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(54) **THERMOSTATIC GAS VALVE**

(57) The invention relates to thermostatic safety or unsafety gas valves (1) which check the upper and lower burner flame in gas-fired domestic cooking ovens and control the flame by checking gas inlet and outlet in the case that the temperature exceeds or decreases below the set value. Said gas valve (1) consists of a body, a lid (1.3.6), a safety valve (1.3.14), lever (1.3.4), pin (1.3.5) and a shaft (1.3.3), wherein said shaft (1.3.3) is designed

as a capped (1.3.3.1) manner. The most important characteristic that distinguishes the gas valve (1) of the invention from the present thermostatic gas valves (2) is that the gas valve (1) is set in a precise manner by the threaded shaft (1.3.8) located in the male (1.3.13) after its production. Thus, the requirement for an extra fixture for setting the gas valve (1) is eliminated, and a more precise setting is provided.

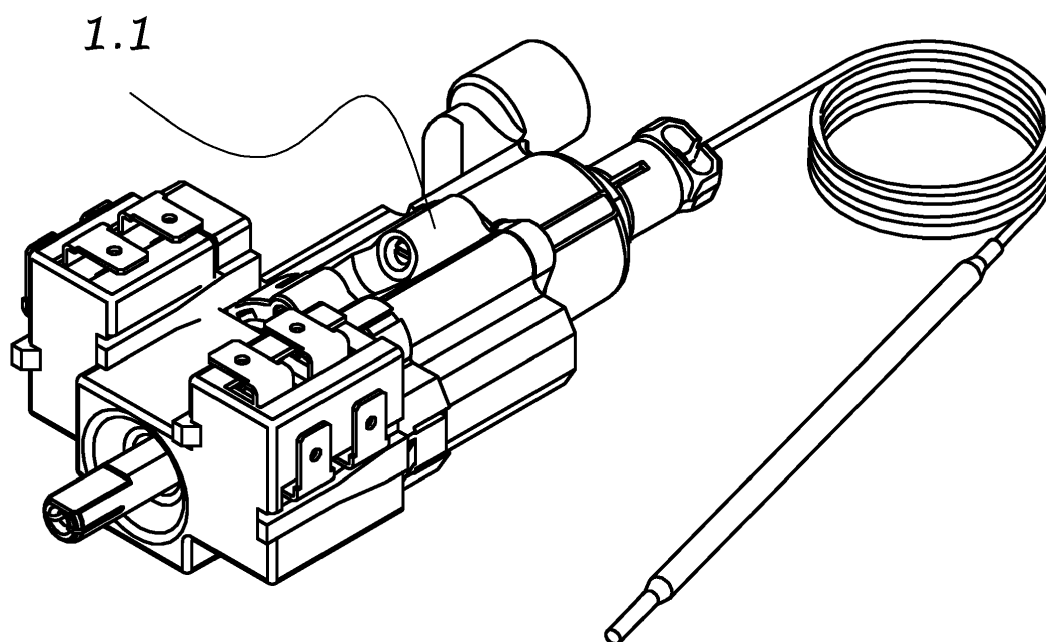


figure 1

Description

TECHNICAL FIELD

[0001] The invention relates to thermostatic safety or unsafety gas valves which check the upper and lower burner flame in gas-fired domestic cooking ovens and control the flame by checking gas inlet and outlet in the case that the temperature exceeds or decreases below the set value. Said gas valve consists essentially of a body, a lid, a safety valve, lever, pin and a shaft, wherein said shaft is designed as a capped manner. Also, the body which is produced by both brass casting and aluminum extrusion is used in the gas valve. The most important characteristic that distinguishes the gas valve of the invention from the present thermostatic gas valves is that the gas valve is set in a precise manner by the threaded shaft located in the male after its production. Thus, the requirement for an extra fixture for setting the gas valve is eliminated, and a more precise setting is provided. In the thermostatic gas valve of the invention, the pin which actuates the safety valve is closed by a lid such that it is not seen outside, unlike the conventional valves. The safety valve is opened by moving the pin forward through the lever located under the lid, thus the gas inlet into the system is allowed.

STATE OF THE ART

[0002] The general working principle of the thermostatic gas valves is that the gas filled in the safety valve pool is transferred by moving the shaft forward from the safety valve pool into the region of the male by opening the safety valve. It is provided that the gas is filled between the male and the diaphragm through the burning holes on the male by rotating the shaft. Herein the heat-sensitive thermo-element is heated, and the diaphragm is automatically opened by pressing the membrane because of the expansion of the fluid herein, and the gas is conveyed to the outlet by transferring it to the thermostat pool. In order to set the maximum temperature in the oven, the setting process of the valve is performed by fitting the valve into a fixture after the production of the valve, and by setting the membrane distance via the rotation of the capillary tube. Due to the shaft, the threaded part and the threaded shaft present in the thermostatic gas valve of the invention, the valve is set via a screw-driver passing through the shaft without a fixture. Said method is a more advantageous method since it shortens the process duration and provides the possibility of setting in a more precise manner.

[0003] This invention has surpassed the state of the art by solving the problems of the state of the art, and will be readily used in the safety gas valves used for the domestic cooking ovens.

AIM OF THE INVENTION

[0004] The aim of the invention is to provide thermostatic gas valve designed to be used in domestic cooking ovens and having aluminum or brass, safety or unsafety body.

[0005] The other aim of the invention is to actuate the pin which allows the safety valve to be actuated by means of a lever in the thermostatic gas valves with the safety arrangement, and to close it with a lid such that it is not seen outside.

[0006] Another aim of the invention is to set the thermostatic gas valve more precisely by means of the threaded parts after its production.

[0007] The other aim of the invention is to produce a unibody valve cam actuating the switches, and to fasten it to the valve by fitting into the tabs on the shaft without any other parts.

[0008] One of the aims of the invention is to make possible the fastening of the switch holder part to the lid by the tabs, and the mounting of four switches.

[0009] Another aim of the invention is to set the thermostatic gas valves more easily without the extra parts.

[0010] The structural and characteristic features and all advantages of the invention will be clearly understood by means of the following figures and the detailed description set forth with reference to these figures, and thus the evaluation should be made considering these figures and the detailed description.

BRIEF DESCRIPTION OF THE INVENTION

[0011]

Figure 1, the perspective view of the single-output gas valve of the invention,
 Figure 2, the perspective view of the double-output gas valve of the invention,
 Figure 3, the perspective view of the single-output safety gas valve of the invention,
 Figure 4, the perspective view of the double-output safety gas valve of the invention,
 Figure 5, the perspective view of another single-output safety gas valve of the invention,
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[0012]

1. Gas valve 45

1.1. A single-output unsafety body
 1.2. A double-output unsafety body
 1.3. A single-output safety body 50

1.3.1. Gas inlet
 1.3.2. Safety valve seat
 1.3.3. Shaft

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 1.3.3.3. Tab seat

1.3.4. Lever

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 1.3.4.3. Limiting tab
 1.3.4.4. Bend

1.3.5. Pin

1.3.5.1. Shock-absorbing spring

1.3.6. Lid

1.3.6.1. Recess

1.3.7. Threaded part

1.3.7.1. Thread

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 1.3.8.4. Shaft thread

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1.3.9.1. Inner part

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1.3.10.1. Gas outlet

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1.3.12. Alternative cam

1.3.13. Male

1.3.14. Safety valve

1.3.15. Switch

1.3.15.1. Washer

1.3.16. Switch holder

1.3.16.1. Coin
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1.3.18. Protective lid

1.3.19. Alternative protective lid

1.3.20. Thermo-element

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 - 2.2. Pushing pin
 - 2.3. Pushing pin bearing sleeve
 - 2.4. Present Shaft
- 3. Gas distribution pipe

DETAILED DESCRIPTION OF THE INVENTION

[0013] The invention is a thermostatic gas valve (1) designed to set the gas regulation in the domestic cooking ovens, consisting generally of a body made of brass or aluminum material, a shaft (1.3.3), a lid (1.3.6), a male (1.3.13), a switch (1.3.15), a threaded shaft (1.3.8), a threaded part (1.3.7), a cam (1.3.11) and a thermostatic element (1.3.20), wherein said body is designed as single-outlet safety body (1.3), single-outlet unsafety body (1.1), double-outlet safety body (1.4) or double-outlet unsafety body (1.2), and there are also a lever (1.3.4), a pin (1.3.5) and a safety valve (1.3.14) in addition to these elements if there is a safety body in the gas valve (1) of the invention. In the thermostatic gas valve (1) of the invention having the single-outlet safety body (1.3) or the double-outlet safety body (1.4), the first security is provided by means of the safety valve (1.3.14) while the second security is provided by allowing the passage of the gas through the male (1.3.13) in the case that the shaft (1.3.3) is not rotated. Accordingly, the safety valve (1.3.14) is opened as the lever (1.3.4) actuates the pin (1.3.5) when the shaft (1.3.3) of the thermostatic gas valve (1) is pressed, and the gas filled into the gas valve (1) from the gas inlet (1.3.1) is passed to the safety valve seat (1.3.2), but does not proceed to the system. However, the gas can reach the gas outlet (1.3.10.1) by passing through the different burning holes on the male (1.3.13) with the rotation of the shaft (1.3.3). Furthermore, the gas-tightness is provided by means of the seals (1.3.22) at the inlet of the safety valve seat (1.3.2) and the thermostat pool (1.3.10). The shaft (1.3.3) in the un-pushed state and the shaft (1.3.3) in the pushed state can be seen in Figure 10 and Figure 11, respectively.

[0014] As in the present thermostatic gas valves (2) having a security arrangement, also the general working principle of the safety gas valve (1) of the invention is that the gas proceeds to the male (1.3.13) by opening the safety valve (1.3.14) via the pin (1.3.5) by pressing the shaft (1.3.3); the male (1.3.13) rotates with the rotation of the shaft (1.3.3), and the gas reaches the burner from the gas outlet (1.3.10.1) by passing the burning holes on the male (1.3.13) and proceeds to the thermostat pool (1.3.10), and the burning of the oven is initiated. If there is an unsafety body of the gas valve (1) of the

invention, the burning of the oven is initiated in such a way that the gas is passed from the burning holes on the male (1.3.13) by moving the shaft (1.3.3) forward and by rotating the shaft (1.3.3) and the male (1.3.13), and reaches the thermostat pool (1.3.10) and the burner therefrom. As the oven is heated, the heat-sensitive thermostatic element (1.3.20) is moved by pressing the thermostat membrane with the expansion of the fluid herein, and the thermostat membrane is closed gradually and the oven begins to become cool. When the internal oven temperature decreases, the thermostat membrane begins to open and the internal oven temperature increases because of the decrease in the pressure exerted on the thermostat membrane. Thus, the oven is set to the desired temperature by the user due to the thermostat system. The difference of the gas valve (1) of the invention from the present one is that the setting is performed in a different way and it contains different elements. The setting can be performed more precisely due to these elements described detailed in the following section.

