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(54) Improved control and safety device for gas appliances

(57) A control and safety device for burners of gas appliances is described, in particular for domestic use, capable of fulfilling a plurality of cooking functions, comprising all the known elements for their operation, including safety means which are actuated through an axial control given by a shaft of a cock controlling the burner operation.

The main feature of the invention consists in that means (6, 9, 11) are provided for the safety activation, which give the axial control to said shaft through the rotation of the control knob of the cock also when said knob is not directly connected to said shaft, by converting at least a part of the rotary motion of the knob in an axial motion.

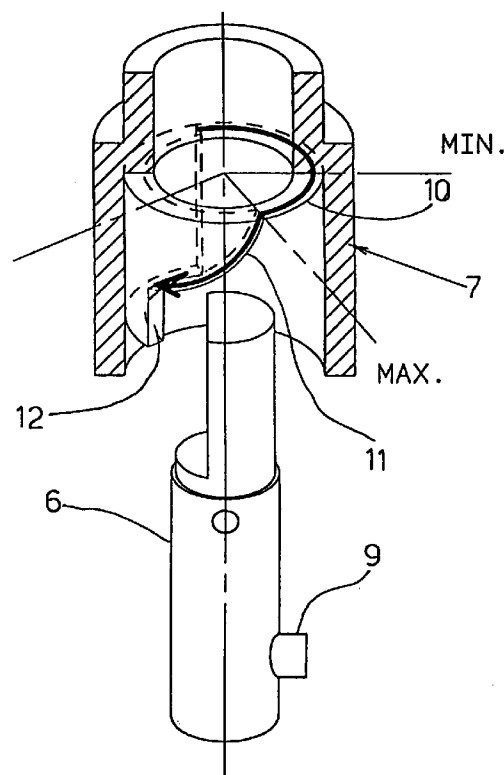


FIG. 4

Description

The present invention refers to a control and safety device for burners of gas appliances, in particular for domestic use, capable of realizing a plurality of cooking functions, comprising all the known elements for their operation, including safety means.

As known, gas cooking appliances for domestic use may be of different types and configurations; for example, they can be of the free standing, type, i.e. of the low-cost type, which consists of a cabinet having a baking oven in its central part and where the upper part of the cabinet is used as a cooking hob comprising the various gas burners; or as built-in or integrated cookers, i.e. with the oven and the cooking hob being separated from each other.

In the latter case, the knobs for controlling the gas cocks are generally located on the cooking hob and connected directly with the gas cocks.

In some particular cases, the cock knobs are assembled on the oven front panel and the oven may be at distance as well as below the cooking hob level; in such cases, a mechanical connection with universal joints is used to transfer the rotary control from the knob to the cock.

It is also known that household gas cooking appliances are equipped by law with a safety system for the oven and the grill, which stops the gas flow should the flame be extinguished.

The same safety system may also be used for the cooking hob burners.

It is known to realize such a safety system through a magnet supplied by a current generated by a flame detecting thermocouple, when this latter is heated up by the burner flame. When the flame is extinguished, the current is no longer supplied to the magnet, which is thus de-energized and stops the gas-flow.

In order to open the gas flow to the burners, it is known to keep the gas cock control knob pressed down, after it has been fully rotated to its end.

Keeping the knob pressed down, the magnet inside the cock is pushed and opens the gas flow; then the burner is ignited, by keeping the knob pressed down for a certain time as long as the thermocouple heated by the flame does not start feeding the magnet, which is energized and locks itself in the gas flow opening position, where it was initially pushed to by the pressure exerted through the cock control knob.

However, in the case that the knobs and the cocks are far from each other and lay on different levels - so that, as previously mentioned, a mechanical connection with universal joints is used to transfer the rotary control from the knob to the cock - it will not be possible to transfer also the axial motion, due to the fact that such a movement would be absorbed by the mechanical connection through the universal joints.

The unavailability of this motion does not make it possible to assemble the safety system on the cock to

stop the gas-flow when the flame is extinguished, with risks being evident for the user.

The object of the present invention is that of providing a solution to the above mentioned problems, and in particular to provide a control and safety device for burners of gas appliances, in particular for domestic use, capable of fulfilling a plurality of cooking functions, comprising all the known elements for their operation, including safety means which are actuated through an axial control given by a shaft of a cock controlling the burner operation, characterized in that means are provided for the safety activation, which give the axial control to said shaft through the rotation of the control knob of the cock also when said knob is not directly connected to said shaft, by converting at least a part of the rotary motion of the knob in an axial motion.

