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(54) Sealing cap

(57) The invention relates to a device for sealing the outlet of a valve such as a gas meter control.

The device comprises an internally threaded cap 10 for screw fitting to the outlet 11 to seal off the outlet 11 and a cover 12 to overlap the cap 10. A closure member 13 is located between the cap 10 and the cover 12 and is movable between positions where apertures 26, 27 in the flange 25 of the cover 12 are closed or open to blind holes 28, 29 in the flange 14 of the cap 10. When the holes 28,29 are open to the apertures 26, 27 the cap 10 can be removed by means of a tool (not shown) engaged in the hole(s) to rotate the cap 10.

The closure member 13 is biassed by a spring 22 into the closed position where its flange 30 is interposed between the apertures and the holes. The member 13 which is made of a magnetic material may be moved against the bias by means of a magnet to the open position. Alternatively, Fig. 3, not shown, a memory metal spring may expand on heating to shift closure member 13.

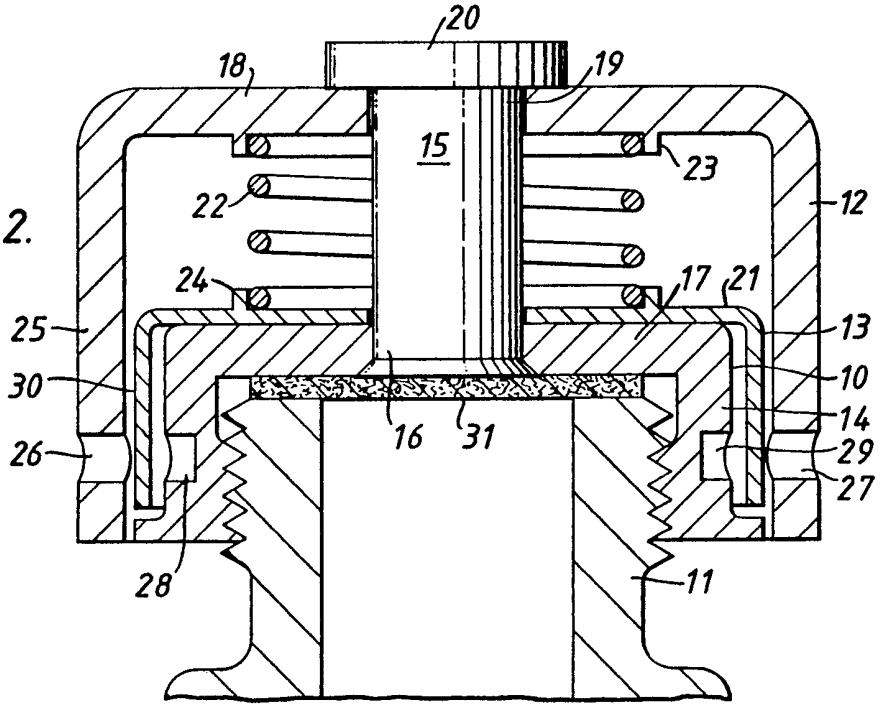

FIG.2.

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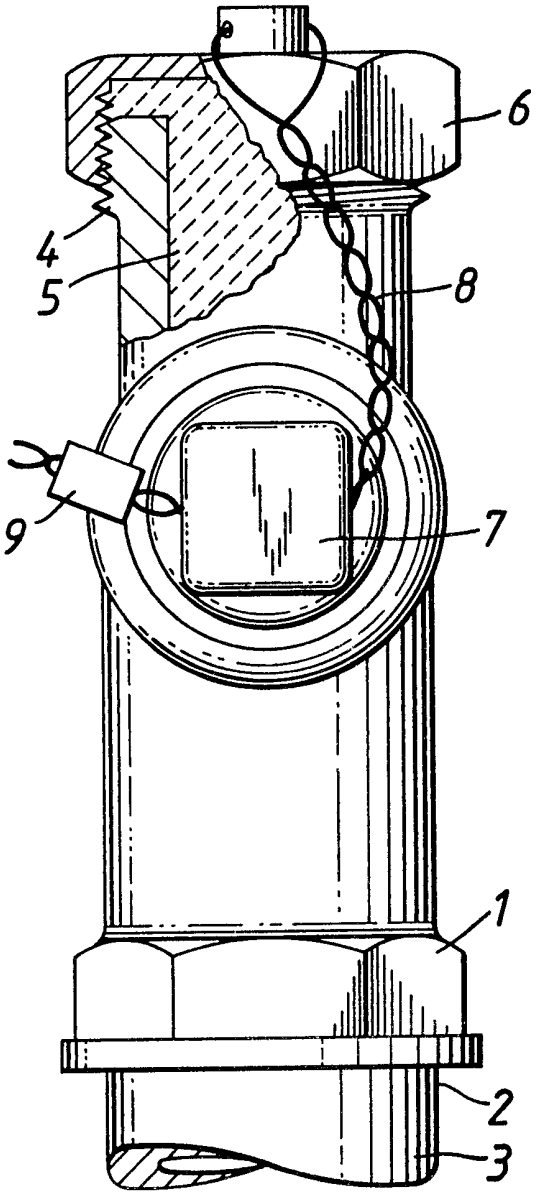
FIG.1.



