burner tap is pointed out, in particular for gas cookers, cook tops or gas appliances in general, according to an embodiment of the invention and globally denoted by numeral reference 10.

[0032] The tap 10 comprises a body 15 of the tap 10 where there is a gas inlet 20 into the tap 10, i.e. a gas inlet channel connectable to an outer gas source.

[0033] The tap 10 further comprises an outflow opening 30 fluidically connected, for example to a burner of a cooktop.

[0034] According to known art, the tap 10, as will be seen, can comprise a safety device of the cut-off and electromagnet type powered by a thermocouple.

[0035] At an end of the body 15 of the tap 10 there is a cap 72 which closes the body 15 and houses a driving rod 70 which can be rotated manually, while at the opposite end of the body 15 of the tap 10, with respect to the cap 72, there is a pierced disc 78 through which the gas can come out to supply, for example, a burner.

[0036] The pierced disc 78 in fact comprises a first series of first holes 78' arranged according to a circle arc, wherein the aforesaid first series of first holes 78' configures a first gas outlet for the tap 10.

[0037] Such first outlet is fluidically connected to the aforesaid outflow opening 30.

[0038] Moreover, the pierced disc 78 comprises a second series of second holes 78" arranged according to a circle arc connected on the outside with respect to the first series of first holes 78', wherein the aforesaid second series of second holes 78" configures a second gas outlet for the tap 10 (figure 7).

[0039] Such second gas outlet is also fluidically connected to the aforesaid outflow opening 30.

[0040] Although the first gas outlet was described as configured by a first series of holes 78', the first gas outlet, in a variant of the invention, could comprise only one hole. Similarly, although the second gas outlet was described as configured by means of a second series of holes 78", the second gas outlet, in a variant of the invention, could comprise only one hole.

[0041] Moreover, it is specified that, in an embodiment of the invention, the holes of the first series of first holes 78' and/or the holes of the second series of second holes 78' are circular-shaped.

[0042] In an alternative embodiment of the invention, the holes of the first series of holes 78' and/or the holes of the second series of holes 78' are slot-shaped, i.e. of elongated shape with curvilinear or elliptical connections.

[0043] In further embodiments, the holes of the first or second series of holes 78', 78" can be of various shapes, slot-shaped, elliptical and circular or even the like.

[0044] Moreover, the holes of each series of holes 78', 78" are progressively increasing, or decreasing or constant in size.

[0045] Whenever only a first and/or second hole is present, it can have a progressively increasing or decreasing or constant section.

[0046] Inside the body 15 of the tap 10, as shown for example in figure 4, the aforesaid driving rod 70, which can be rotated about a longitudinal axis thereof with respect to the cap 72 to rotate a plug 74, is prolonged.

[0047] In turn, the rotation of the plug 74 is transmitted to a gasket 76 (figure 6), whose angular position relative to the pierced disc 78 held fixed, determines the opening or selective occlusion of one or more of the holes between the holes of the first series of holes 78' and the opening of one or more of the holes between the holes of the second series of second holes 78".

[0048] In an alternative embodiment, not shown herein, it is possible to provide that the pierced disc 78 can be rotated with respect to the gasket 76, fixed in this case, such as to selectively allow the flow of gas through the first and possibly second holes 78', 78" of the same pierced disc 78.

[0049] In practice, the gasket 76 allows to selectively block or free the first holes 78' and the second holes 78" depending on the relative angular position reached by the gasket 76 with respect to the pierced disc 78, since such gasket 76, through the driving rod 70, can be rotatably driven with respect to the pierced disc 78, held fixed, or vice-versa, such pierced disc 78 can be rotatably driven with respect to said gasket 76, fixed in this case.

[0050] The tap 10 depicted herein further comprises, according to known ways, a cut-off safety device comprising an electromagnet 73 and a fastening nut 75 for fastening the electromagnet 73. The functional connection of the electromagnet 73 to a thermocouple placed at the burner supplied by the tap 10, according to known art, allows the electromagnet 73 to be electrically powered only when the thermocouple detects a flame. In this case, as known, only when the electromagnet 73 is powered, i.e. in the presence of a flame, it holds a safety cut-off of the tap 10 open, whereas when the electromagnet 73 is not powered by the thermocouple, in the absence of flame, the safety cut-off returns to the closed position of the tap.