Further objects and advantages of the present invention will become apparent from the following detailed description and the annexed drawings, which are supplied by way of explanatory but non limiting example, wherein:

- Fig. 1 shows schematically the mechanical connection with universal joints from the knob to the cock;
- Fig. 2 shows the view of a gas cock according to the present invention;
- Fig. 3 shows a double scale section view of a gas cock according to the present invention;
- Fig. 4 shows an exploded section view of a part of the gas cock according to the present invention.

In Fig. 1, which shows schematically the mechanical connection with universal joints between the knob and the cock, number 1 indicates a gas cock, number 2 indicates a control knob for the gas cock; number 3 indicates a mechanical connection with universal joints between the knob and the gas cock, where number 4 indicates the connecting bars joined to each other by universal joints indicated with number 5.

In Fig. 2, which shows a view of the gas cock according to the present invention, number 1 indicates a gas cock, number 6 indicates the gas-cock control shaft, number 7 indicates a guide for the shaft 6 and number 8 indicates a torsion spring.

In Fig. 3, which shows a double scale section view of a gas cock according to the present invention, number 6 indicates the gas cock control shaft, which has a projection 9 to keep it in position inside the gas cock, number 7 indicates the guide of the shaft 6 and number 10 indicates a plane on which the projection 9 of the shaft 6 is supported and can slide.

The plane 10 extends with an angle of about 160°, corresponding to the gas cock adjustment from its closing position to its maximum opening.

Number 11 indicates an inclined surface starting from plane 10, i.e. from the maximum gas cock adjustment, with about 5 mm difference in height against plane 10, which extends to form an angle of about 80° on which the projection 9 of the shaft 6 can slide.

In Fig. 4, which shows an exploded sectioned view of a part of the gas-cock according to the present invention, number 6 indicates the control shaft of the gas-cock 1, number 7 the shaft 6 guide and number 9 the shaft 6 projection.

Number 10 indicates the plane onto which the projection 9 of the shaft 6 slides, whereas number 11 indicates the inclined surface, which are both outlined on the drawing by a bold line with an arrow on its end. The stop for the rotation of the shaft is realized by plane 12, which is vertical in respect to plane 10 and starts where the inclined surface 11 is ending.

Said inclined surface 11 causes, during the rotation of the shaft 6 rotation, by means of the knob 2 and the driving gear system provided with universal joints, the projecting part 9 of the shaft 6 to slide over the plane 10, to reach the inclined surface 11. By continuing the rotation of the shaft 6, said inclined surface 11 causes the shaft to go towards the inside of the cock 1, as if it were pushed by an axial thrust.

This motion allows a displacement of the safety magnet located inside the cock, with a consequent opening of the passage for the gas flow.

If the knob is kept in such a position for a certain time after igniting the burner, the thermocouple detecting the burner flame will have enough time to heat and generate a current energizing the magnet and keeping it in the opening position of the gas flow.

Upon releasing the knob, the torsion spring 8 rotates the shaft 6 inversely until to the plane 10, in the adjustment position of the maximum gas flow. For the adjustment of the gas flow it will be enough to rotate the knob towards the minimum adjustment position.

In this way, when the magnet is disenergized because no flame is detected, it goes back to its start position and stops the gas flow.

The return of the magnet to its starting position, i.e. gas closure, occurs by means of a spring.

Said spring is dimensioned in order to exert a force required for the magnet displacement, but not such to exceed the force that keeps the magnet in the gas flow opening position, after that the flame has been ignited and the thermocouple generates the current required to energize the magnet.

The characteristics of the control and safety device for a gas appliance according to the present invention and its advantages appear clearly from the above description and the annexed drawings; specifically, they are represented by:

- availability of a safety system, which can also be used on these types of burner controls with no direct gas cock control;
- the low cost for the cock, as only a shaft guide needs to be changed and one torsion spring have to be added.

It is obvious that many changes can be made by the man skilled in the art to the control and safety device of

a gas appliance as described above by way of example, without departing from the novelty spirit of the innovative solution, and it is also clear that in the practical actuation of the invention, the components may differ in form and size from the ones described herein and be replaced with technical equivalent elements.

