(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 591 721 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.11.2005 Bulletin 2005/44

(21) Application number: **04425294.8**

(22) Date of filing: **29.04.2004**

(51) Int Cl.[7]: **F23K 5/00**, F16K 17/168, F23N 1/00, F23K 5/14, F23K 5/16

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

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Remarks:
Amended claims in accordance with Rule 86 (2) EPC.

(54) Safety and gas flow regulating valve in cooking tops

(57) A safety and gas flow regulating valve in cooking tops comprises: an inlet (3) to be connected with a gas supply network; an outlet (6) brought into fluid communication with the inlet (3) and adapted to be connected with a burner; a regulation portion (4) brought into fluid communication with the inlet (3) and/or the outlet (6) and in turn comprising a first inner space (4a) occupiable by a gas and a selecting element (4b) active therein and adapted to be moved between a condition of minimum or zero gas flow rate and a condition of maximum gas flow rate; a safety portion (5) brought into fluid communication with the inlet (3) and/or the outlet (6) and in turn comprising a second inner space (5a) brought into fluid communication with the first inner space (4a), and a closure member (5b) active therein and adapted to be moved between a closed condition and an open condition; setting means (7) active on the closure member (5b) to bring said member to an open condition correspondingly with switching on of a flame; the setting means (7) is active on the closure member (5b) externally of the first and/or second inner space (4a) and/or (5a).

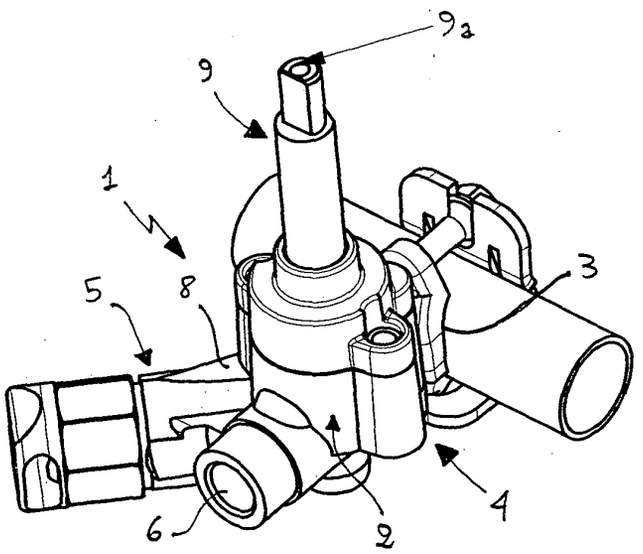

Fig. 1

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Description

[0001] The present invention relates to a safety and gas flow regulating valve in cooking tops.

[0002] It is known that regulation of the flame intensity on the burners of a gas cooker is important under different points of view, in order to maintain optimal cooking conditions or for yield maximisation (in terms of heat and/or gaseous emissions), for example.

[0003] Also of fundamental importance is safety in operation of the cooking top, so as to avoid gas leaks and/or gas escapes under non-use or failure conditions of the household appliance.

[0004] In modern gas cookers, and in particular in the cooking tops, appropriate safety and regulation valves are used (also referred to as "gastaps") that simultaneously perform the above mentioned technical functions.

[0005] These valves are generally constructed following the structure depicted in patent IT1200081 (or in the equivalent patent FR 2583506) which mainly comprises a "regulation section" including a valve for flow-rate regulation interlocked with a suitable regulating knob to be rotatably utilised by a user, a "safety section" having a closure member and extending along an axis of its own, and suitable pipe fittings for connection with the supply pipeline of the gas network.

[0006] This valve of known type internally defines a gas path extending along all the just mentioned "sections" and going from the point of connection to the supply pipeline until the burner on the cooking top; also present is a kinematic chain capable of imparting an axial movement to a safety element (generally consisting of a rod operatively active on the closure member in the safety section) based on a corresponding axial movement of the stem supporting the gas regulating knob.

[0007] In the above described known device, the closure member in the safety section is made of a ferromagnetic material and is retained in an open configuration by an electromagnet which in turn receives the necessary electric energy from a thermocouple exposed to the gas under combustion.

[0008] When current generated by the thermocouple is zero or in any case too low (which happens when the gas is turned off by the user or unintentionally due to spilling of water on the burner, for example), the electromagnet stops exerting its attraction on the closure member that closes the gas passage by virtue of the action of an elastic counter-element.

[0009] When the gas is turned on, the user must necessarily bring the closure member to an open configuration (following a process that in jargon is defined as "setting of the closure member"): this operation is carried out mechanically by acting in an appropriate manner (through a suitable command positioned at the front on the gas cooker or on the cooking top) on the kinematic chain so as to act on the closure member and bring it to an open configuration.

[0010] In addition, valves of known type usually have suitable means for selecting the minimum flow-rate conditions depending on the type of gas: this means, usually comprising a rotatable needle provided with passage ports of different diameters, must be suitably regulated before or during mounting of the valve in a cooking top and therefore it must be easily accessible to a qualified operator.

[0011] The above described known art has some non negligible drawbacks.

[0012] It is to be noted for example that in the just described construction architecture, gas takes up an important volume at the inside of the valve: this involves important problems connected with the fact that it is necessary to arrange many sealing elements for all the inner spaces of the valve body concerned with the presence of gas, which will increase the production costs and reduce the general reliability (that is obviously more reduced when there are increased possibilities of suffering gas leaks).