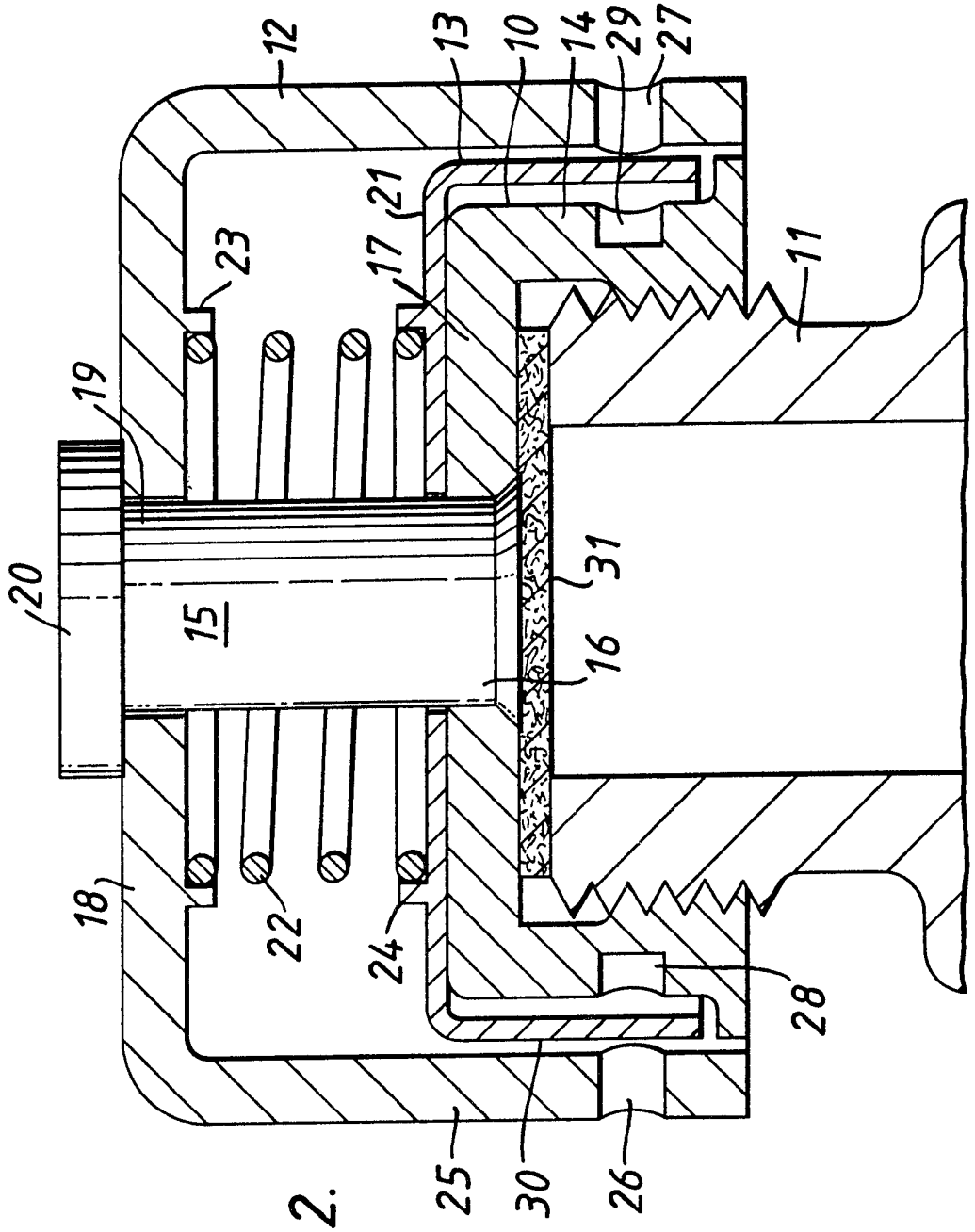


FIG.2.