Claims

1. Control and safety device for burners of gas appliances, in particular for domestic use, capable of fulfilling a plurality of cooking functions, comprising all the known elements for their operation, including safety means which are actuated through an axial control given by a shaft of a cock controlling the burner operation, characterized in that means (6, 9, 11) are provided for the safety activation, which give the axial control to said shaft through the rotation of the control knob of the cock also when said knob is not directly connected to said shaft, by converting at least a part of the rotary motion of the knob in an axial motion.
2. Control and safety device for burners of gas appliances, according to Claim 1, characterized in that said means for the safety activation comprise a guide (7) for the shaft (6).
3. Control and safety device for burners of gas appliances, according to Claim 2, characterized in that said guide (7) has a zone in the form of a circular crown with an inclined surface (11) which, during the shaft rotation, causes an axial displacement of the shaft (6) towards the device actuating the safety means.
4. Control and safety device for burners of gas appliances, according to Claim 3, characterized in that said inclined surface is located in an angular zone which corresponds with the maximum rotation position allowed to said shaft (6).
5. Control and safety device for burners of gas appliances, according to Claim 3, characterized in that said axial displacement of the shaft (6) is generated by a shaft (6) projection (9) sliding over said inclined surface (11).
6. Control and safety device for burners of gas appliances, according to Claim 1, characterized in that a torsion spring (8) is provided for returning the shaft (6) in the gas flow adjustment position when the safety means has been activated.
7. Control and safety device for burners of gas appliances, according to Claim 1, characterized in that the transmission of the rotary motion to the shaft (6) of the cock (1) through the knob (2) occurs by

means of a mechanical connection with bars (4)
connected to each other by universal joints (5).

8. Control and safety device for burners of gas appliances, according to Claim 1, characterized in that a
spring is provided, which locates the magnet in the
gas flow closed position when the flame is extinguished.

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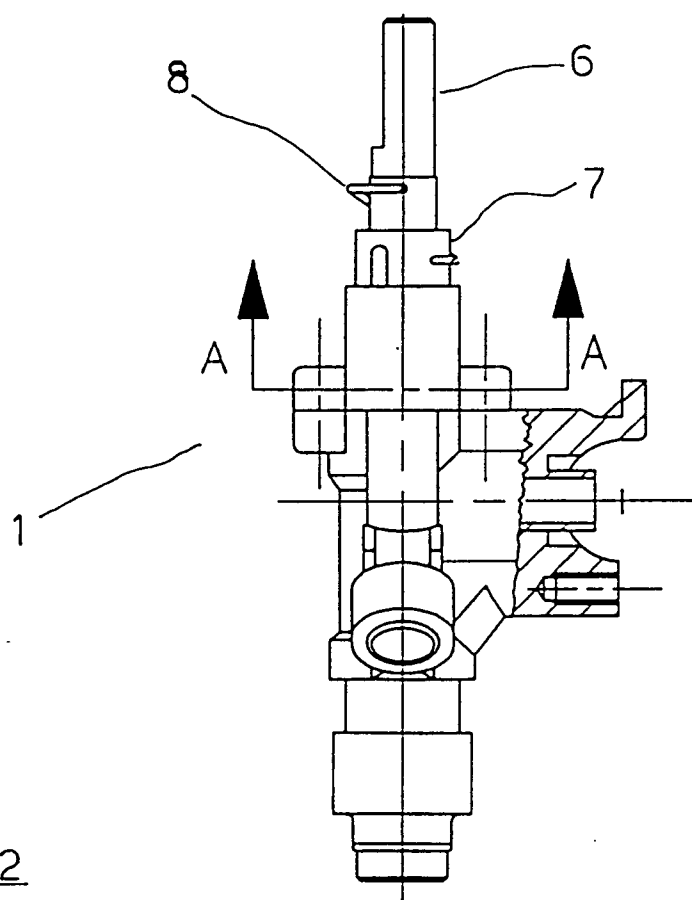
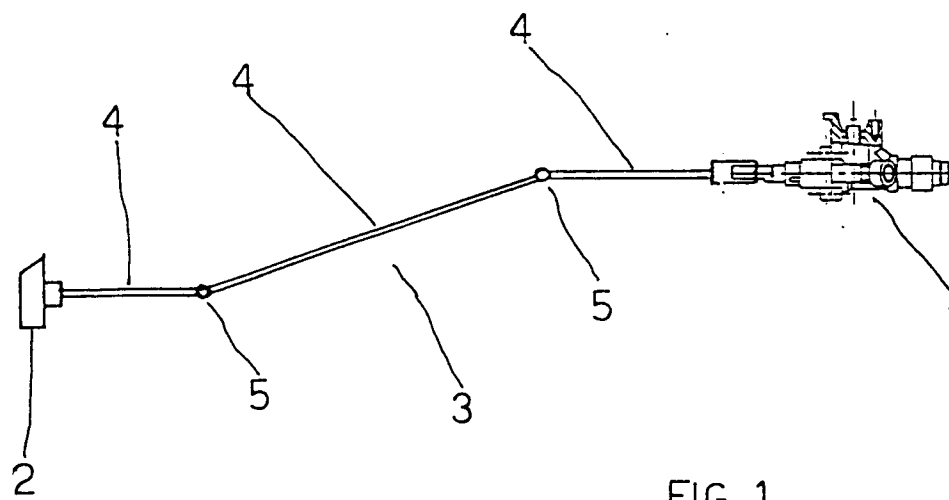
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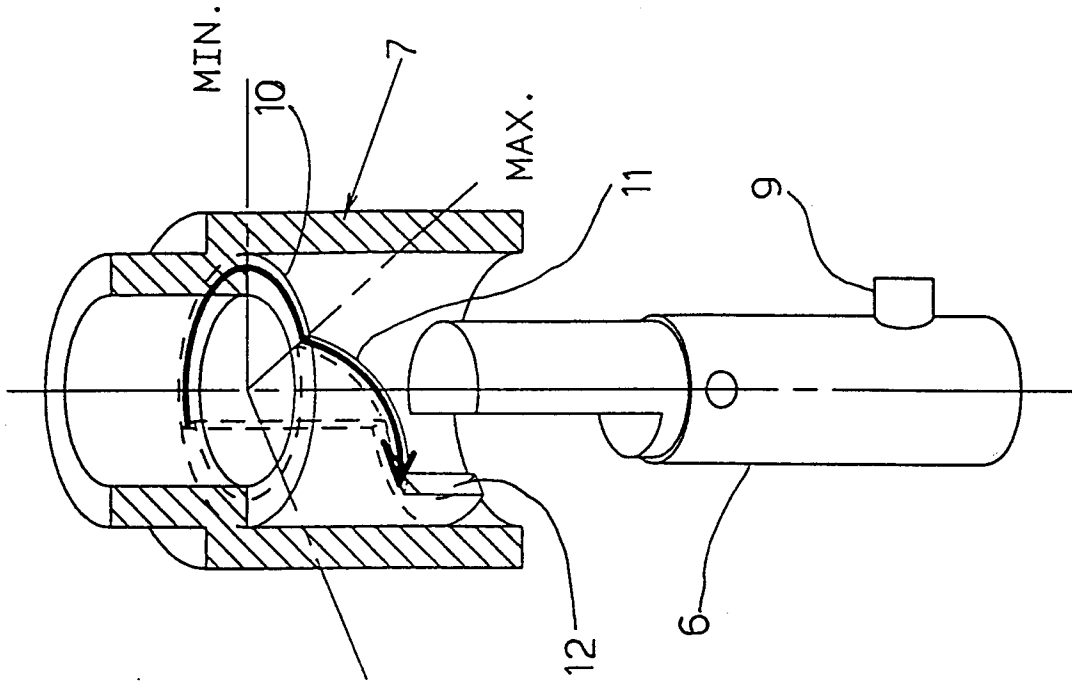