[0015] In the present thermostatic gas valves (2) having the security arrangement used in the domestic cooking ovens, a part of the pushing pin (2.2) mounted onto the present body (2.1) with the pushing pin bearing sleeve (2.3) is outside the present body (2.1) while the lid (1.3.6) used in the safety gas valve (1) of the invention is designed such that it entirely closes the shaft (1.3.5) and the lever (1.3.4) which is the propulsion for the shaft (1.3.5). The lever (1.3.4) moves the pin (1.3.5), and the hole (1.3.4.1) allows it to fit into the lid (1.3.6) while the fastening part (1.3.4.2) fastens the lever (1.3.4) between the body and the lid (1.3.6) such that it does not move. The limiting tab (1.3.4.3) in said fastening part (1.3.4.2) allows the lever (1.3.4) to move and limits the whole movement of the part by imposing this movement on the bend (1.3.4.4). Thus, it is provided that the lever (1.3.4) is moved accurately and pushes the pin (1.3.5). Furthermore, a shock-absorbing spring (1.3.5.1) located on the end of the shaft (1.3.5) is present and prevents the pressure on the safety valve (1.3.14) when the pin (1.3.5) is pushed excessively. In addition, the pin (1.3.5) is angularly located in the body in order to allow the lever (1.3.4) to push the pin (1.3.5) by applying less force. The shaft (1.3.3) used in the gas valve (1) of the invention has a different design from the present shafts (2.4), presses the lever (1.3.4) located under the lid (1.3.6) by moving the shaft (1.3.3) forward by the user due to its capped (1.3.3.1) structure and opens the safety valve (1.3.14) by allowing the pin (1.3.5) to move forward. In order to set the maximum internal oven temperature, the gas valve (1) should be set after the production and this setting is performed more precisely than the present thermostatic gas valves (2) due to the hole (1.3.3.2) extending along the shaft (1.3.3) at the center of the shaft (1.3.3) in the gas valve (1) of the invention. The male (1.3.13) is accessed through said hole (1.3.3.2) via a screwdriver. The threaded part (1.3.7) in the male (1.3.13) and the threaded shaft (1.3.8) become unibody by engaging with each other,

and are separated from each other by pressing the screw-driver. This separation is provided in such a way that the movement of the threaded part (1.3.7) fastened to the male (1.3.13) by means of its diameter greater than the male (1.3.13) is prevented and the release threaded shaft (1.3.8) is moved forward. There is an o-ring seat (1.3.8.3) for o-ring (1.3.21) providing sealing in the male (1.3.13) in the threaded shaft (1.3.8) and there is a spring (1.3.8.1) allowing the threaded shaft (1.3.8) to be restored to engage again with the threaded part (1.3.7) immediately under the top of the threaded shaft (1.3.8) after the gas valve (1) is set. The thread (1.3.7.1) in the threaded part (1.3.7) and the shaft thread (1.3.8.4) are designed such that they contain a specific number of threads in the range of 0-360°. Herein it is an important point that the thread (1.3.7.1) of the threaded part (1.3.7) and the shaft thread (1.3.8.4) are frequently aligned to allow the threaded part (1.3.7) and the threaded shaft (1.3.8) to be engaged again without changing the setting after the gas valve (1) is set. Apart from that, the threaded shaft (1.3.8) is designed to have at least tetragonal end part (1.3.8.2) and the membrane shaft (1.3.8) is designed to have at least tetragonal inner part (1.3.9.1) to transfer the movement of the threaded shaft (1.3.8) to the membrane shaft (1.3.9). The gas valve (1) is set by determining the position of the membrane due the fact that the threaded shaft (1.3.8) transfers the rotation movement to the membrane shaft (1.3.9) via the screwdriver rotated through the hole (1.3.4.1) of the shaft (1.3.3). In traditional method, the present thermostatic gas valves (2) are fitted into a fixture and the capillary tube is rotated by loosening the nut in order to set the membrane position. However, in this method, it becomes important that the gas valve (1) of the invention is preferred since an extra fixture is required and the rotation of the capillary tube extends the process duration.

[0016] In addition, the cam (1.3.11) is mounted to the gas valve (1) in such a way that the fastening tabs (1.3.11.3) located inside the cam (1.3.11), which provides the switch (1.3.15) to be actuated as a result of the contact of the tabs (1.3.11.2) thereon with the switch (1.3.15), engage with the tab seats (1.3.3.3) in the shaft (1.3.3) of the invention, thereby eliminating the need of a segment used to fasten the cam (1.3.11) in the present case. "D" shaped inner part (1.3.11.4) allows the shaft (1.3.3) to be rotated as well as preventing the cam (1.3.11) from mounting inaccurately. In addition, the tabs (1.3.11.2) in the cam (1.3.11) can be designed in different sizes in accordance with the switches (1.3.15). In Figure 12 it is seen in that the tabs (1.3.11.2) in the cam (1.3.11) actuate the switches (1.3.15) by rotating the shaft (1.3.3). Another improvement in the invention is that the upper part is designed conical (1.3.11.1) in order to produce the cam (1.3.11) in a single piece and to use a longer button in oven.

[0017] More switches (1.3.15) can be used in the gas valve (1) of the invention than that of the present thermostatic gas valves (2). Three switches (1.3.15) at most

can be used in the present thermostatic gas valves (2) while the gas valve (1) of the invention contains a switch holder (1.3.16) suitable for using maximum four switches (1.3.15) and is designed to have the narrowest construct in such a form. Thus, more than one oven function such as lighter, lamp, grill and fan can be controlled by means of a single button. The alternative switch holder (1.3.17) is suitably designed for positioning maximum two switches (1.3.15) thereon. While it is considerably important to mount accurately the switches (1.3.15) and the cam (1.3.11) to the gas valve (1) for running the oven functions properly, the possibility of inaccurate mounting is also eliminated by fitting the fastening tabs (1.3.11.3) in the cam (1.3.11) into the shaft (1.3.3), and the coign (1.3.16.1) in the switch holder (1.3.16) into the recesses (1.3.6.1) on the lid (1.3.6). In addition, there are washers (1.3.15.1) between switches (1.3.15) in order that the cam (1.3.11) does not actuate more than one switch (1.3.15) at the same time, and there is a protective lid (1.3.18) to protect the cam (1.3.11) and the switches (1.3.15) in the gas valve (1) of the invention. The switch tabs (1.3.16.2) in said switch holder (1.3.16) engage the switches (1.3.15) with the lid (1.3.18).

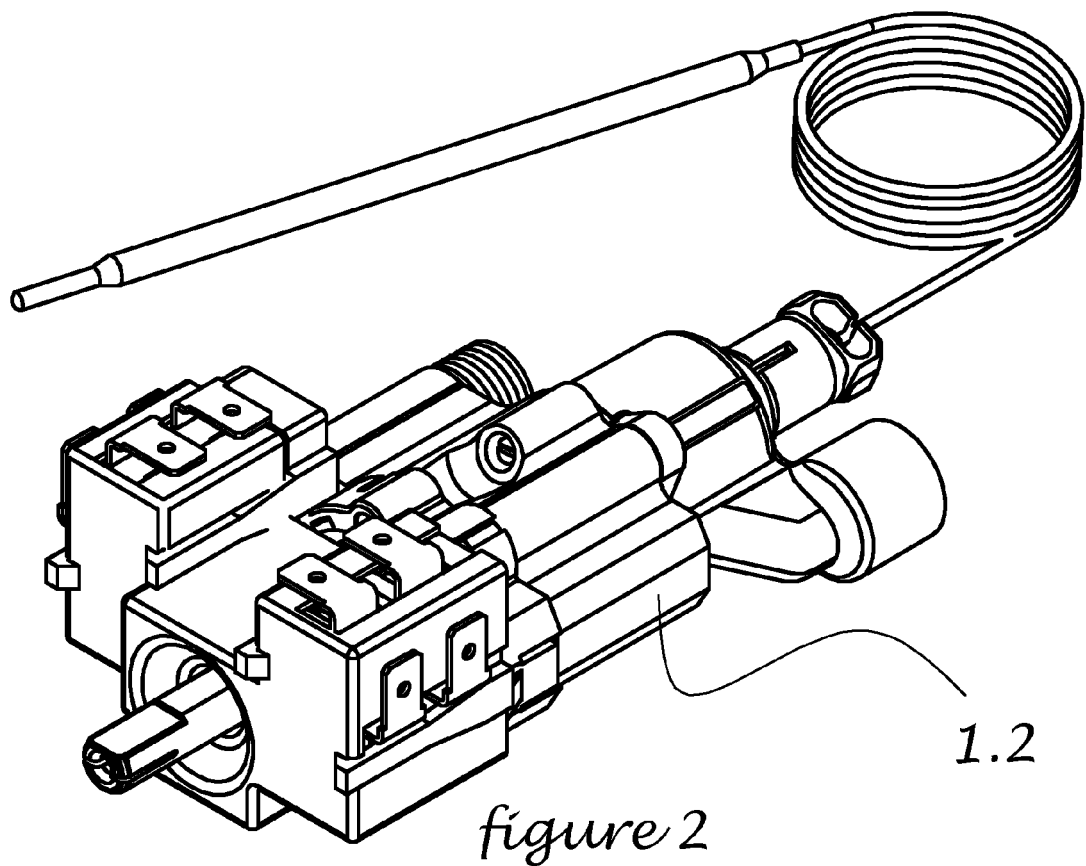
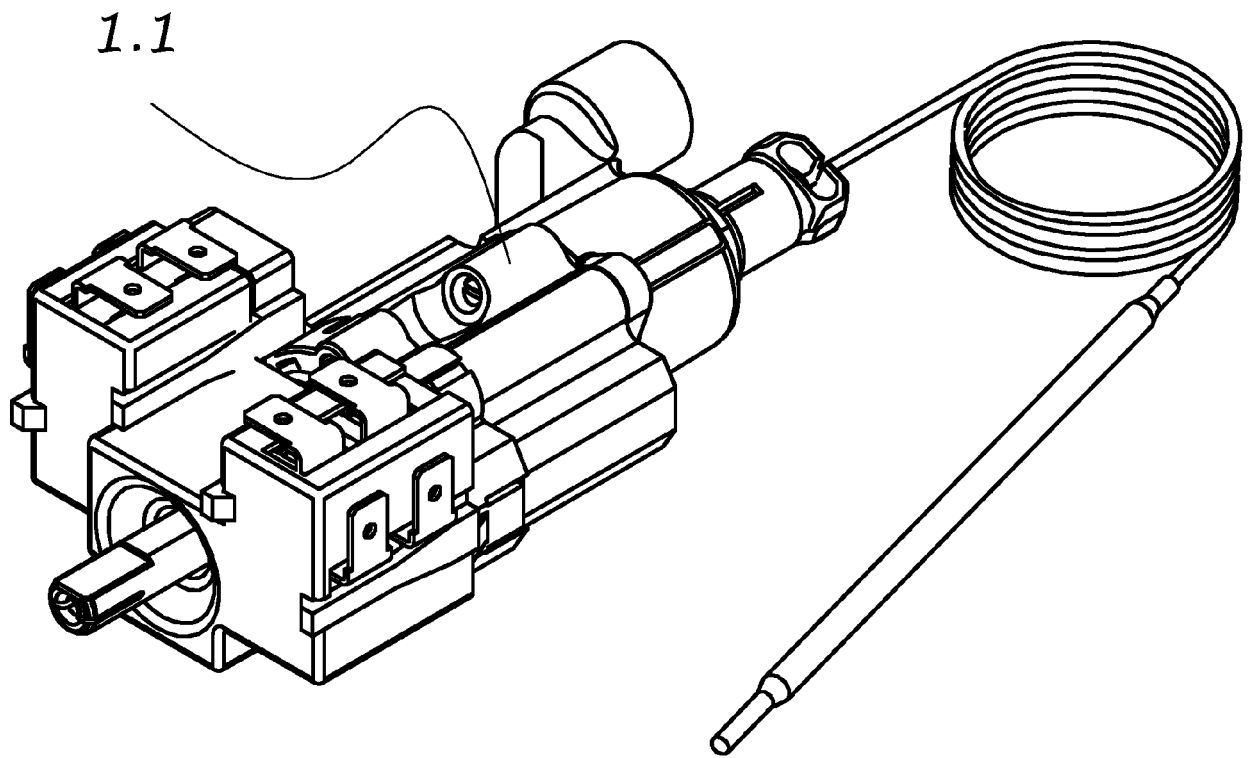
[0018] If maximum two switches (1.3.15) are used in the gas valve (1) of the invention depending on the user request, a smaller gas valve (1) can be produced by saving the length of the shaft (1.3.3). For this, the alternative switch holder (1.3.17), the alternative protective lid (1.3.19) and the alternative cam (1.3.12) can be used in the gas valve (1) of the invention, wherein these elements can be seen in Figure 20, Figure 22 and Figure 25, respectively. The upper part of the alternative cam (1.3.12) is not conical.