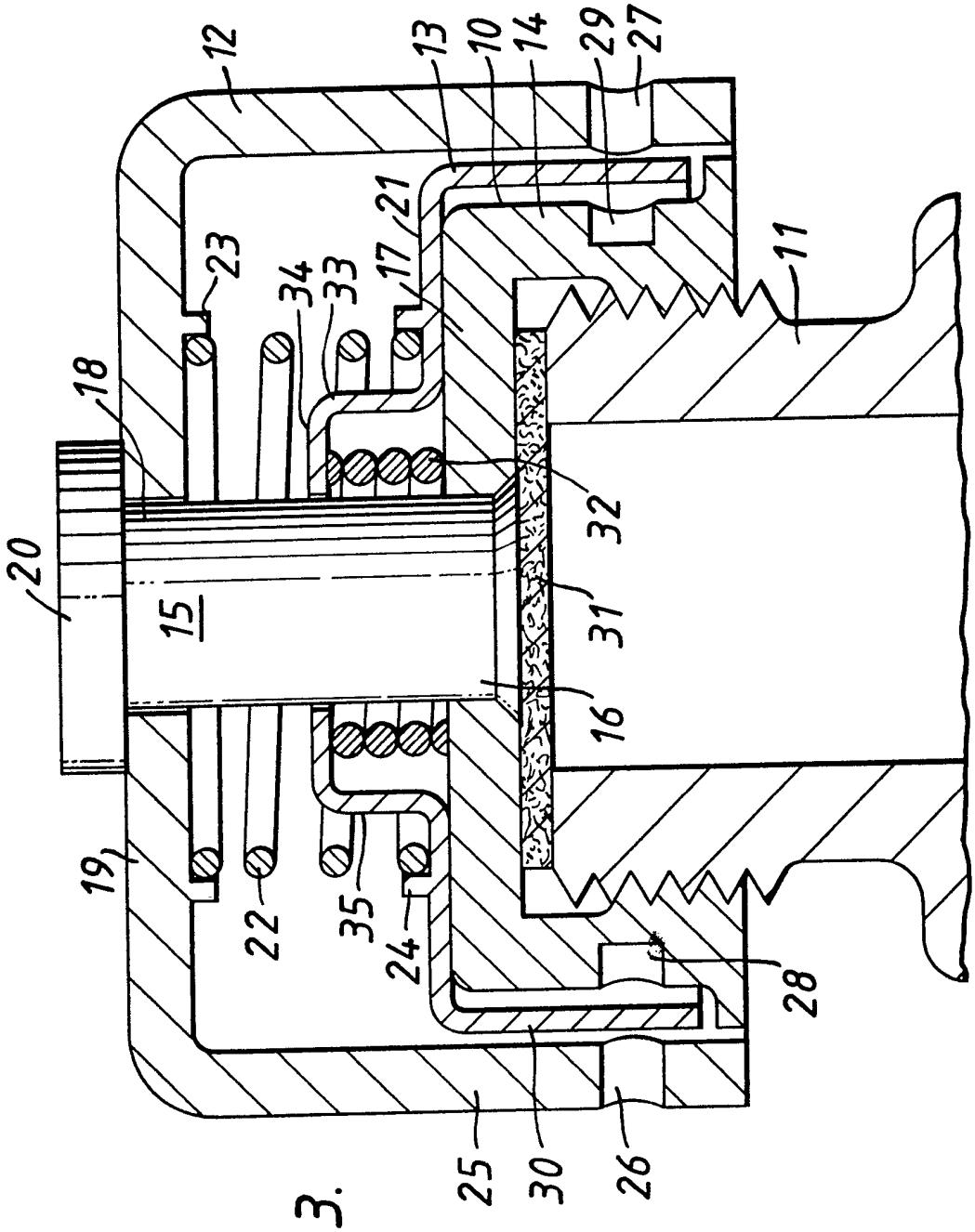

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FIG.3.

SPECIFICATION

Sealing device

The present invention relates to a device for sealing the outlet of a valve such as a gas meter control.

A gas meter control is used to connect a gas service pipe to a gas meter inlet pipe to provide the gas consumer with means for controlling the supply of gas to the meter.