[0013] In addition, the above described valve of known type has a rather complicated kinematic chain adapted to set the closure member in a mechanical manner: this fact negatively affects the complexity and sizes of the valve and also the valve reliability (which decreases on increasing of the number of pieces forming the kinematic chain) and costs.

[0014] It is also to be noted that the great bulkiness of the valves of known type is not suitable for modern design requirements of the cooking tops demanding a particular positioning of the regulation and safety valves and above all also demanding a particular positioning of the regulation knobs; at the same time, the availability of a separated command to set one or more closure members (each of which will be operationally coupled with a respective regulating and safety valve) results in further drawbacks from the point of view of the valve integration into the cooking top or the gas cooker.

[0015] From the point of view of selecting the minimum flow-rate condition, the valves of known type have a further drawback, because they have very uncomfortable accesses to the rotatable needle which generally limits the assembling flexibility and sometimes does not allow intervention on the rotatable needle once the valve has been inserted into the structure of a cooking top or a gas cooker.

[0016] The present invention therefore aims at providing a safety and gas flow regulating valve in cooking tops capable of obviating the limits set out above.

[0017] In more detail the present invention aims at making a regulating and safety valve having the simplest possible structure and in particular capable of minimising the inner volume of the valve body taken up by the gas under any operating condition.

[0018] In addition, the present invention aims at making a valve enabling the closure member to be set through a simplified kinematic chain so as to minimise the overall dimensions, reduce the possibilities of malfunctions and/or breaks and increase safety in use.

[0019] The present invention also aims at providing a valve enabling the closure member to be set and the gas flow to be simultaneously regulated through a single command, which advantageously offers a greater possibility of integrating the valve into the cooking tops and obtaining reduced sizes.

[0020] It is an inherent aim of the present invention to make a valve that can be easily submitted to operations for selection of the minimum, even when said valve has been already assembled or embedded in a cooking top or in a gas cooker.

[0021] It is a further aim of the present invention to provide a valve of high compactness, above all in a vertical direction, while at the same time having reduced design and manufacturing costs.

[0022] The foregoing and further aims that will become more apparent in the course of the present description are substantially achieved by a safety and gas flow regulating valve in cooking tops having the features set out in one or more of the appended claims.

[0023] For better explaining the present inventive idea, an embodiment of a valve in accordance with the present invention is now described by way of non-limiting example and illustrated in the accompanying drawings, in which:

- Fig. 1 is a perspective view of a valve in accordance with the present invention;
- Fig. 2 is a top view of the valve shown in Fig. 1;
- Fig. 3 is a perspective view against the light of the valve in Fig. 1;
- Fig. 4 is a view partly in section of a valve in accordance with the invention taken along line IV-IV in Fig. 2; and
- Fig. 5 is a view partly in section of a valve in accordance with the invention taken along line V-V in Fig. 2.

[0024] With reference to the drawings, the valve in accordance with the present invention is generally identified by reference numeral 1 and it substantially comprises an inlet 3 (to be connected with a gas supply network) and an outlet 6 (brought into fluid communication with the inlet 3 and adapted to be connected with a burner).

[0025] In more detail, valve 1 has a regulation portion 4, brought into fluid communication with the inlet 3 and/or the outlet 6, which in turn comprises a first inner space 4a to be taken up by a gas and a selecting element 4b (that can conveniently be a traditional selecting element of a flow rate regulating valve) interlocked with suitable flow rate regulating means 9 (described in more detail in the following) and operatively active in said first inner space 4a so that it can be moved in a reversible manner from a condition of minimum or zero gas flow rate to a condition of maximum gas flow rate towards the outlet 6.

[0026] There is then a safety portion 5 brought into fluid communication with the inlet 3 and/or outlet 6 and in turn comprising a second inner space 5a (brought into fluid communication at least with the first inner space 4a) and a closure member 5b operatively active in said second inner space 5a and adapted to be moved in a reversible manner from a closed condition at which it prevents passage of gas at least towards the first inner space 4a, and an open condition at which on the contrary it allows passage of gas at least towards the first inner space 4a.

[0027] Conveniently, setting means 7 is present that is operatively active on the closure member 5b to bring it at least to an open condition under predetermined operating conditions that typically can be those corresponding to switching on of the flame on a burner; this setting means will be manually operated by a user of the cooking top (or gas cooker) and will exert an appropriate mechanical action on the closure member 5b, to be illustrated in more detail in the following.

[0028] Advantageously, the setting means is active on the closure member 5b along at least one operating axis parallel to and offset with respect to the axis of a stem 9a.

[0029] In accordance with the present invention, the setting means 7 is operatively active at least partly out of the first and/or the second inner space 4a and/or 5a, and more particularly the setting means 7 is at least partly contained in a third inner space 7a that in turn is at least partly separated, from a physical and/or hydraulic point of view, from the remaining inner spaces of the valve that are on the contrary submitted to the gas/flow presence under operating conditions.

[0030] With reference to the drawings it is to be noted that the inlet 3, regulation portion 4, safety portion 5 and outlet 6 form a single valve body 2 and define, at the inside of said valve body 2, an outflow path for a gas that is travelled over by the gas itself from the inlet 3 to the safety portion 5, to the regulation portion 4, to the outlet 6 (so that possible failure situations or situations of undesirable switching off of the flame will cause closure of the closure member 5b, and will consequently stop the gas outflow upstream of the regulation portion 4).