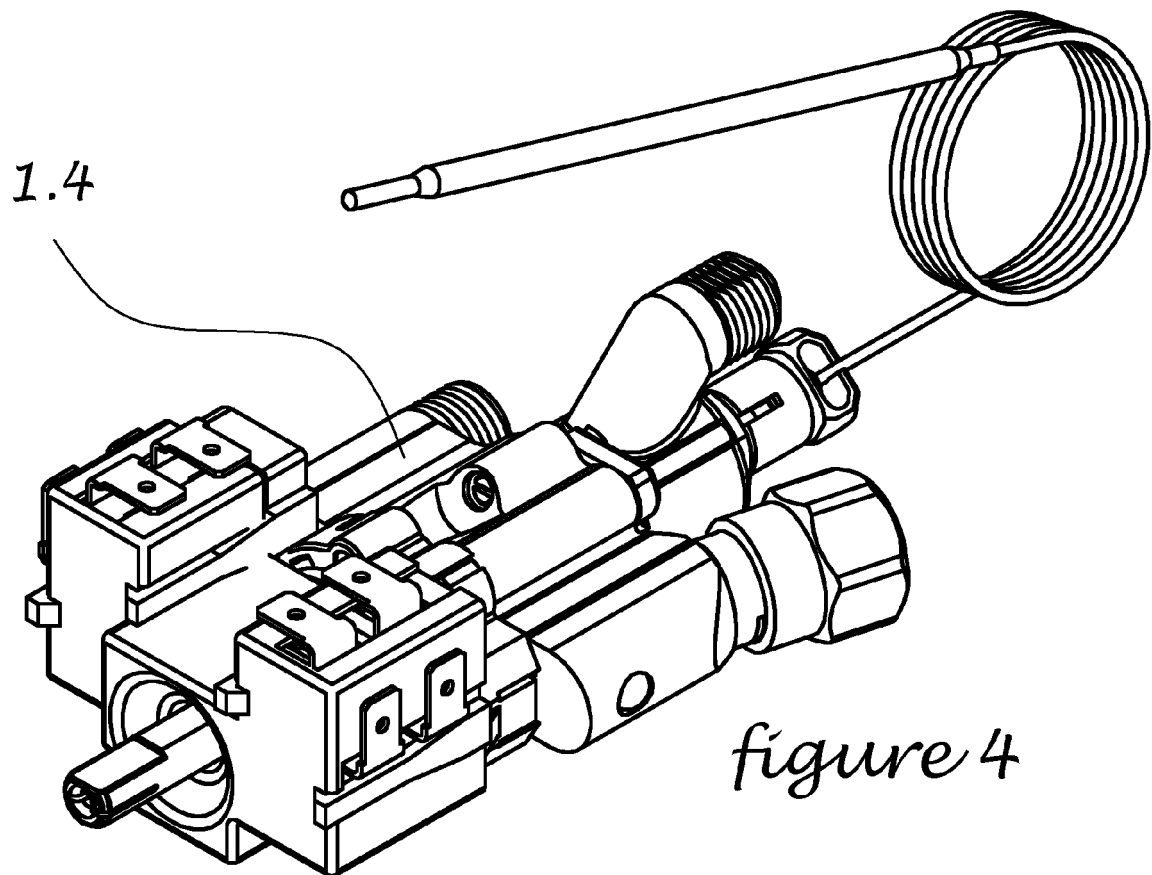
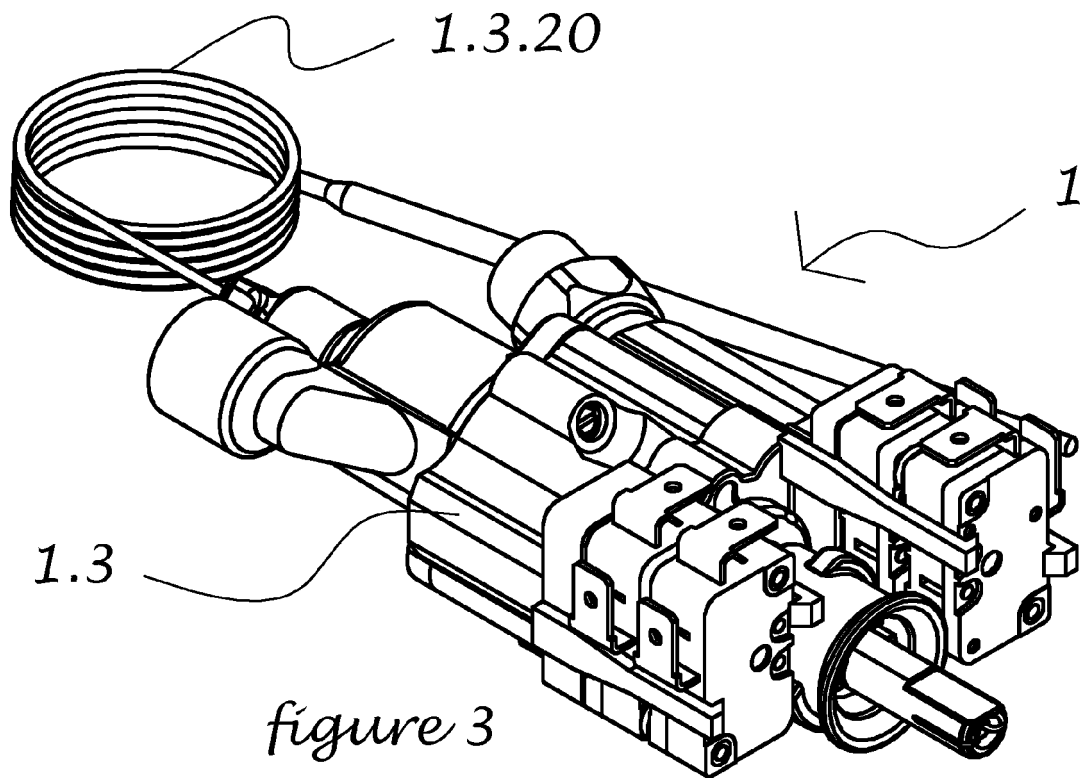
Claims