A typical meter control is shown in Figure 1 of our copending UK Patent Application No. 8311009 together with relevant description. Should the gas supplying authority wish to cut off the supply of gas to the consumer for any reason (e.g. the consumer has defaulted on payment of a bill) one method of achieving this is by closing off the service pipe externally of the consumer's property. Since the service pipe is usually underground this course of action may involve costly and time consuming excavation operations.

Another method is shown in Figure 1 which shows a plan view of a typical meter control with one end partly sectioned to disclose internal features.

The meter control has an inlet end 1 connected by a soldered-on screw fitting to the outlet end 2 of a gas service pipe 3 as conventional. The externally threaded outlet end 4 of the meter control has been disconnected from the gas meter inlet (not shown) and is sealed off by a sealant compound 5 filling the meter control outlet 4. The seal is completed by an internally threaded blank cap 6 screwed onto the threads of the meter control outlet 4 after its threads have been smeared with the compound 5. The cap 6 is then connected to the square end 7 of the meter control valve by a wire 8 which is tagged with a warning label 9.

The sealant compound 5 comprises a double bond putty which cures and hardens to form a solid bung in the meter control outlet 4 so that gas will not escape from the meter control in the event of accidental or malicious removal of the cap 6 and operation of the control.

If at some future date it is desired to reconnect the meter control to the service pipe it is frequently found that the putty has set hard and is virtually impossible to remove. In this event it will be necessary to remove the existing meter control and replace it with a new one. Apart from the labour costs involved in such replacement and the cost of the new control, there is a safety hazard inherent in such a replacement since the removal of the existing meter control involves release of gas into the consumer's premises by way of the exposed outlet of the service pipe often in confined spaces. There is also the possibility of disturbing other joints in the service pipe.

It is therefore an object of the present invention to provide means by which the gas supply may be cut off without the disadvantages of the existing methods.

According therefore to the present invention there is provided a device for sealing the outlet of a valve the device comprising an internally threaded cap for screw fitting to the outlet of the valve to seal off the outlet, a cover arranged to overlap the cap in such a manner that access to the outer surface of the cap for rotation thereof is permitted only by way of an access point or access points in the cover, the cap and cover being connected in such a way that the cap and cover are axially rotatable independently of each other and movable means located between the cap and cover for movement between positions respectively opening and closing the access point or points.

Embodiments of the invention will now be particularly described with reference to:

Figure 2 which shows a cross-sectional view of a sealing device in accordance with one embodiment of the present invention and

Figure 3 which shows a cross-sectional view of a sealing device in accordance with another embodiment of the present invention.

Referring to Figure 2, the sealing device comprises a sealing cap 10 for connection to the outlet end 11 of a meter control (not shown), a movable cover 12 for the cap 10 and a movable closure member 13 lying between the cap 10 and the cover 11.

The cap 10 comprises a flanged disc in which the flange 14 is internally threaded for screw connection to the external threads on the meter control outlet 11. In Figure 2 the cap 10 is actually in position on the outlet 11.

The cover 12 also comprises a flanged disc which is connected to the cap 10 by means of a pin 15, one end 16 of which extends through a central aperture in the disc 17 of the cap 10 and is rivetted to the disc 17. The other end is of the pin 15 extends with clearance through a central aperture in the disc 18 of the cover 12 so that the cover 12 is both axially slidable and rotatable on the pin 15. The end 19 of the pin 15 is provided with a flatdisc-like head 20 extending radially beyond the boundary of the aperture in the cover 12 to provide a limit to the axial movement of the cover 12 in a direction away from the cap 10.

The closure member 13 also comprises a flanged disc, the disc 21 of which is provided with a central aperture through which the pin 15 also extends with clearance. Thus like the cover 12, the closure member 13 is axially movable on the pin 15.

Located on the pin 15 between the cover 12 and the closure member 13 is a coiled biassing spring 22 which serves to bias the closure member 13 towards the cap 10 and to bias the cover 12 into engagement with the

pin head 20 as shown in Figure 2. The spring 22 is retained within a pair of opposed retaining seats 23, 24 respectively formed as circular projections on the lower surface of the cover disc 19 and on the upper surface of the closure member disc 21.

The flange 25 of the cover 12 is provided with a pair of diametrically opposed through-wall apertures 26 and 27 which are alignable with a corresponding pair of diametrically opposed blind holes 28 and 29 in the cap flange 14. When an aperture is aligned with a hole, a tool (not shown) may be inserted into the blind hole by way of the aperture to grip the cap 10 and rotate it to unscrew it from the outlet 11. The same procedure must be performed to screw the cap 10 onto the outlet 11.