[0031] It is also to be noted that the setting means 7 is positioned in a third inner space 7a formed in the valve body 2: advantageously, this third inner space 7a is at least partly separated from the outflow path, and more particularly part of the third inner space 7a is not in fluid communication with the inlet 3 and/or the outlet 6 and/or the first inner space 4a and/or the second inner space 5a.

[0032] From a structural point of view, the setting means 7 substantially comprises a kinematic chain terminating at the closure member 5b and having its starting point at a location on which a user can directly or indirectly act (as illustrated later on).

[0033] In order to simplify the structure of valve 1 and to have the maximum operating rapidity and efficiency, the embodiment of the present invention herein illustrated has a first actuator 7b operable by a user and mov-

able along a first operating direction, which actuator is operatively associated with a second actuator 7c that in turn is movable in a second operating direction transverse to the first operating direction (and is substantially parallel to and/or coincident with a movement direction of the closure member 5b).

[0034] In order to convert movement of the first actuator 7b into a corresponding movement of the second actuator 7c (and therefore of the closure member 5b), the last-mentioned elements are mutually interfaced at respective first and second operating portions 8b, 8c; conveniently, these first and second operating portions 8b, 8c have surfaces that are inclined to the corresponding first and second operating directions and are mutually in contact under operating conditions, so that a translation of the first actuator 7b causes a relative slight rubbing between these two surfaces in contact the effect of which is a thrust exerted on the second actuator 7c giving rise to translation of same along the respective operating direction.

[0035] In order to suitably arrange the oblique surfaces, the first and second operating portions 8b, 8c can consist of prismatic bodies of a conical or frustoconical shape or having the conformation of a truncated pyramid.

[0036] From a structural point of view, it is to be noticed that inlet 3 and outlet 6 are disposed along a first axis, whereas the safety portion 5 extends in a second axis transverse (oblique for example, as shown in the accompanying drawings) to said first axis; as regards minimising of the vertical overall dimensions, said first and second axes can be considered as belonging to the same ideal plane, or in other words they define a lying plane on which most of the valve 1 structure extends.

[0037] With reference to the illustrated embodiment, it is for example possible to see that the third operating space 7a comprises a first cavity receiving the first actuator 7b, and a second cavity adjacent to the first cavity and in turn housing the second actuator 7c: this second cavity is exposed to the gas flow (or, more precisely, to the gas leakage) and at the same time is hydraulically separated, through suitable sealing elements 7g, from the first cavity, so that the first actuator 7b works almost completely in an inner space of the valve body 2 that is not occupiable by the gas.

[0038] On the other hand, the regulation portion 4 (that must bear a means for regulation of the gas flow rate that in turn, must be able to emerge from a cooking top or the front piece of a gas cooker to be manipulated by a user) extends in a third axis coming out of the just mentioned lying plane, along a direction that can be for example, perpendicular to said plane.

[0039] Conveniently, a means for flow-rate regulation (9) is present which is operable by a user: in accordance with the known art, this regulation means 9 is operatively active on the regulation portion 4 and typically may comprise a knob engaged in a rotational manner on a stem 9a disposed along the third axis (or in other words along the extension axis of the regulation portion that from a geometrical and structural point of view intersects at least the axis of the safety portion and/or the axis defined by the joining line between the valve inlet and outlet).

[0040] Going back to the setting means 7, it is to be pointed out that in the embodiment herein illustrated the first actuator 7b is movable within the regulation portion 4 (and is therefore housed therein in an appropriate seat formed within the valve body 2 and that formally is part of the third inner space 7a) along a first operating axis parallel to and offset with respect to the third axis (that substantially is the axis of stem 9a), whereas the second actuator 7c is movable within the safety portion 5 (in a suitable seat that in turn is part of the third inner space 7a) along the second axis of the latter.

[0041] In more detail, it is possible to see that the conformation of the second actuator 7c has a shank 7d abutting against the closure member 5b and a base 7e of a greater transverse section than the corresponding transverse section of the shank 7d (and the shape of which for example matches that of the housing seat internally retaining the second actuator 7c at least partly). It will be recognised that the base 7e is interposed between the shank 7d and the second operating portion 8c: in this manner, and with such a difference in terms of cross sections, it is possible to let the gas pass, under open conditions of the closure member 5b, through the safety portion 5 until the regulation portion 4, whereas the base 7e ensures the non-penetration of the gas into the third inner space 7a.

[0042] In order to minimise the number of external commands (or in other words, in order to be able to simultaneously act by a single outer command both on the gas flow-rate regulation and on setting of the closure member 5b before switching the burner on), the setting means 7 advantageously comprises a transmission 7f operatively active between the first actuator 7b and the stem 9a, said stem 9a being movable along the third axis so that a translation of the stem 9a corresponds to a translation of the first actuator 7b.

[0043] In order to adapt the same valve 1 to different types of combustible gas, the present valve advantageously comprises means 10 for selecting a minimum gas flow rate; this selecting means 10 is operatively active on the regulation portion 4 and is operable (before or after installation of the valve 1 in a cooking top) by an operator depending on a predetermined type of gas or gas mixture.