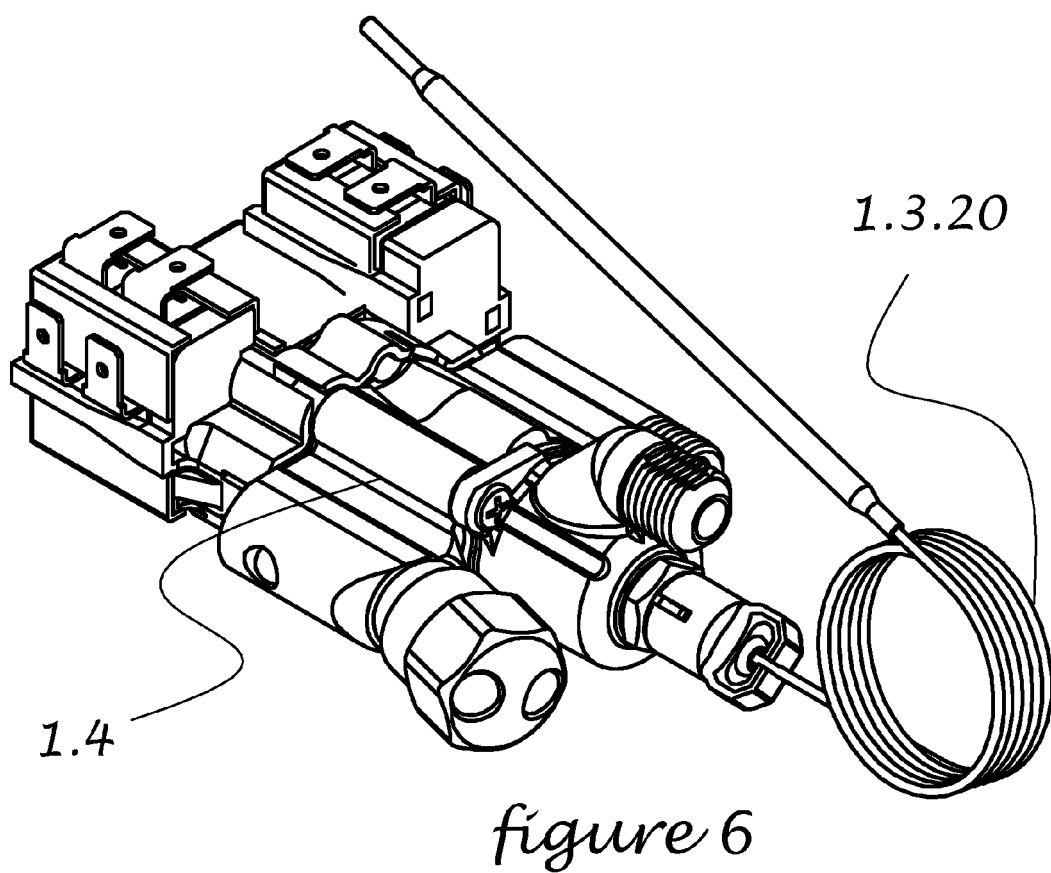
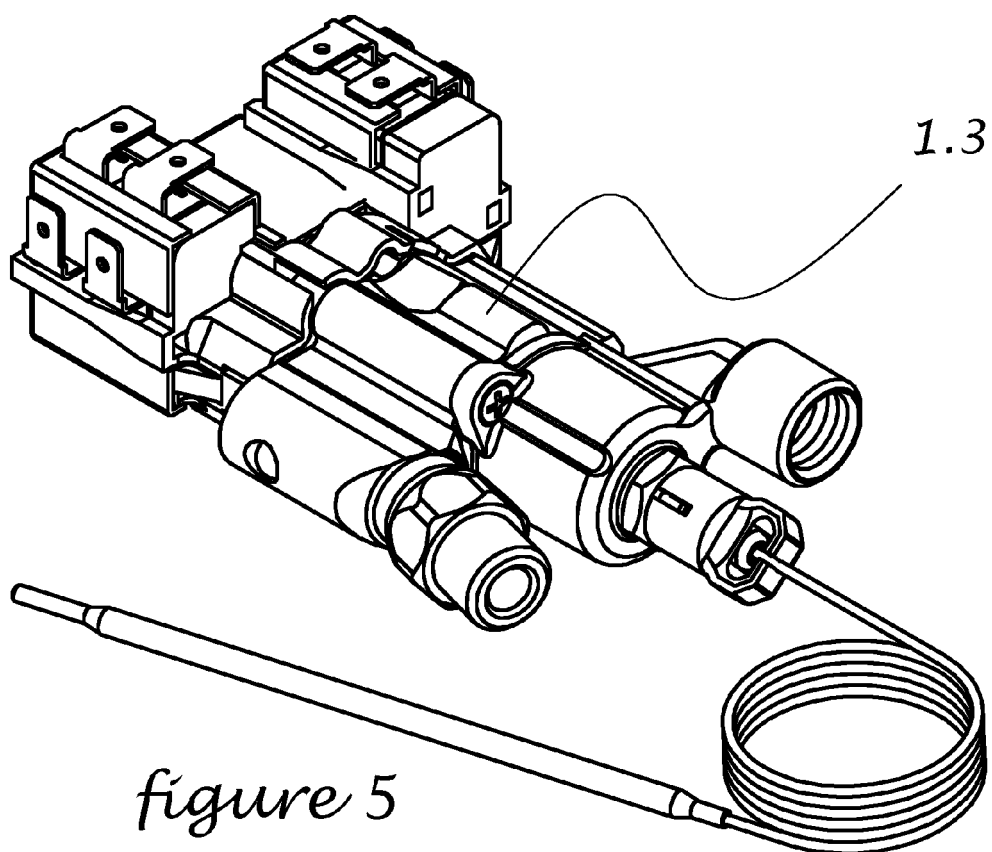
1. A thermostatic gas valve (1) designed to set gas regulation in domestic cooking ovens and having single-output (1.1), double-output (1.2), single-output safety (1.3) or double-output safety (1.4) body produced from the aluminum or brass material, **characterized in that;** it contains

- the male (1.3.13) that allows the gas to pass through the different burning holes, by switching it,
- the shaft (1.3.3) that allows the valve to be set,
- the lid (1.3.6),
- a unibody cam (1.3.11) or an alternative cam (1.3.12) of which the upper part is designed conical (1.3.11.1) for using with different size buttons,
- the threaded part (1.3.7) interlocked with the male (1.3.13) because of its size greater than the diameter of the male (1.3.13), and having a specific number of threads (1.3.7.1) in the range of 0-360°,

- a threaded shaft (1.3.8) that allows the valve to be set in a precise manner after its production,
 - the membrane shaft (1.3.9),
 - the thermostat pool (1.3.10),
 - the switch (1.3.15) for performing the functions such as lighter, lamp, grill, fan,
 - the switch holder (1.3.16) that allows maximum four switches (1.3.15) to be mounted on the valve or the alternative switch holder (1.3.17) that allows maximum two switches to be mounted,
 - the protective lid (1.3.18) or the alternative protective lid (1.3.19),
 - the thermo-element (1.3.20),
 - in the case of the double-output safety (1.4) or single-output safety (1.3) body, in addition to these elements, the safety valve (1.3.14) that provides security, the pin (1.3.5) that allows the safety valve (1.3.14) to be opened, and the lever (1.3.4) that moves the pin (1.3.5) forward.
2. The pin (1.3.5) according to claim 1, **characterized in that** it; has the shock-absorbing spring (1.3.5.1) which prevents press on the safety valve (1.3.14) when it is pushed excessively.
3. The lever (1.3.4) according to claim 1, **characterized in that**; it contains
- the hole (1.3.3.2) for fitting it into the lid (1.3.6) by engaging with the shaft (1.3.3),
 - the fastening part (1.3.4.2) that allows it to be fastened between the body and the lid (1.3.6),
 - a bend (1.3.4.4),
 - the limiting tab (1.3.4.3) which prevents the whole movement of the lever (1.3.4).
4. The shaft (1.3.4) according to claim 1, **characterized in that**; it contains
- the cap (1.3.3.1) which presses on the lever (1.3.4) moving the shaft (1.3.5) forward for opening the safety valve (1.3.14),
 - at least two tab seats (1.3.3.3) suitable for the fastening tabs (1.3.11.3) in the cam (1.3.11) for mounting the cam (1.3.11) properly,
 - the full-length hole (1.3.3.2) through which the screwdriver is passed for setting the gas valve (1).
5. The lid (1.3.6) according to claim 1, **characterized in that**; it has the recesses (1.3.6.1) for mounting the switch holder (1.3.16).
6. The unibody cam (1.3.11) according to claim 1, **characterized in that**; it has
- at least two tabs (1.3.11.2) of different sizes
- which allow the switch (1.3.15) to be actuated as a result of the contact with the switch (1.3.15),
- the fastening tabs (1.3.11.3) which allow the cam (1.3.11) to be mounted into the gas valve (1) by engaging with the tab seats (1.3.3.3) in the shaft (1.3.3),
 - "D" shaped inner part (1.3.11.4) for preventing the incorrect mounting into the gas valve (1).
7. The threaded shaft (1.3.8) according to claim 1, **characterized in that**; it contains
- a specific number of shaft threads (1.3.8.4) in the range of 0-360°,
 - at least tetragonal end part (1.3.8.2) for transferring the movement to the membrane shaft (1.3.9),
 - o-ring seat (1.3.8.3) for inserting o-ring (1.3.21) which provides sealing in the male (1.3.13),
 - the spring (1.3.8.1) which allows the threaded shaft (1.3.8) to restore the previous position after setting the gas valve (1).
8. The membrane shaft (1.3.9) according to claim 1, **characterized in that**; it has at least tetragonal inner part (1.3.9.1) for complying with the threaded shaft (1.3.8).
9. The switch holder (1.3.16) according to claim 1, **characterized in that**; it has
- the coign (1.3.16.1) for preventing it from mounting incorrectly onto the lid (1.3.6),
 - the switch tab (1.3.16.2) that allows the protective lid (1.3.18) to be engaged with the switches (1.3.15).