However, when the closure member 13 is in the position shown in Figure 2, its flange 30 is interposed between the apertures and the holes so that it is impossible to gain access to a blind hole once the cap 10 is in position on the outlet 11 as shown in Figure 2.

In order to expose the blind hole to the aperture it is necessary to move the closure member 13 against the spring bias so that the flange 30 is moved to expose an aperture to a hole.

In practice, the closure member 13 is made of a suitable magnetic material such as mild steel, while the cap 10 and cover 12 are made of a suitable non-magnetic material such as brass. If a sufficiently strong enough magnet is placed adjacent to the disc 19 of the cover 12, the closure member 13 can be moved against the spring bias to move the flange 30 to expose the apertures to the blind holes. This enables the device either to be fitted to or to be removed from the outlet 11 in the manner previously described. In order to form an effective seal when the device is screwed onto the outlet 11, a resilient circular washer 31 is compressively held between the end of the outlet 11 and the disc 17 of the cap 10.

Referring to Figure 3 where parts identical to those shown in Figure 2 bear the same reference numerals, a further biassing spring 32 is held between the upper surface of the disc 17 of the cap 10 and a cup 33 formed in the disc 21, the spring 32 bearing against the underside of the base 34 of the cup 33.

The biassing spring 32 is made of a metal alloy of the type known as a memory metal. These alloys undergo a phase transformation upon being heated above or cooled below a certain temperature. The phase change is accompanied by an expansion of the alloy.

In the case of the spring 32 this phase change occurs at 70°C or so such that above this temperature the alloy expands and thus so does the spring 32. Upon being cooled to below this temperature the spring 32 relaxes and takes the form shown in Figure 3.

The spring 32 is so selected that its expansion overcomes the bias exerted by the spring 22 to move the closure member 13 away from the cap 10 and thus the flange 30 away from the position shown in Figure 3 where it is interposed between the apertures and the blind holes. This will enable the apertures to expose the blind holes to enable the device to be fitted or removed from the outlet 11 with the aid of a suitable tool.

In order then to cause the spring 32 to expand, the device must be heated (by say a blow lamp) until the spring temerature reaches 70°C.

It will be appreciated that the spring 32 can equally well be made of an alloy which expands when its temperature is below a certain temperature. This temperature should be such that at normal environmental temperatures the spring 32 is relaxed. In this case it will be necessary to cool the device sufficiently to cause the spring temperature to fall below its phase change temperature.

The spring 32 can also be made of certain plastics materials which undergo similar phase changes to those described.

It will also be appreciated that the cap 10 need only have one blind hole and the cover 12 one aperture alignable with the hole to permit removal of the device with a suitable tool.

CLAIMS

1. A device for sealing the outlet of a valve the device comprising an internally threaded cap for screw fitting to the outlet of the valve to seal off the outlet, a cover arranged to overlap the cap in such a manner that access to the outer surface of the cap for rotation thereof is permitted only by way of an access point or access points in the cover, the cap and cover being connected in such a way that the cap and cover are axially rotatable independently of each other and movable means located between the cap and cover for movement between positions respectively opening and closing the access point or points.

2. A device as claimed in claim 1 in which the movable means is biassed into the position in which the access point or points is or are closed.

3. A device as claimed in claim 1 or claim 2 in which the cap and cover are in the form of flanged discs.

4. A device as claimed in claim 3 in which the access point comprises an opening in the flange of the cover and the movable means comprises another flanged disc biassed into a position where the flange closes the opening and movable under the bias to a position where the flange is clear of the opening.

5. A device as claimed in claim 4 in which the flange of the cap has an opening alignable with the opening in the flange of the cover.

6. A device as claimed in any of the preceding claims in which the movable means is magnetic and is movable by means of a magnet from its closed position to its open position.

7. A device as claimed in any of claims 1 to 5 in which the bias is temperature sensitive such that below a selected temperature the movable means is biassed into the closed position and at or above the selected temperature the movable means is biassed into the open position.

8. A device as claimed in any of claims 1 to 5 in which the bias is temperature sensitive such that above a selected temperature the movable means is biassed into the closed position end at or below the selected temperature the movable means is biassed into the open position.

9. A device substantially as hereinbefore described with reference to Figure 2 or Figure 3.

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