

PATENT SPECIFICATION

(11) 1 534 672

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(21) Application No. 895/77 (22) Filed 11 Jan. 1977

(44) Complete Specification Published 6 Dec. 1978

(51) INT. CL.² F16K 17/28 5/04

(52) Index at Acceptance
F2V E1N2 E5B E61 E66 L5A1

(19)



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(54) A FLOW CUT-OFF DEVICE FOR INSERTION IN A GAS DUCT

(71) We, CHAN KWAN SHIU and LEUNG WING KWONG, both of Chinese nationality trading as Wing Kee Enterprises Co., a partnership company, at 8A Hankow Road, 5th Floor, Kowloon, Hong Kong, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a cut-off device for insertion in a gas duct to reduce the possibility of gas leaking into a room as a result of damage to, for instance, the gas duct.

According to the invention, there is provided a flow cut-off device for insertion in a gas-duct, the device comprising an inlet and an outlet, a chamber on the inlet side of the device, a passage leading from the chamber to the outlet and including two mutually rotatable coaxial tubes each having a plurality of holes through their walls arranged so that the flow cross-section through the passage can be altered by relative rotation of the tubes, and a blocking member arranged to be acted upon by the pressure in the chamber when this exceeds a predetermined value to move into a position where it blocks the passage, and prevents gas flowing through the outlet.

The device is intended to be inserted immediately adjacent a gas supply, with a gas duct leading from the outlet of the device to the appliance where the gas is to be used. In such set-ups, the duct is particularly vulnerable. This is often of a flexible nature and can perish or break; furthermore, the appliance could be damaged or the duct could become disconnected. If any of these events did occur, a larger quantity of gas would attempt to flow from the supply, and since the passage is of a limited cross-section relative to the volume of the chamber, the pressure in the chamber will

rise, thus activating the device to cut-off the gas supply.

Preferably, in use, the device is arranged so that the blocking member moves vertically to enter the passage and, in normal operation, is kept in a non-blocking position by gravity.

The blocking member may be a ball which cooperates with a corresponding seat in the passage. The ball could be guided for movement into the passage by a tube with a transverse pin across its lower end to retain the ball in the tube.

Conveniently, the device can include a resetting member in the form of a plunger, operable from outside the device, for pushing the blocking member out of the passage when normal pressure conditions once more prevail. The plunger can be spring loaded.

The invention will now be further described, by way of example, with reference to the accompanying drawing which shows a cross-section through a device according to the invention.

The inlet to the device is marked 1, and the outlet 2. Dotted lines show the direction of gas flow through the device. Inflowing gas enters first of all the chamber 3. From there it flows through the aperture H1 and H2 respectively in sleeve F and tube I. These apertures form the beginning of the passage leading from the chamber to the outlet, and this passage continues up the centre of the device and to the outlet 2, following the dotted lines.

If an exceptionally large demand for gas occurs at the outlet side of the device, a larger throughput will be needed and because of the relatively small dimensions of the apertures H1, H2 a pressure larger than normal will build up in chamber 3. This pressure acts all around the chamber, and in particular on the underside of ball J at the bottom of tube I. When the pressure acts on this ball J, it will be pushed upwards because

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it is free to move, until it abuts the seat G where it blocks the gas flow passage. The gas supply from the inlet will therefore be blocked. The seat G is preferably a rubber bushing.

Once the defect in the gas duct or appliance has been remedied, the flow cut-off device can be opened again by depressing the plunger A against the force of spring C. The lower end of the plunger A will push the ball away from the seat G, and once gas has once again started to flow through apertures H1, H2 to the outlet, the ball J will fall under gravity to the bottom of the tube I where it is retained by a pin K passing through the bottom of the tube. The purpose of the pin K is just to stop the ball falling out of the tube while allowing it to be influenced by the pressure in chamber 3.

A rubber plate B seals the top of the device.

The flow cross-section can be altered by rotating the regulator D either clockwise or anticlockwise. This causes sleeve F to rotate relative to tube I. A plurality of holes are drilled in these two parts, in such a configuration that different sets of holes align with one another in different positions of the regulator D to alter the area of the passage from chamber 3 to the outlet 2.

Sealing rings E prevent a leakage of gas from the device itself.

WHAT WE CLAIM IS:-

1. A flow-off device for insertion in a gas-duct, the device comprising an inlet and an outlet, a chamber on the inlet side of the device, a passage leading from the chamber to the outlet and including two mutually rotatable coaxial tubes each having a plural-

ity of holes through their walls arranged so that the flow cross-section through the passage can be altered by relative rotation of the tubes, and a blocking member arranged to be acted upon by the pressure in the chamber when this exceeds a predetermined value to move into a position where it blocks the passage, and prevents gas flowing through the outlet.

2. A device as claimed in Claim 1, wherein in use, the device is arranged so that the blocking member moves vertically to enter the passage and, in normal operation, is kept in a non-blocking position by gravity.

3. A device as claimed in Claim 2, wherein the blocking member is a ball which cooperates with a corresponding seat in the passage, and is guided for movement into the passage by a tube which has a transverse pin across its lower end to retain the ball in the tube.

4. A device as claimed in any preceding claim which includes a resetting member in the form of a plunger, operable from outside the device, for pushing the blocking member out of the passage when normal pressure conditions once more prevail.

5. A device as claimed in Claim 4, wherein the plunger is spring-loaded.

6. A flow cut-off device for insertion in a gas duct, substantially as herein described with reference to, and as shown in the accompanying drawing.

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10 spring C. The lower end of the plunger A will push the ball away from the seat G, and once gas has once again started to flow through apertures H1, H2 to the outlet, the ball J will fall under gravity to the bottom of the tube I where it is retained by a pin K
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The flow cross-section can be altered by rotating the regulator D either clockwise or anticlockwise. This causes sleeve F to rotate
25 relative to tube I. A plurality of holes are drilled in these two parts, in such a configuration that different sets of holes align with one another in different positions of the regulator D to alter the area of the passage from chamber 3 to the outlet 2.

30 Sealing rings E prevent a leakage of gas from the device itself.

WHAT WE CLAIM IS:-

35 1. A flow-off device for insertion in a gas-duct, the device comprising an inlet and an outlet, a chamber on the inlet side of the device, a passage leading from the chamber to the outlet and including two mutually rotatable coaxial tubes each having a plural-

ity of holes through their walls arranged so that the flow cross-section through the passage can be altered by relative rotation of the tubes, and a blocking member arranged to be acted upon by the pressure in the chamber when this exceeds a predetermined value to move into a position where it blocks the passage, and prevents gas flowing through the outlet.

2. A device as claimed in Claim 1, wherein in use, the device is arranged so that the blocking member moves vertically to enter the passage and, in normal operation, is kept in a non-blocking position by gravity.

3. A device as claimed in Claim 2, wherein the blocking member is a ball which cooperates with a corresponding seat in the passage, and is guided for movement into the passage by a tube which has a transverse pin across its lower end to retain the ball in the tube.

4. A device as claimed in any preceding claim which includes a resetting member in the form of a plunger, operable from outside the device, for pushing the blocking member out of the passage when normal pressure conditions once more prevail.

5. A device as claimed in Claim 4, wherein the plunger is spring-loaded.

6. A flow cut-off device for insertion in a gas duct, substantially as herein described with reference to, and as shown in the accompanying drawing.

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