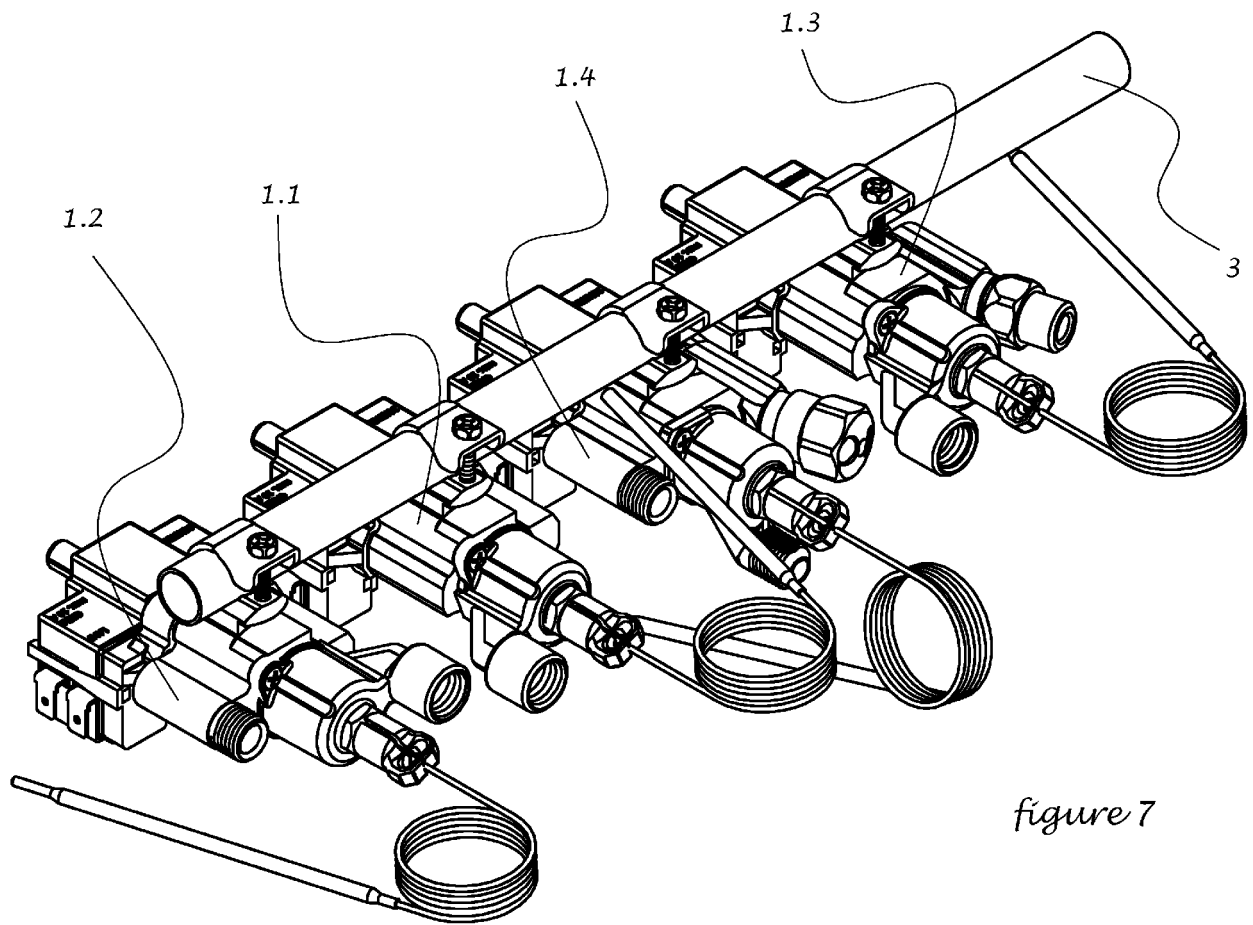
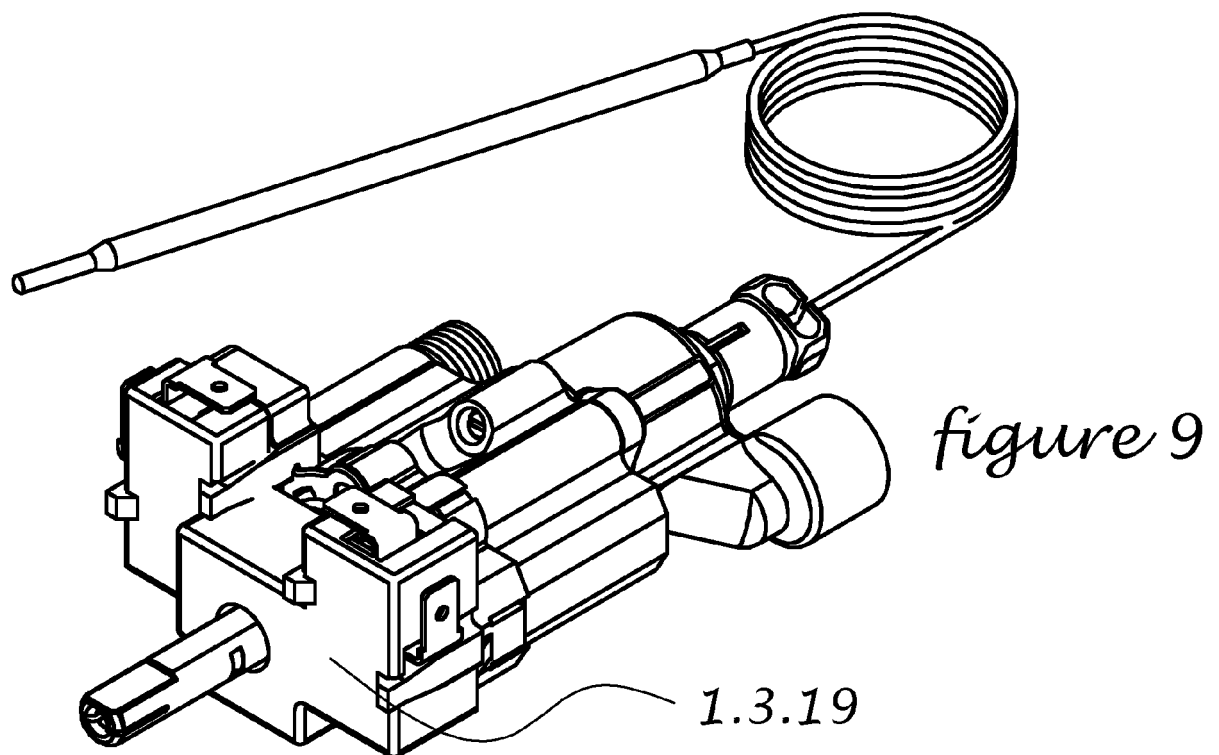
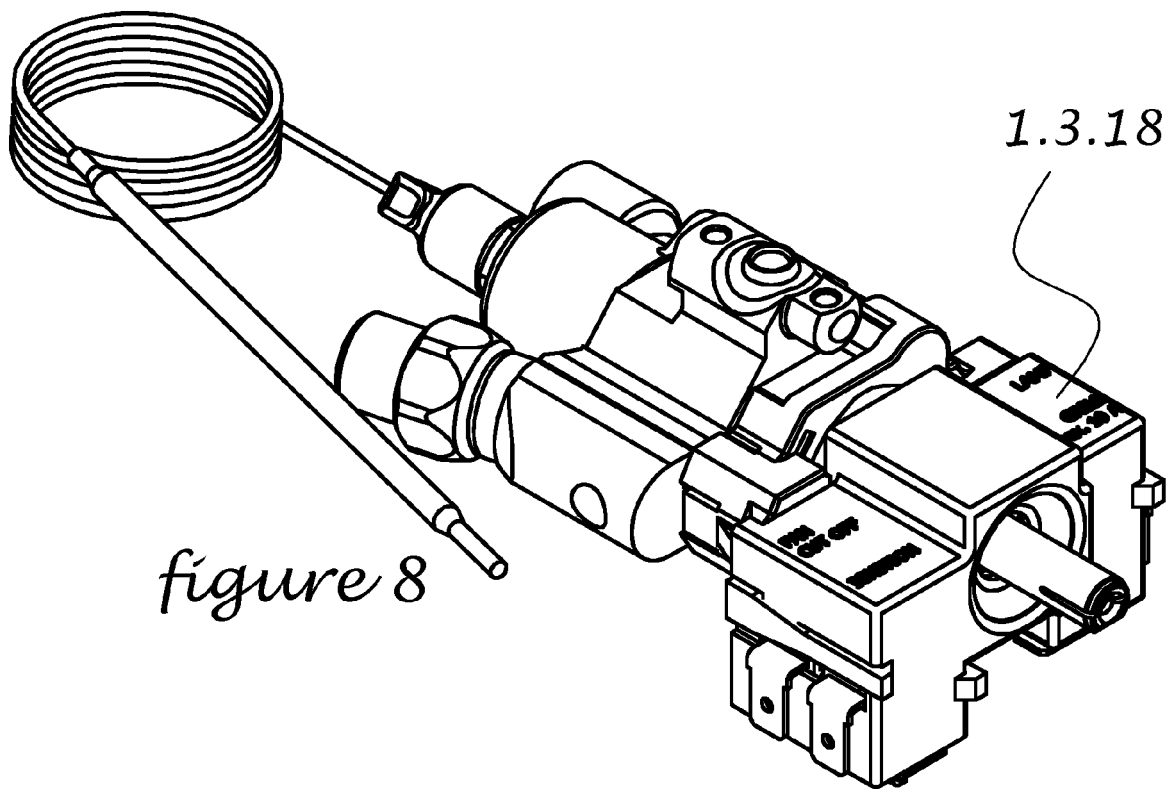
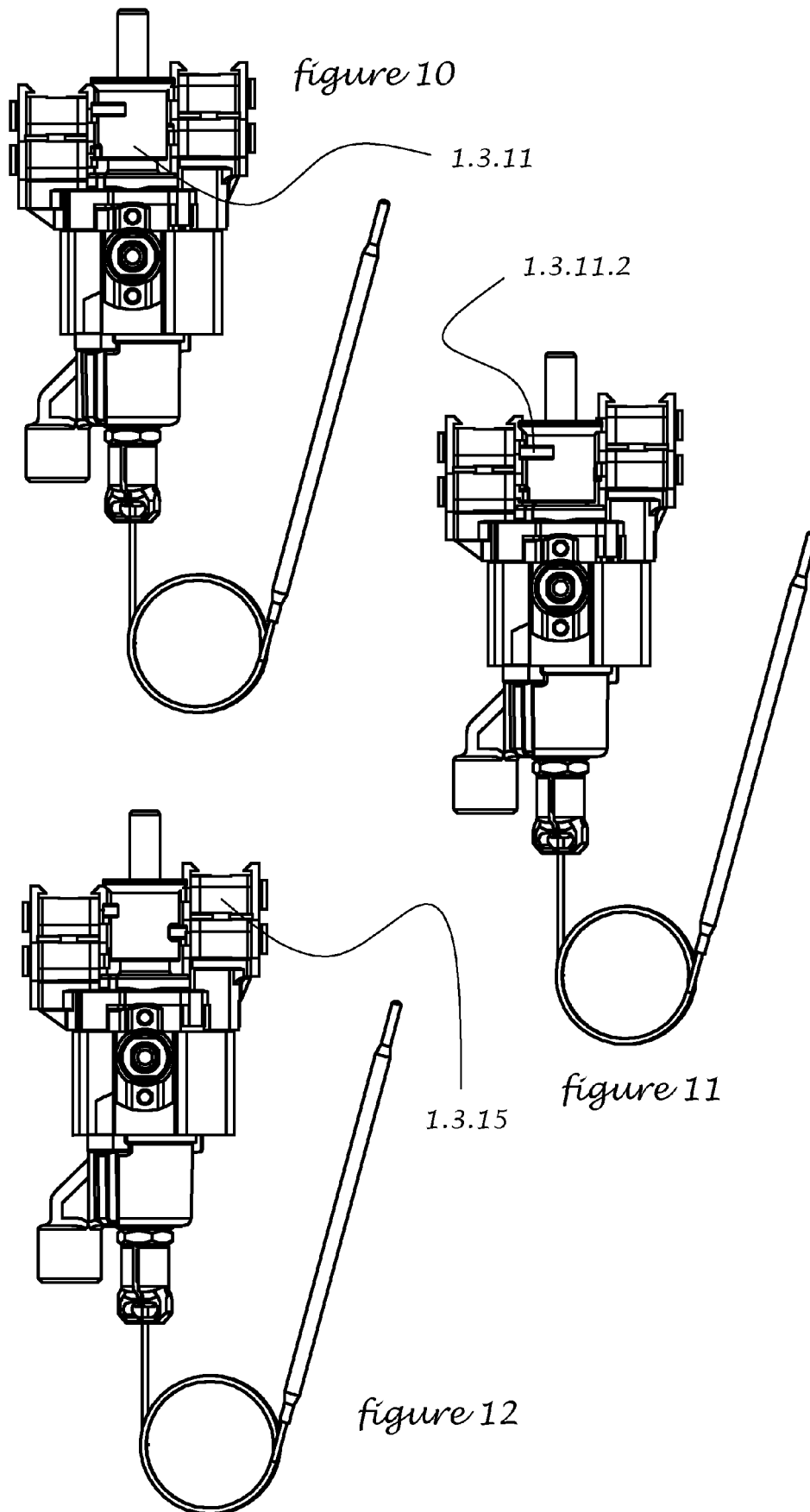
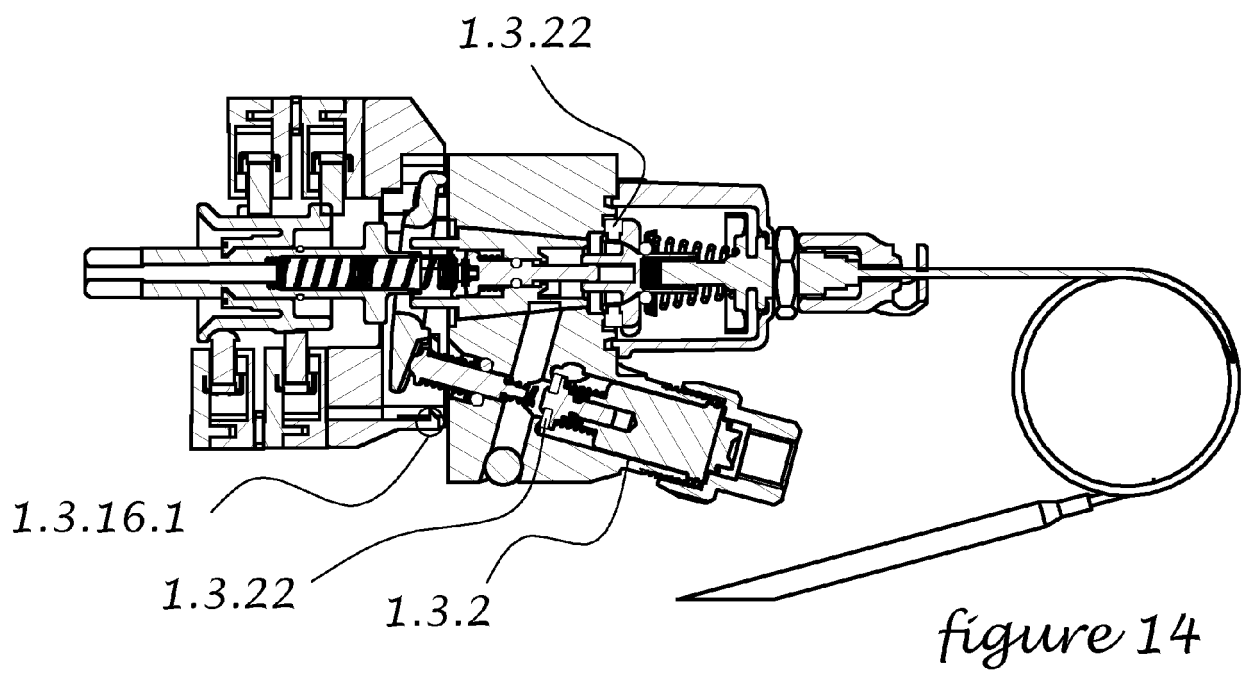
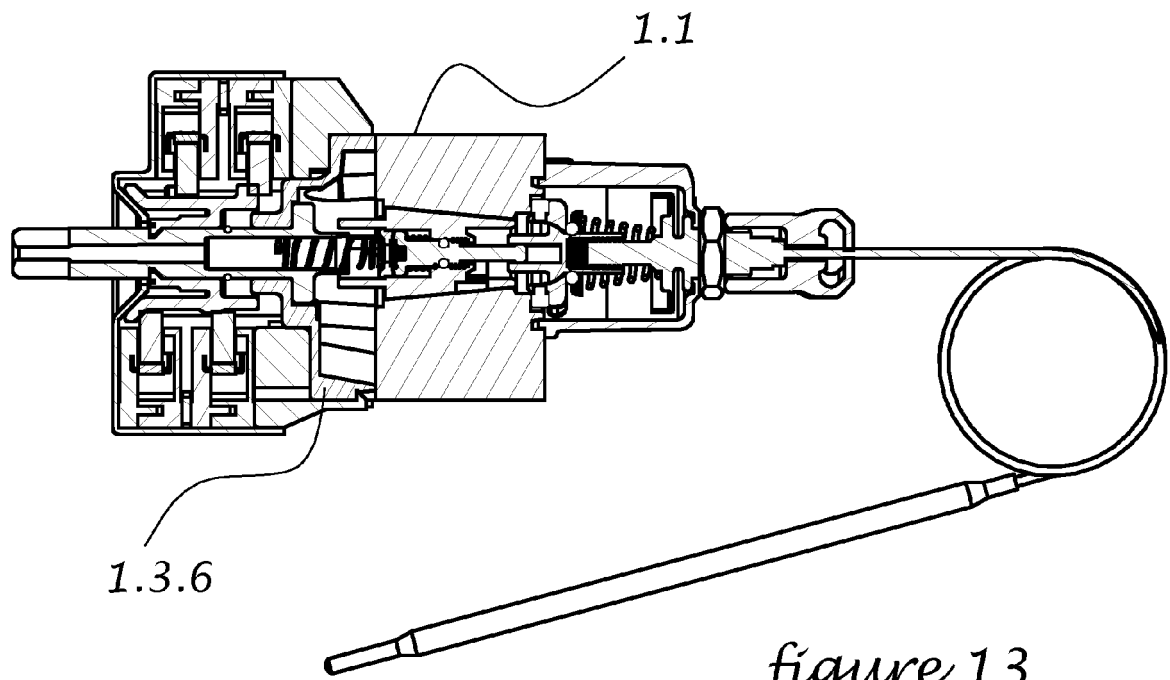
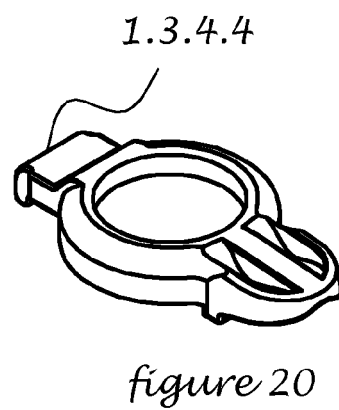
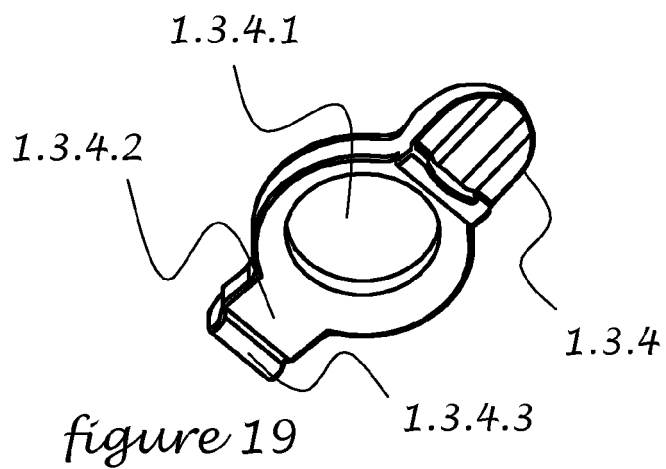
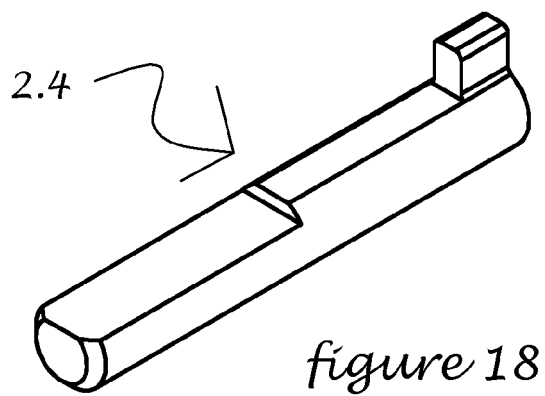
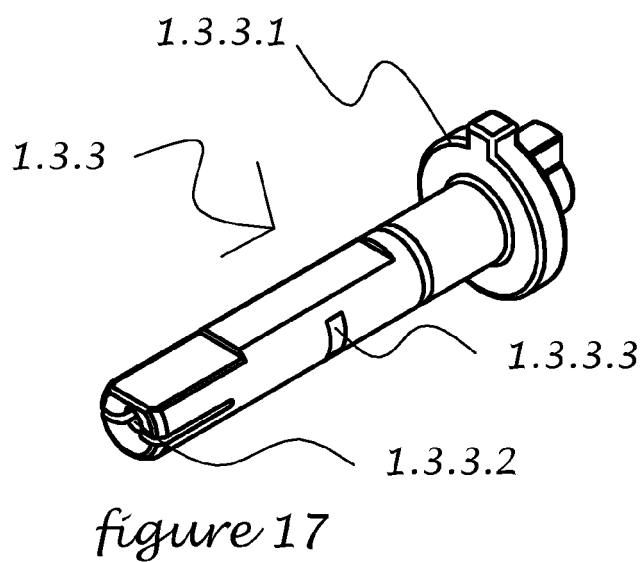
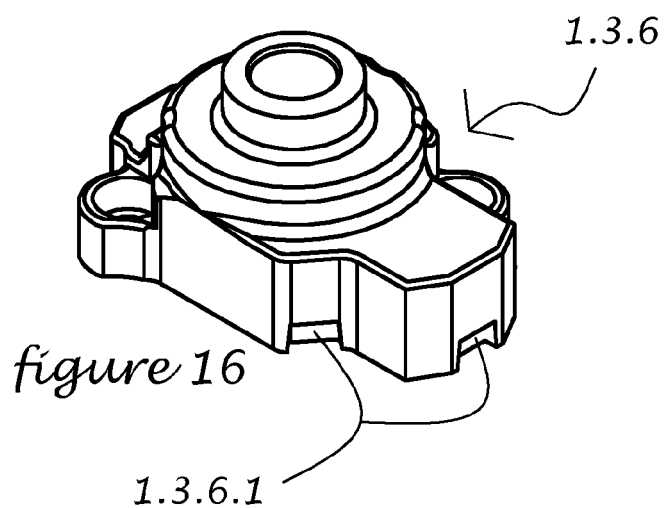
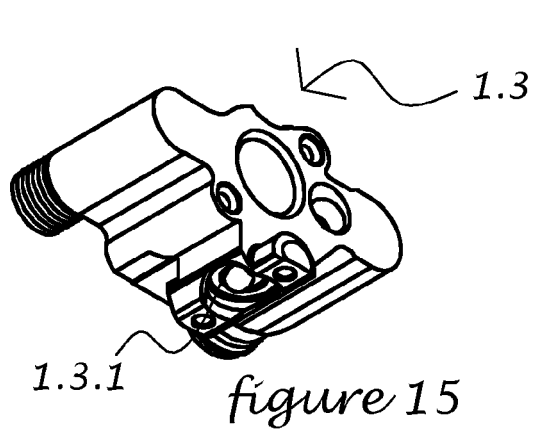