[0051] As depicted in the section of figure 5, a first annular chamber 90, which is fluidically connected to the gas inlet 20 through a passage channel, is provided inside the body 15 of the tap 10.

[0052] Moreover, a second annular chamber 92 is provided on the outside with respect to the annular chamber 90 and is connected to the latter by means of a further passage channel 60.

[0053] In the embodiment shown herein, such inner and outer chambers 90, 92 are fluidically connected only through the passage channel 60, being otherwise fluidically separated. It should be noted that, although in the embodiment of the tap 10 depicted herein, the gas inlet 20 is fluidically connected to the inner annular chamber 90, such inlet 20 can be alternatively connected to the outer annular chamber 92.

[0054] Both the inner 90 and outer 92 annular chambers are put in communication with the pierced disc 78 and with the outside of the tap 10 through the outflow opening 30, depending on the angular position of the gasket 76 with respect to the pierced disc 78, and in particular with respect to the first and second holes 78', 78" of such pierced disc 78.

[0055] More in detail, the first inner annular chamber 90, depending on the relative angular position taken by the gasket 76 with respect to the pierced disc 78, can be put in fluid communication with one or more of the first holes 78', while the second outer annular chamber 92, always depending on the relative angular position in which the gasket 76 is arranged with respect to the pierced disc 78, can be put in fluid communication with one or more of the second holes 78".

[0056] Although if described herein as annular or circular, the chambers 90 and 92 can be of any shape adapted for allowing their fluidic connection respectively with the first and second holes 78', 78".

[0057] The passage channel 60 can be shut off by means of a selector pin 70 depending on the type of gas with which the tap 10 operates.

[0058] Such selector pin 70, for example made with a threaded coupling and a gasket, being able to be inserted or removed into/from the passage channel, allows to close or open, and in some case choke, a transit section of the passage channel 60, thus preventing or allowing, possibly partially, the passage of the gas inside the chamber 92. Alternatively, the inner and outer chambers 90, 92 are fluidically separated from each other and the gas inlet 20 can be connected to such inner and outer chambers 90, 92 with two distinct channels, of which one, a passage channel, can be shut off by a selector pin.

[0059] Also in this case, the selector pin prevents or allows, possibly partially, the passage of the gas towards the chamber to which such passage channel is connect-

ed.

[0060] The operation of the tap 10 of the embodiment of the invention shown herein is the following.

[0061] First, it should be noted that, during the step of installing the tap 10, it is possible to decide in which way the tap 10 must operate, depending on the type of gas to be used in the burner, and to act accordingly on the selector pin 70.

[0062] In particular, whenever the tap 10 operates with liquefied petroleum gas (LPG), the selector pin 70 can be arranged such as to shut off the passage channel 60 and the liquefied petroleum gas (LPG), after having transited inside the first inner chamber 90, only comes out of the aforesaid first outlet, i.e. one or more of the holes 78', and reaches the outflow opening 30.

[0063] Whenever the tap 10 operates with natural gas (NG), the selector pin 70 can be arranged such as to not shut off the passage channel 60 and the natural gas (NG), after having traveled in the inner chamber 90 and after having passed through the passage channel 60 also in the second outer chamber 92, comes out of both the first outlet, i.e. one or more of the first holes 78', and the second outlet, i.e. one or more of the second holes 78", to reach the outflow opening 30.

[0064] In the event of other types of gas or fuel gas mixtures supplied with different pressures, it is possible that the pin 70 only partially shuts off the passage channel 60.

[0065] Whenever the passage channel directly connects the gas inlet opening 20 with the second chamber 92, the selector pin can be arranged such as to shut off or not such passage channel and, also in this case, such as to allow or not the inflow of gas into the aforesaid second chamber 92.

[0066] Once the tap 10 has been installed, by rotatingly acting on the driving rod 70 which rotates the plug 74, the user consequently modifies the angular position of the gasket 76, which determines which holes of the first and/or second series of holes 78', 78" are affected by the passage of the gas, depending on the flow rate that needs to be achieved.