[0044] This selecting means 10 comprises a selecting element that typically can be a needle having a plurality of passage orifices of different area, and interfacing means (that can merely consist of a suitably grooved head of said needle, so that it can be driven by a screwdriver or similar tool) accessible to an operator and associated with said selecting element.

[0045] Advantageously, the interfacing means is housed in the stem 9a and more specifically is housed

within a cavity coaxial with the stem 9a extending along the third axis of the regulation portion 4: in this connection it is to be noted that arrangement of this coaxial cavity is made possible through offsetting of the first actuator, that in any case is operated indirectly by the stem 9a itself: in this way the structure of valve 1 is greatly compacted although said valve has all the functional features hitherto described.

[0046] In order to ensure a correct gas passage, a bypass duct 8 is also present which extends from the first inner space 4a to the second inner space 5a; this bypass duct 8 can be positioned in any manner in the valve body 2, provided it is adapted to perform the just described function, and can be travelled over by a gas flow under the open condition of the closure member 5b.

[0047] Obviously, in order to allow a correct operation the safety portion 5 comprises an electromagnetic element adapted to move the closure member 5b (that therefore can be of ferromagnetic material or may comprise at least one ferromagnetic portion capable of being attracted by the electromagnet itself) at least to the open condition; in addition, the safety portion 5 comprises suitable counter-means (such as a spring, not shown in the accompanying drawings) adapted to move the closure member 5b at least to the closed condition.

[0048] The invention achieves important advantages.

[0049] First of all, the particular construction architecture of the present valve allows the kinematic chain for setting of the closure member to work in spaces internal to the valve body, thereby obtaining a great compactness of the product, and at the same time makes it possible to carry out a simultaneous operation of the setting means through the flow rate regulating means.

[0050] It is also to be noted that an important fraction of the setting means operates in inner spaces that are not invaded by the gas: this greatly increases the safety of use because the pneumatic isolation of these inner spaces is obtained with a minimum number of sealing elements, which is advantageous in terms of construction and operation simplicity.

[0051] At the same time, it is to be pointed out that in the present valve, gas circulation takes place following a minimum path: this brings about further advantages in terms of valve compactness, rapidity of intervention in case of (desired or undesired) switching off of the flame, reduction of the valve body portions susceptible of being submitted to the presence of sealing elements, and manufacturing costs.

[0052] In addition, the kinematic setting chain of the closure member is very simple and is made up of a minimum number of pieces: this has beneficial effects in terms of production economy and operating reliability.

[0053] Still as regards the kinematic chain, it will be recognised that, by virtue of its intrinsic simplicity and its particular positioning within the valve body, it is advantageously possible to integrate the setting command with the flow-rate regulation command so that a user can operate (in a different manner) a single manipulation interface, the integration of this valve in modern cooking tops being thereby facilitated.

[0054] On the other hand, by combining the particular structural and operational features of the present valve, an important reduction in the outer sizes of the whole product is obtained, above all in a vertical direction: this further enhances the possibility of integrating the valve into modern kitchen appliances and apparatus.

[0055] It is also to be noted that the structure of the present valve allows an easy and quick access to the means for selecting the minimum flow rate: therefore it is possible to intervene on this means also under assembling/embedding conditions of the valve in the cooking top, without the risk on the other hand that this additional functional character may be detrimental to the overall dimensions of the valve.

[0056] It is finally to be pointed out that the structure simplicity and the great variety of materials that can be used positively affects the design and production costs.

Claims

1. A safety and gas flow regulating valve in cooking tops comprising:

- an inlet (3) to be connected with a gas supply network;
- an outlet (6) brought into fluid communication at least with said inlet (3) and to be connected with a burner;
- a regulation portion (4) brought into fluid communication with the inlet (3) and/or outlet (6), said regulation portion (4) in turn comprising:

- a first inner space (4a) occupiable by a gas;
- flow-rate regulating means (9) operable by a user, said regulating means (9) preferably comprising a knob engaged in a rotational manner on a stem (9a) disposed along a respective axis; and
- a selecting element (4b) interlocked with said flow-rate regulating means (9) and operatively active in said first inner space and adapted to be moved in a reversible manner between a condition of minimum or zero gas flow rate and a condition of maximum gas flow rate towards said outlet (6);
- a safety portion (5) brought into fluid communication with the inlet (3) and/or outlet (6), said safety portion (5) in turn comprising:

- a second inner space (5a) brought into fluid communication at least with said first inner space (4a);
- a closure member (5b) operatively active in said second inner space (5a) and adapted to be moved in a reversible manner between a

closed condition at which it inhibits passage of gas at least towards the first inner space (4a) and an open condition at which it allows passage of gas at least towards the first inner space (4a); and

- setting means (7) operatively active on the closure member (5b) to bring said member at least to said open condition under predetermined operating conditions, said operating conditions preferably corresponding to switching on of the flame on a burner;

characterised in that said setting means (7) is active on the closure member (5b) along at least one offset and preferably parallel operating axis, with respect to the axis of the stem (9a).

2. A valve as claimed in claim 1, **characterised in that** the setting means (7) is operatively active at least partly out of the first and/or second inner space (4a) and/or (5a), said setting means (7) being at least partly contained in a third inner space (7a).

3. A valve as claimed in claim 1 or 2, **characterised in that** the inlet (3), regulation portion (4), safety portion (5) and outlet (6) form a single valve body (2) and define, within said valve body (2), an outflow path for a gas that preferably extends from the inlet (3) to the safety portion (5), to the regulation portion (4), to the outlet (6).