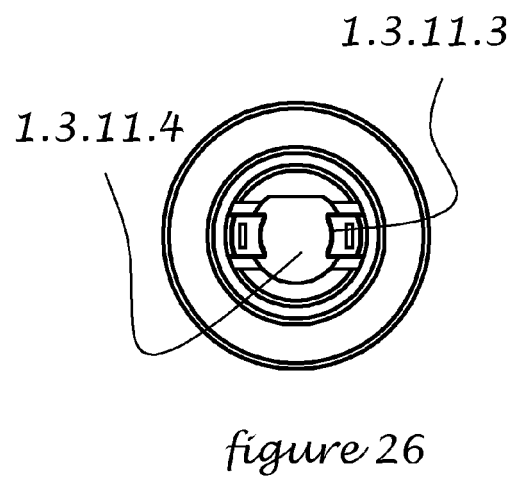
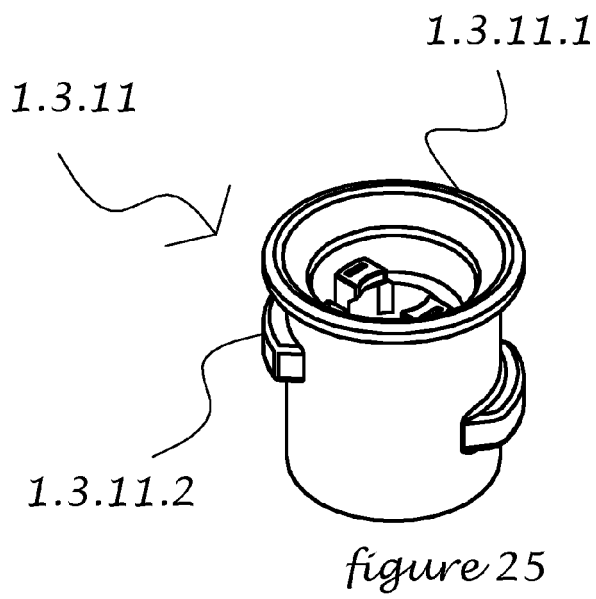
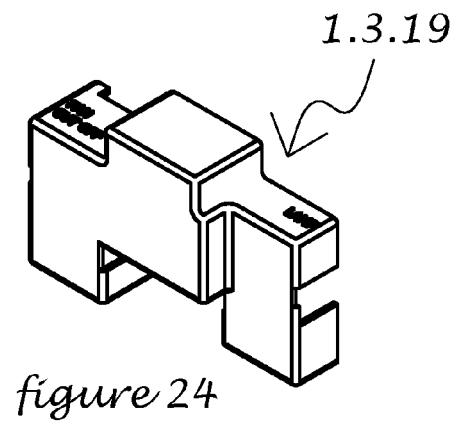
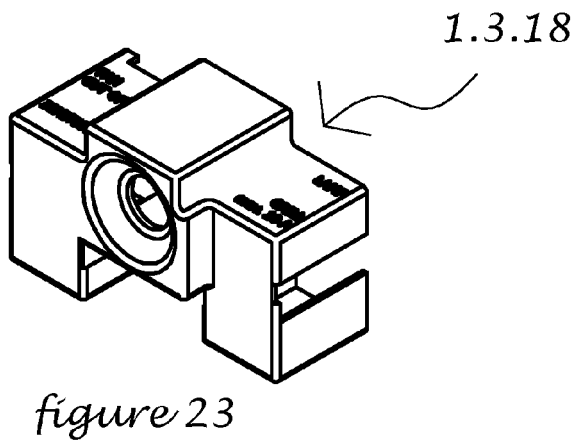
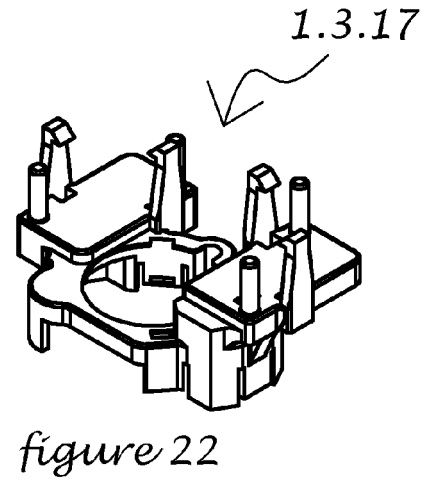
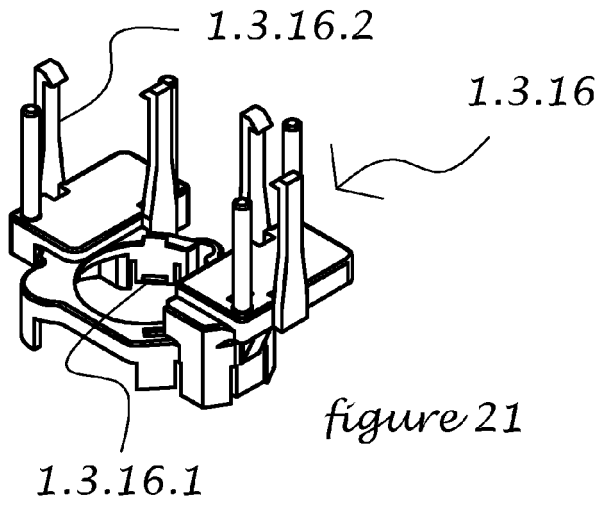
figure 7