[0067] The number of holes 78' of the series of first holes 78' and possibly the number of holes 78" of the series of second holes 78", which are affected by the gas passing in the inner chamber 90 and possibly in the outer chamber 92, respectively, is given by the angular position of the gasket 76 controlled by the driving rod 70.

[0068] Moreover, always by acting on the driving rod 70, it is possible to fully close the tap 10, thus preventing the passage of the gas through the holes.

[0069] In other words, there is an angular position of the gasket 76 which prevents the passage of the gas through the first holes 78' and/or through the second holes 78". Obviously, modifications or improvements that are dictated by contingent or particular reasons may be made to the invention as described, without thereby departing from the scope of the invention as claimed below.

Claims

1. Gas burner tap (10) of the type adapted for the use with different types of gas, wherein the tap (10) comprises a body (15) of the tap (10), inside which there is a gas inlet (20) into the tap (10), and wherein the aforesaid tap (10) comprises a pierced disc (78) which has at least one first hole (78') which forms a first gas outlet for the tap (10), wherein the aforesaid first hole (78') is in fluidic communication with the gas inlet (20) through a first chamber (90), **characterized in that** the aforesaid pierced disc (78) has at least one second hole (78") which forms a second gas outlet for the tap (10), wherein the aforesaid at least one second hole (78") is in fluidic communication with a second chamber (92), the second chamber (92) being fluidically connectable to the first chamber (90) or to the gas inlet (20) into the tap, through a passage channel (60), wherein the aforesaid passage channel (60) can be shut off, at least partially, by using a selector pin (70) depending on the type of gas with which the tap (10) operates.

2. Tap (10) according to one of the preceding claims, wherein the pierced disc (78) comprises a first series of first holes (78') arranged in fluidic connection with said first chamber (90), as well as a second series of second holes (78") arranged in fluidic connection with said second chamber (92).

3. Tap (10) according to claim 2, wherein the holes of the first series of first holes are arranged along a first circle arc, and the holes of the second series of second holes (78") are arranged along a second circle arc placed outside with respect to the first circle arc of the first series of holes (78').

4. Tap (10) according to claim 1, 2 or 3, wherein the pierced disc (78) is combined with a gasket (76), whose angular position with respect to the pierced disc (78) sets the opening or selective occlusion of said at least one first hole (78') and of said at least one second hole (78") or of one or more of the holes of the first series of first holes (78') and of one or more of the holes of the second series of second holes (78").

5. Tap (10) according to claim 4, wherein the gasket (76) is rotatably controlled with respect to the pierced disc (78) or, vice-versa, the pierced disc (78) is rotatably controlled with respect to the gasket (78).

6. Tap (10) according to claim 5, wherein the angular position of the gasket (76) with respect to the pierced disc (78) can be controlled by means of the rotation of a plug (74) on which a driving rod (70), which can be rotated around a longitudinal axis thereof, acts.

7. Tap (10) according to any one of the preceding claims, wherein the first chamber (90) is an inner annular or circular one and the second chamber (92) is annular, outside the first chamber (90).

8. Tap (10) according to any one of the preceding claims wherein, whenever the tap (10) operates with liquefied petroleum gas (LPG), the selector pin (70) shuts off the passage channel (60) and the liquefied petroleum gas (LPG) only comes out of the aforesaid first outlet.

9. Tap (10) according to any one of preceding claims 1 to 7 wherein, whenever the tap (10) operates with natural gas (NG), the selector pin (70) does not shut off the passage channel (60), and the natural gas (NG) comes out of both the aforesaid first outlet and the aforesaid second outlet.

10. Tap (10) according to claim 1, wherein said at least one first hole (78') and/or said at least one second hole (78") have an increasing or decreasing or constant passage section.

11. Tap (10) according to claim 2 or 3, wherein the holes of the first series of first holes (78') and/or the holes of the second series of first holes (78') are circular-shaped and/or elliptical and/or slot-shaped.

12. Tap (10) according to claim 2 or 3, wherein the holes of each series of holes (78', 78") are progressively increasing, or decreasing, or constant in size.