4. A valve as claimed in anyone of the preceding claims, **characterised in that** the setting means (7) is positioned in a third inner space (7a) formed in the valve body (2), said third inner space (7a) is at least partly separated from said outflow path, a portion of said third inner space (7a) is not in fluid communication with the inlet (3) and/or outlet (6) and/or the first inner space (4a) and/or the second inner space (5a).

5. A valve as claimed in claim 4, **characterised in that** the setting means (7) comprises:

- a first actuator (7b) operable by a user and movable along a first operating direction; and
- a second actuator (7c) operatively associated with said first actuator (7b) and movable in a second operating direction transverse to said first operating direction and preferably parallel to a movement direction of the closure member (5b).

6. A valve as claimed in claim 5, **characterised in that** said first and second actuators (7b, 7c) are mutually interfaced at respective first and second operating portions (8b, 8c),' said first and second operating portions (8b, 8c) having surfaces inclined to the corresponding first and second operating directions and mutually in contact under operating conditions.

7. A valve as claimed in claim 6, **characterized in that** the first and second operating portions (8b, 8c) are made up of prismatic bodies having the shape of a cone, a truncated cone or a truncated pyramid.

8. A valve as claimed in anyone of the preceding claims, **characterised in that** the third operating space (7a) comprises a first cavity housing the first actuator (7b) and a second cavity adjacent to said first cavity and housing the second actuator (7c), said second cavity being susceptible of being at least partly exposed to a gas flow and/or a gas leakage and being preferably hydraulically separated from the first cavity, through suitable sealing elements (7g).

9. A valve as claimed in anyone of the preceding claims, **characterised in that** the inlet (3) and outlet (6) are disposed along a first axis, the safety portion (5) extending in a second axis transverse, and preferably oblique, to said first axis, said first and second axes defining a lying plane.

10. A valve as claimed in claim 9, **characterised in that** the regulation portion (4) extends in a third axis emerging from said lying plane and preferably perpendicular thereto.

11. A valve as claimed in anyone of the preceding claims, **characterised in that** it further comprises flow-rate regulating means (9) operable by a user and operatively active on the regulation portion (4), said regulating means (9) preferably comprising a knob engaged in a rotational manner on a stem (9a) disposed along said third axis.

12. A valve as claimed in the preceding claims 5 to 11, **characterised in that** the first actuator (7b) is movable within the regulation portion (4) along a first operating axis parallel and offset with respect to the third axis, the second actuator (7c) being preferably movable within the safety portion (5) along the second axis thereof.

13. A valve as claimed in claim 12, **characterised in that** the second actuator (7c) comprises:

- a shank (7d) abutting against the closure member (5b); and
- a base (7e) interposed between said shank (7d) and the second operating portion (8c) and having a cross section greater than a corresponding cross section of the shank (7d), the shape of said cross section of the base (7e) preferably matching that of a housing seat inside which

the second actuator (7c) is retained at least partly.

14. A valve as claimed in anyone of the preceding claims 11 to 13, **characterised in that** the setting means (7) further comprises a transmission (7f) operatively active between the first actuator (7b) and the stem (9a), the stem (9a) being movable along said third axis, a translation of the stem (9a) corresponding to a translation of the first actuator (7b).

15. A valve as claimed in anyone of the preceding claims, **characterised in that** it comprises means (10) for selecting a minimum gas flow rate, which means is operatively active in the regulation portion (4) and is operable by an operator depending on a predetermined type of gas or gaseous mixture.

16. A valve as claimed in claim 15, **characterised in that** said selecting means (10) comprises a selecting element which preferably consists of a rotatable needle having a plurality of passage orifices of different area, and interfacing means accessible by an operator and associated with said selecting element.

17. A valve as claimed in claim 16, **characterised in that** said interfacing means is houses within said stem (9a), the interfacing means being preferably housed within a cavity coaxial with the stem (9a) and extending along the third axis of the regulation portion (4).

18. A valve as claimed in anyone of the preceding claims, **characterised in that** it further comprises a by-pass duct (8) extending from the first inner space (4a) to the second inner space (5a), said by-pass duct (8) being adapted to be travelled over by a gas flow when the closure member (5b) is in an open condition.

19. A valve as claimed in anyone of the preceding claims, **characterised in that** the safety portion (5) comprises an electromagnetic element adapted to move the closure member (5b) at least to the open condition, the closure member (5b) being preferably made of a ferromagnetic material, the safety portion (5) more preferably comprising counter-means adapted to move the closure member (5b) at least to the closed condition.

Amended claims in accordance with Rule 86(2) EPC.