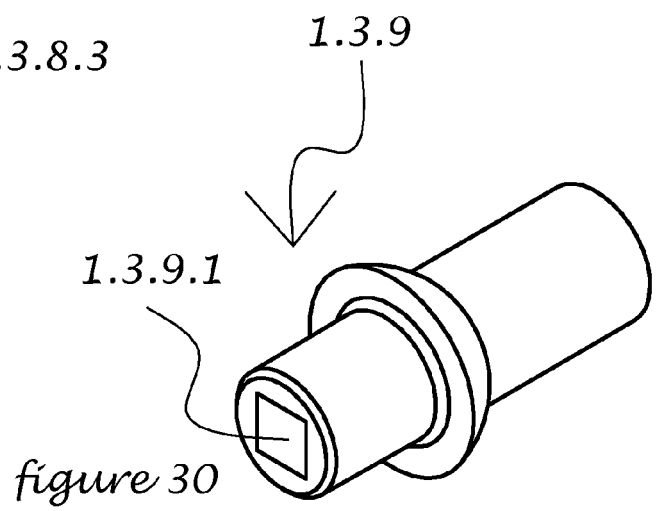
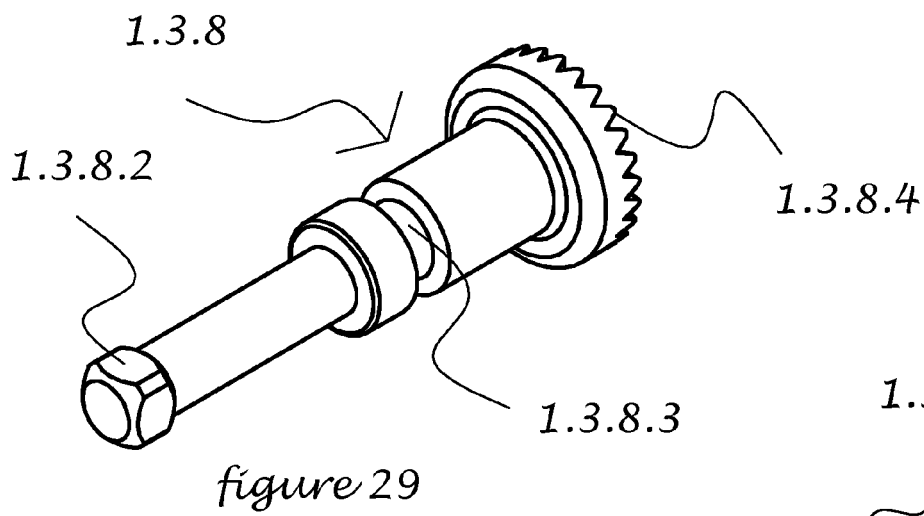
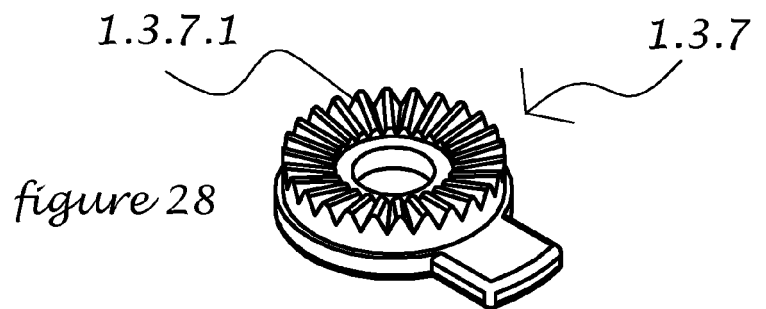
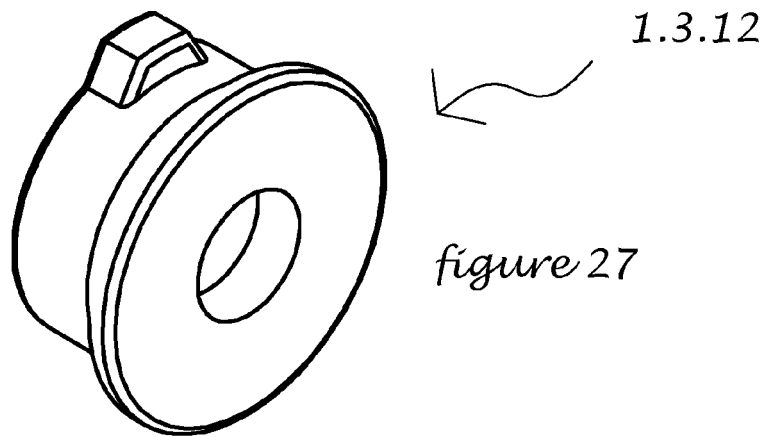