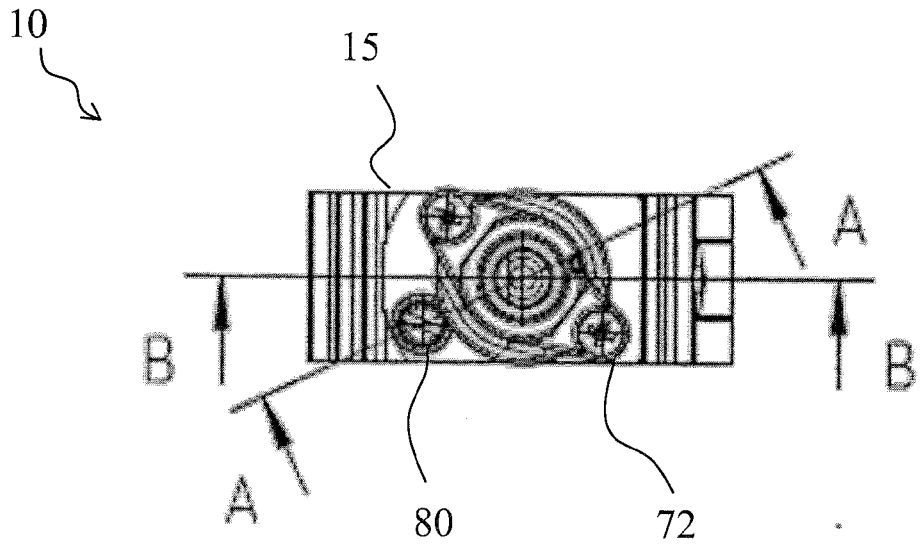

FIG.1

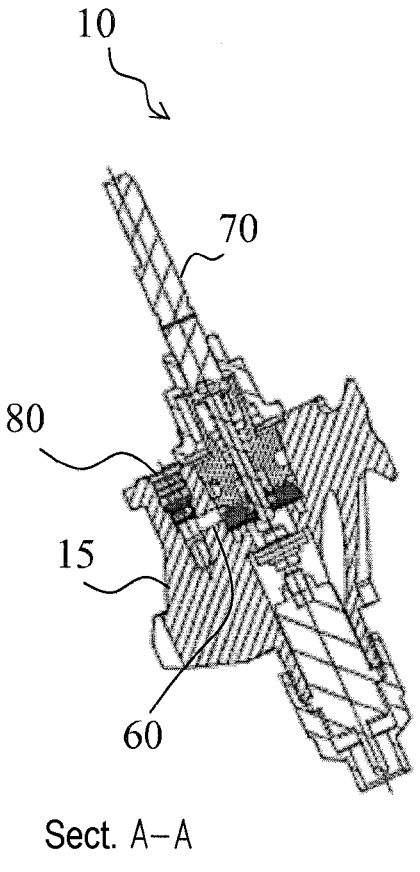

FIG.2

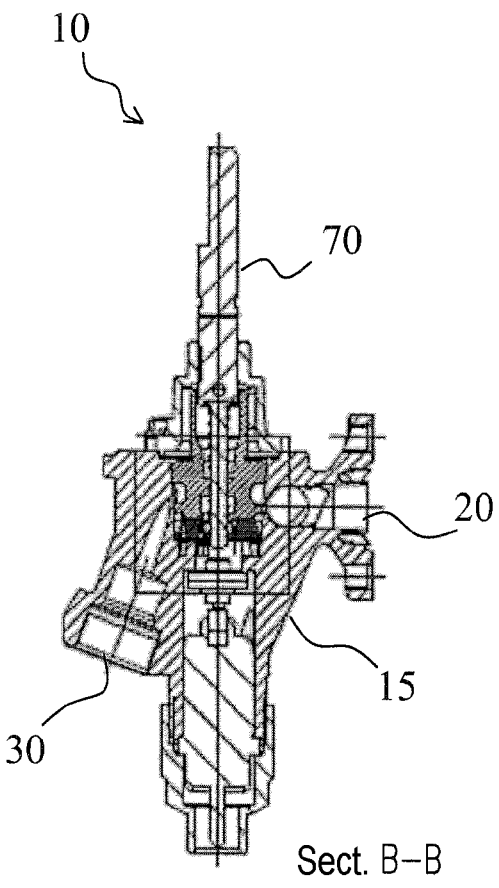

FIG.3

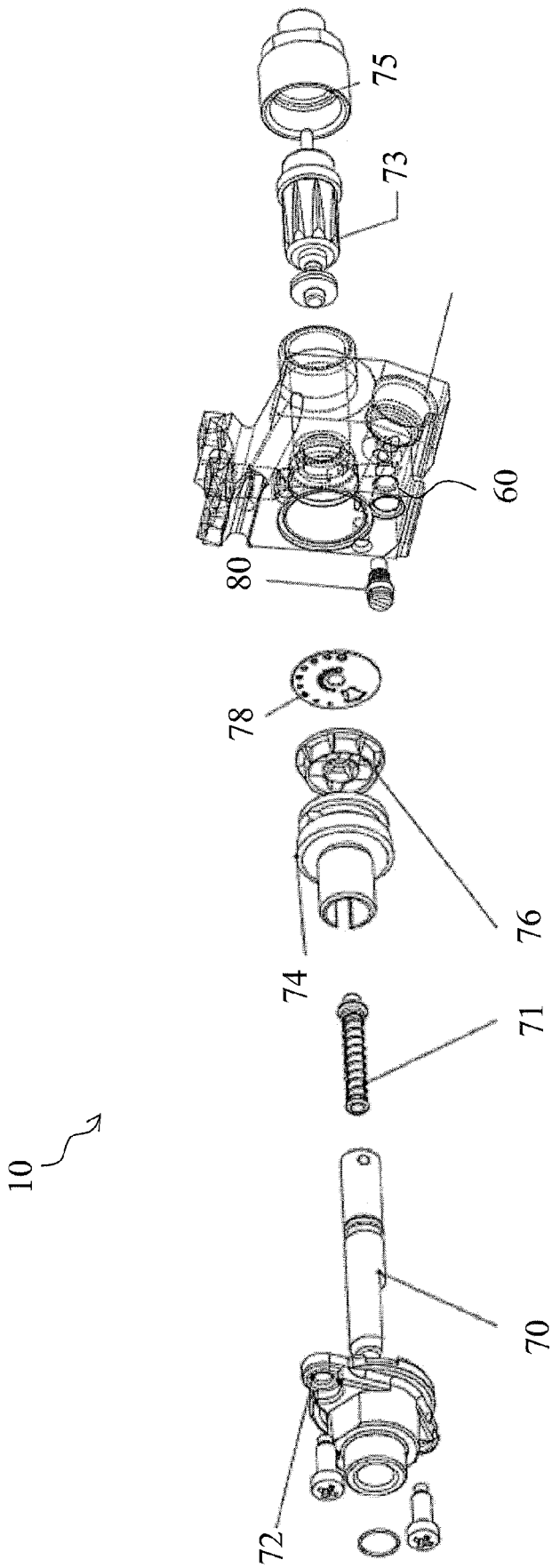

FIG.4

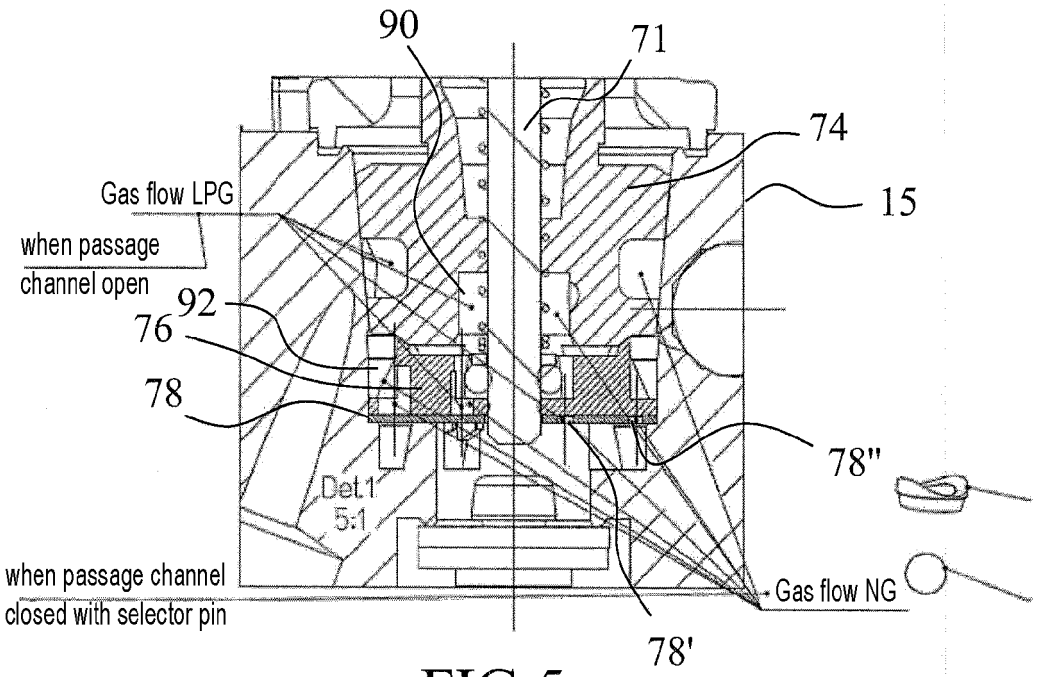

FIG.5

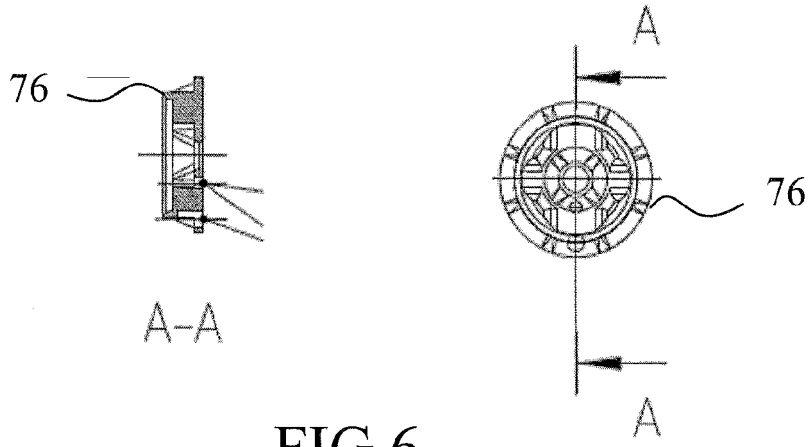

FIG.6

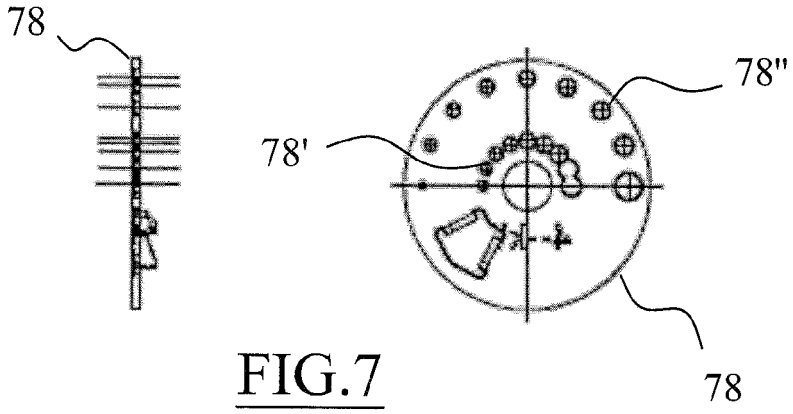

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 22 18 8187

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2017/144526 A1 (COPRECI S COOP [ES]) 31 August 2017 (2017-08-31) * column 6, paragraph 38 - column 14, paragraph 73 * * figures 1-13 *	1-6,8-12	INV. F23N1/00 F16K1/52 F16K3/08
A	US 3 014 489 A (LAMP JR JAMES K ET AL) 26 December 1961 (1961-12-26) * column 2, line 9 - column 5, line 35 * * figures 1-4 *	1-12	
A	EP 2 786 073 B1 (BSH HAUSGERAETE GMBH [DE]) 29 May 2019 (2019-05-29) * page 5, line 6 - page 16, line 9 * * figures 1-18 *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			F23N F16K F23K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 December 2022	Rudolf, Andreas

CATEGORY OF CITED DOCUMENTS

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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Patent documents cited in the description

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