FIG. 4

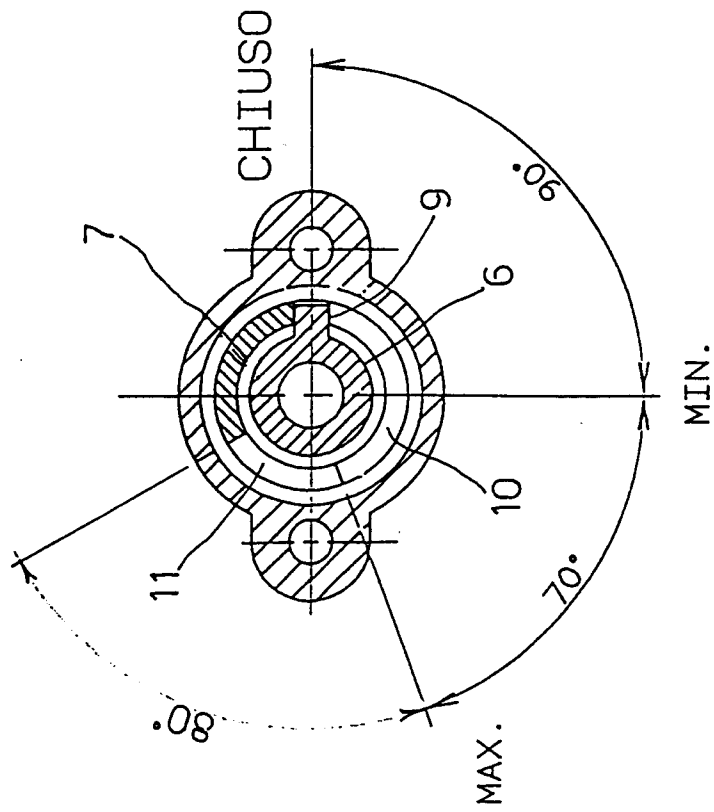


FIG. 3