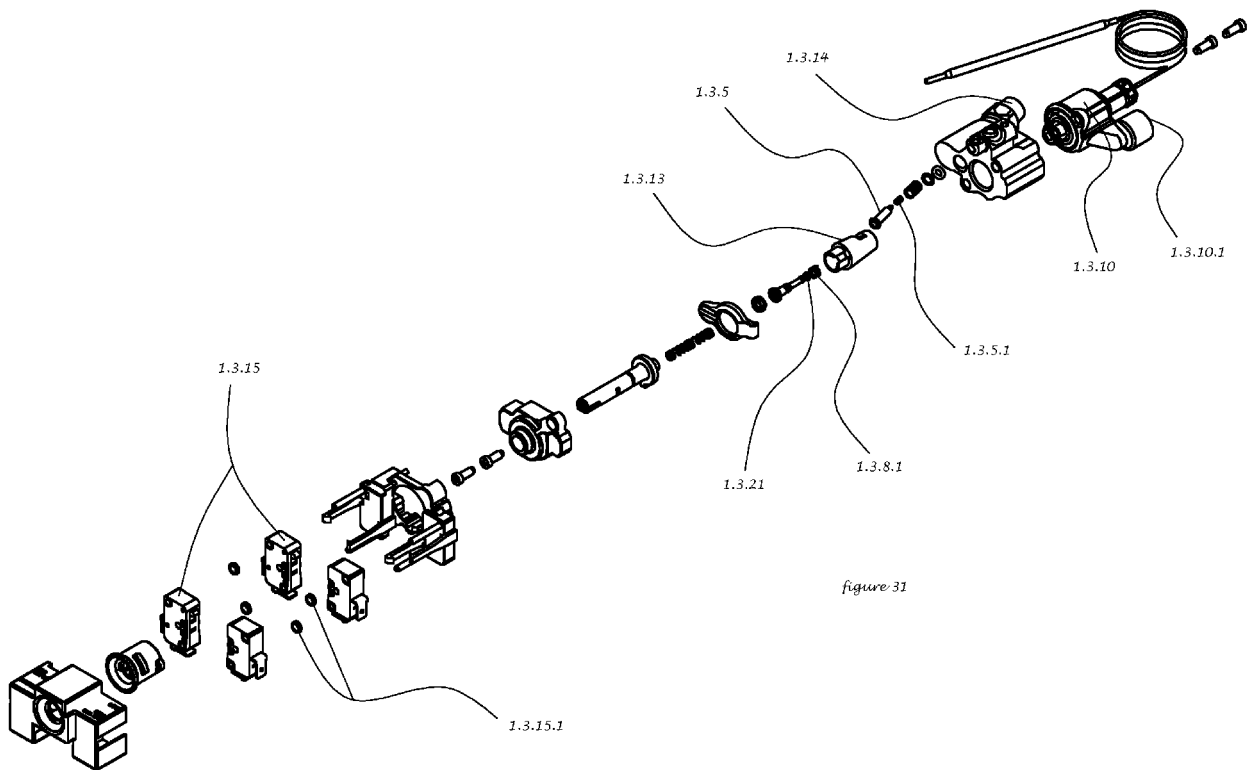


figure 31

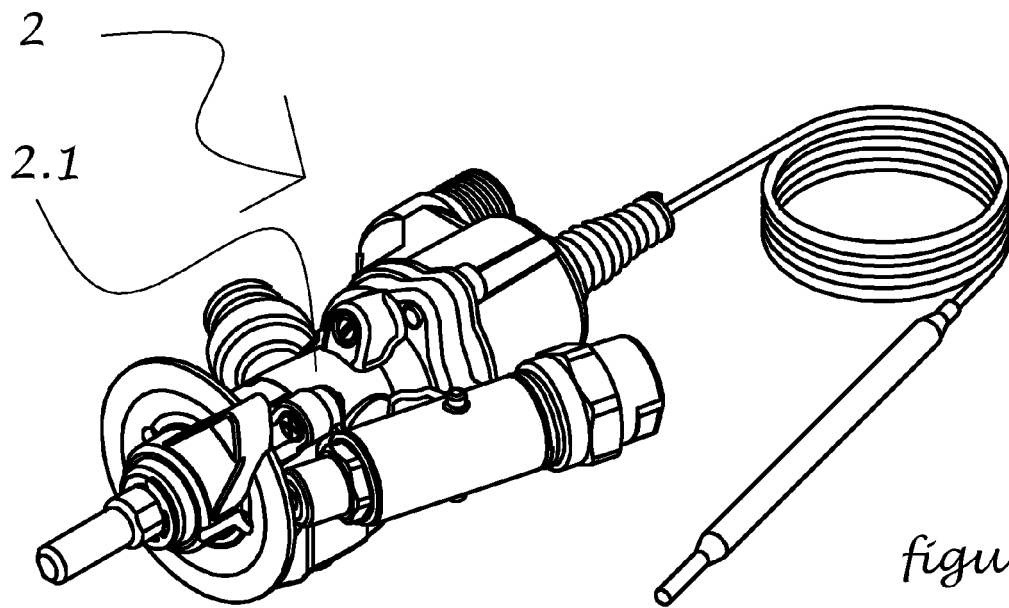


figure 32

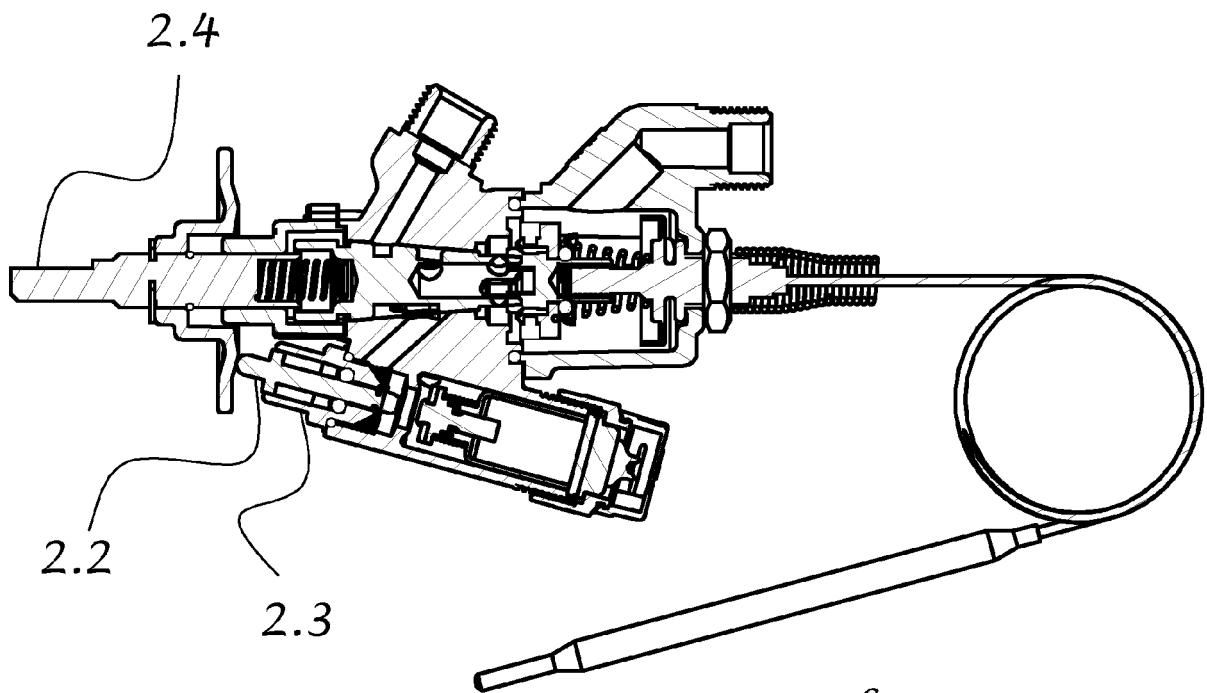


figure 33



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A	* paragraphs [0001], [0002]; figures 1-3 * paragraph [0013] - paragraph [0020] *	2-9	
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A	* paragraph [0001]; figures 1-6 * * paragraph [0011] - paragraph [0013] *	9	
X	US 4 085 891 A (BRANSON CHARLES D ET AL) 25 April 1978 (1978-04-25) * the whole document *	1-9	
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			F23N F23K
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 October 2017	Examiner Hauck, Gunther
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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