1. A safety and gas flow regulating valve in cooking tops comprising:

- an inlet (3) to be connected with a gas supply network;
- an outlet (6) brought into fluid communication at least with said inlet (3) and to be connected with a burner;
- a regulation portion (4) brought into fluid communication with the inlet (3) and/or outlet (6), said regulation portion (4) in turn comprising:
  - a first inner space (4a) occupiable by a gas;
  - flow-rate regulating means (9) operable by a user and comprising a knob engaged in a rotational manner on a stem (9a) disposed along a respective axis; and
  - a selecting element (4b) interlocked with said flow-rate regulating means (9) and operatively active in said first inner space and adapted to be moved in a reversible manner between a condition of minimum or zero gas flow rate and a condition of maximum gas flow rate towards said outlet (6);
- a safety portion (5) brought into fluid communication with the inlet (3) and/or outlet (6), said safety portion (5) in turn comprising:
  - a second inner space (5a) brought into fluid communication at least with said first inner space (4a);
  - a closure member (5b) operatively active in said second inner space (5a) and adapted to be moved in a reversible manner between a closed condition at which it inhibits passage of gas at least towards the first inner space (4a) and an open condition at which it allows passage of gas at least towards the first inner space (4a); and
  - setting means (7) operatively active on the closure member (5b) to bring said member at least to said open condition under predetermined operating conditions, said operating conditions preferably corresponding to switching on of the flame on a burner, said setting means (7) being operable by a user and respectively comprising:
    - a first actuator (7b) operable by a user and movable along a first operating direction, said first operating direction being one offset and parallel operating axis with respect to the axis of the stem (9a); and
    - a second actuator (7c) operatively associated with said first actuator (7b) and movable in a second operating direction parallel to a movement direction of the closure member (5b) and transverse to the first operating direction,

characterised in that the inlet (3), the regulation portion (4), the safety portion (5) and the outlet (6) form a single valve body (2) and define, within said valve body (2), an outflow path for a gas that extends from the inlet (3) to the safety portion (5), to the regulation portion (4), to the outlet (6).

2. A valve as claimed in claim 1, **characterised in that** the setting means (7) is operatively active at least partly out of the first and/or second inner space (4a) and/or (5a), said setting means (7) being at least partly contained in a third inner space (7a).

3. A valve as claimed in claims 1 or 2, **characterised in that** the setting means (7) is positioned in a third inner space (7a) formed in the valve body (2), said third inner space (7a) is at least partly separated from said outflow path, a portion of said third inner space (7a) is not in fluid communication with the inlet (3) and/or outlet (6) and/or the first inner space (4a) and/or the second inner space (5a).

4. A valve as claimed in claim 3, **characterised in that** the setting means (7)

5. A valve as claimed in claim 4, **characterised in that** said first and second actuators (7b, 7c) are mutually interfaced at respective first and second operating portions (8b, 8c), said first and second operating portions (8b, 8c) having surfaces inclined to the corresponding first and second operating directions and mutually in contact under operating conditions.

6. A valve as claimed in claim 5, **characterized in that** the first and second operating portions (8b, 8c) are made up of prismatic bodies having the shape of a cone, a truncated cone or a truncated pyramid.

7. A valve as claimed in anyone of the preceding claims, **characterised in that** the third operating space (7a) comprises a first cavity housing the first actuator (7b) and a second cavity adjacent to said first cavity and housing the second actuator (7c), said second cavity being susceptible of being at least partly exposed to a gas flow and/or a gas leakage and being hydraulically separated from the first cavity, through suitable sealing elements (7g).

8. A valve as claimed in anyone of the preceding claims, **characterised in that** the inlet (3) and outlet (6) are disposed along a first axis, the safety portion (5) extending in a second axis oblique, to said first axis, said first and second axes defining a lying plane.

9. A valve as claimed in claim 8, **characterised in that** the regulation portion (4) extends in a third axis emerging from said lying plane and perpendicular thereto.

10. A valve as claimed in anyone of the preceding claims, **characterised in that** it further comprises flow-rate regulating means (9) operable by a user and operatively active on the regulation portion (4), said regulating means (9) comprising a knob engaged in a rotational manner on a stem (9a) disposed along said third axis.

11. A valve as claimed in the preceding claims from 4 to 10, **characterised in that** the first actuator (7b) is movable within the regulation portion (4) along a first operating axis parallel and offset with respect to the third axis, the second actuator (7c) being movable within the safety portion (5) along the second axis thereof.

12. A valve as claimed in claim 11, **characterised in that** the second actuator (7c) comprises:

- a shank (7d) abutting against the closure member (5b); and
- a base (7e) interposed between said shank (7d) and the second operating portion (8c) and having a cross section greater than a corresponding cross section of the shank (7d), the shape of said cross section of the base (7e) matching that of a housing seat inside which the second actuator (7c) is retained at least partly.

13. A valve as claimed in anyone of the preceding claims from 10 to 12, **characterised in that** the setting means (7) further comprises a transmission (7f) operatively active between the first actuator (7b) and the stem (9a), the stem (9a) being movable along said third axis, a translation of the stem (9a) corresponding to a translation of the first actuator (7b).

14. A valve as claimed in anyone of the preceding claims, **characterised in that** it comprises means (10) for selecting a minimum gas flow rate, which means is operatively active in the regulation portion (4) and is operable by an operator depending on a predetermined type of gas or gaseous mixture.

15. A valve as claimed in claim 14, **characterised in that** said selecting means (10) comprises a selecting element which consists of a rotatable needle having a plurality of passage orifices of different area, and interfacing means accessible by an operator and associated with said selecting element.

16. A valve as claimed in claim 15, **characterised in that** said interfacing means is housed within said stem (9a), the interfacing means being housed with-

in a cavity coaxial with the stem (9a) and extending along the third axis of the regulation portion (4).

17. A valve as claimed in anyone of the preceding claims, **characterised in that** it further comprises a by-pass duct (8) extending from the first inner space (4a) to the second inner space (5a), said by-pass duct (8) being adapted to be travelled over by a gas flow when the closure member (5b) is in an open condition.

18. A valve as claimed in anyone of the preceding claims, **characterised in that** the safety portion (5) comprises an electromagnetic element adapted to move the closure member (5b) at least to the open condition, the closure member (5b) being made of a ferromagnetic material, the safety portion (5) comprising counter-means adapted to move the closure member (5b) at least to the closed condition.

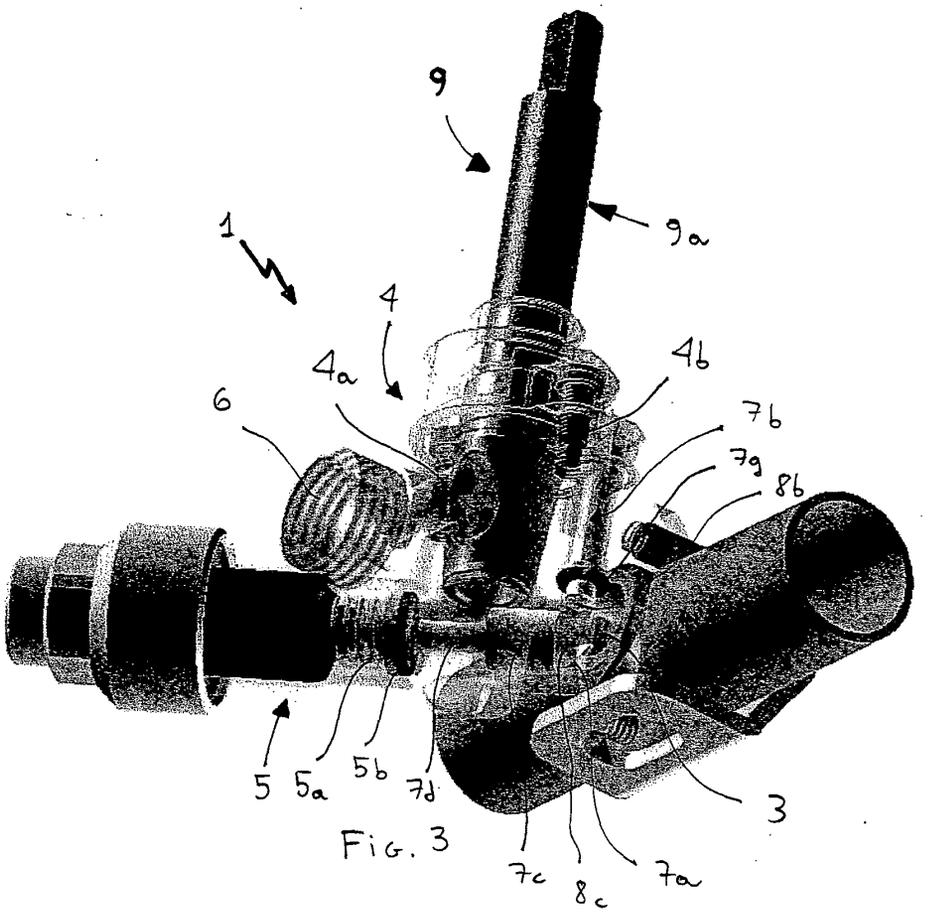

Fig. 3

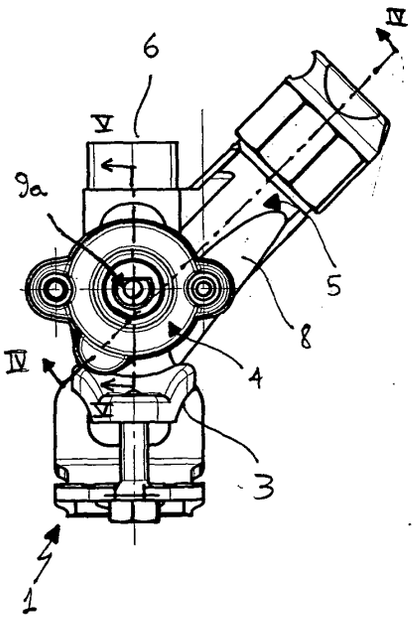

Fig. 2

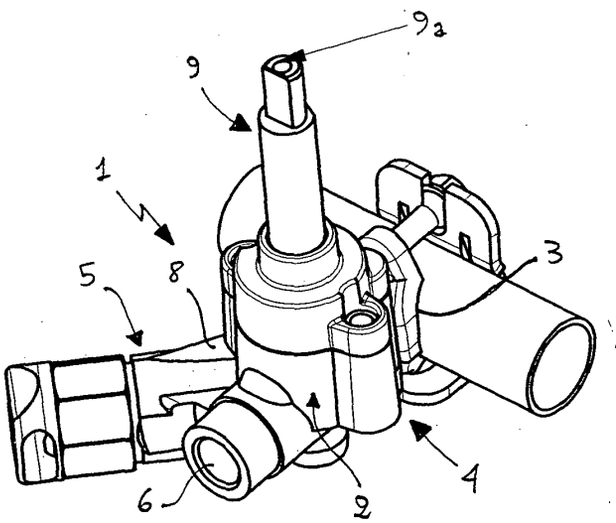

Fig. 1

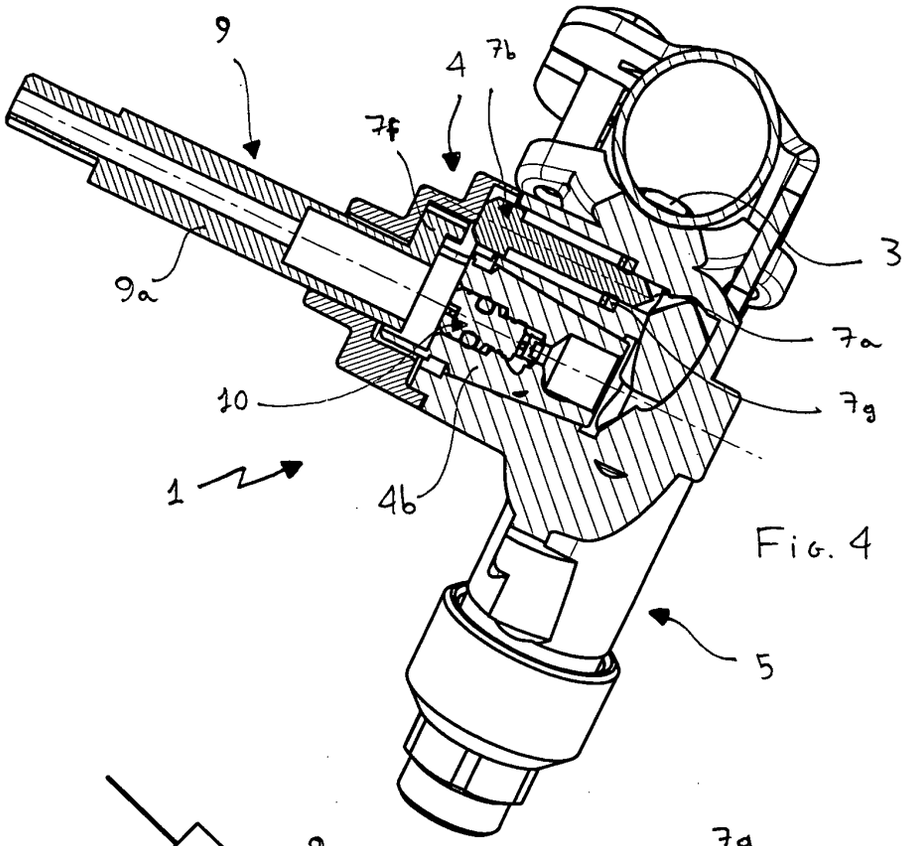
9
4
7b
7f
3
9a
7a
10
7g
1
4b
5

Fig. 4

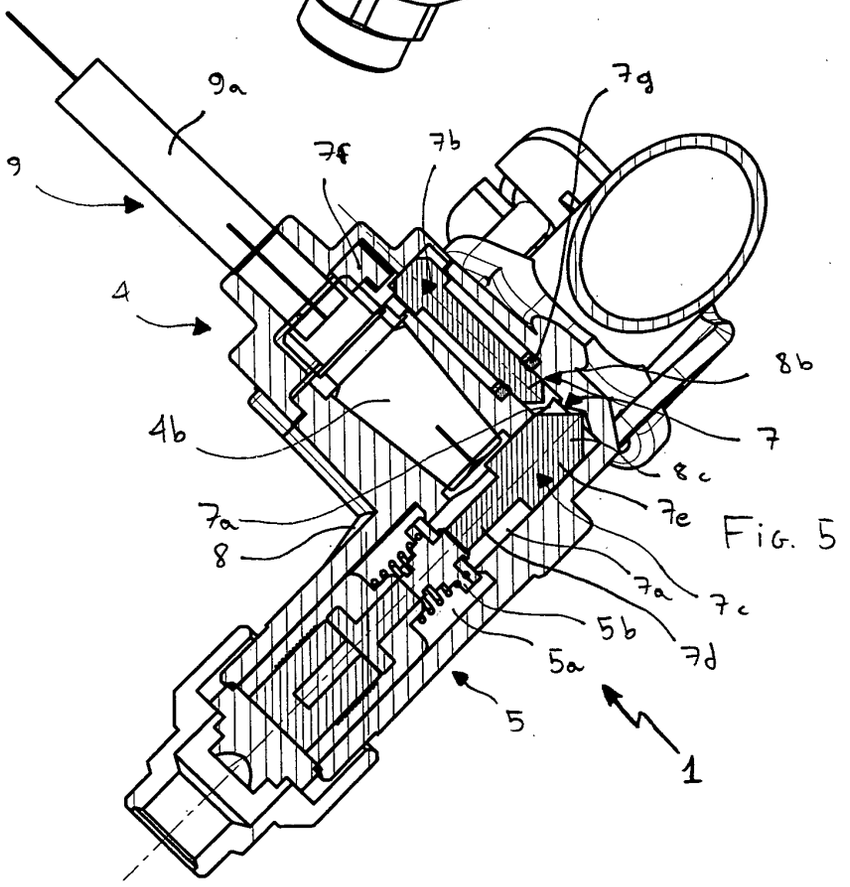
9a
7g
9
7f
7b
4
8b
4b
7
8c
7a
7e
8
7a
7c
5b
7d
5a
5
1

Fig. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5294

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Munich	21 September 2004	Gavriliu, C

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