

①²

EUROPEAN PATENT APPLICATION

②¹ Application number: 86110289.5

⑤¹ Int. Cl.⁴: **H 01 R 4/64**

②² Date of filing: 25.07.86

③⁰ Priority: 01.08.85 GB 8519396

④³ Date of publication of application:
29.04.87 Bulletin 87/18

⑧⁴ Designated Contracting States:
BE DE FR IT NL SE

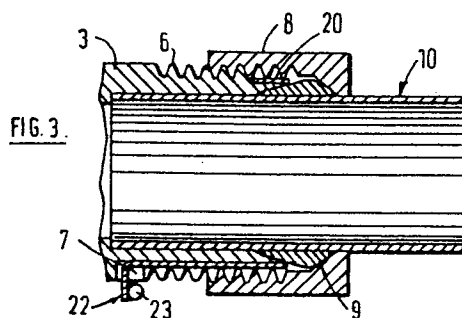
⑦¹ Applicant: **TRITON AQUATHERM LIMITED**
Triton House Weddington Terrace Weddington Industrial
Estate
Nuneaton Warwickshire CV10 0AG(GB)

⑦² Inventor: **Dalton, Martin Walter**
185 Barn Lane
Solihull West Midlands(GB)

⑦⁴ Representative: **Attfield, Donald James et al,**
BROOKES, MARTIN & WILSON Prudential Buildings 5 St.
Philip's Place
Birmingham B3 2AF(GB)

⑤⁴ **Earth bonding.**

⑤⁷ A method for providing an electric instantaneous water heater with an earth bond comprises fitting a conductive device (20,40) to the water inlet pipe (3,30) of the heaters plastic bodied solenoid valve, causing the device (20,40) to make electrical contact with a copper water supply pipe (10) through the action of an olive (9) and nut (8) of a compression joint fitting and provide the device (20,40) with a conductive cable (23,43) for connection to a metallic element associated with the heating element of the heater.



EARTH BONDING

The present invention relates to a method of earth bonding an electrical fitment to which a water supply is connected.

It is desirable that all electric fitments, 5 domestic and industrial, be provided with an "earth bond". If the fitment is provided with a water supply, for example an electric water heater, then the bonding may be conveniently achieved by earthing the metal parts of the fitment back to 10 the copper water supply pipe.

The increasing use of plastic materials in electrical fitments, for example as connectors, necessitates the use of separate wiring being connected, usually using a clamp, to the inlet water 15 supply in order to achieve the required earth-continuity. One such method for achieving this result is described in patent application 2,139,724 A. However not only is the use of external wiring frequently unsightly, but since this form of earthing is provided 20 after the installation of the fitment the need for earth continuity is frequently forgotten or ignored, especially by DIY enthusiasts.

We have now devised a simple method for ensuring that earth continuity in electrical fitments to which 25 a water supply is provided are fitted with the required

- 2 -

earth bond.

Our method requires that a conductive device, which is connected to a metal part of the fitment, be located at the water inlet fitment such that it makes electrical contact with an electrically conductive water supply pipe to provide the required earth continuity.

The advantage of our method is that it ensures earth continuity is provided since the earth bond is made on connection of the water supply to the fitment and therefore cannot be forgotten, furthermore the wiring is enclosed within the fitment and hidden from sight.

Accordingly, therefore, the present invention provides a method of providing an electric fitment with an earth bond, said fitment having a non-conductive body portion containing metallic elements associated with electrically operative parts of the fitment and provided with a water supply thereto comprises providing a conductive device positioned at the fitment water supply inlet to provide an electrical connection to an electrically conductive supply pipe and having a portion connected to a said metallic element within the fitment.

Embodiments of the invention, as applied to a solenoid valve used in instantaneous water heaters,

- 3 -

will now be described with reference to the accompanying drawings.

In the drawings:

Fig. 1 is a side view of a solenoid valve used in instantaneous electric water heaters:

Fig. 1a is a side view in direction "A" of Fig. 1;

Fig. 2 is a side view of an earthing ring for use with the solenoid of Fig. 1;

Fig. 2a is a view in the direction "B" of Fig. 2;

Fig. 3 is a section through A-A of Fig. 1 including the water supply pipe and fittings;

Fig. 4 is a side view of another form of solenoid valve used in instantaneous electric water heaters;

Fig. 4a is a view in direction "C" of Fig. 4;

Fig. 5 is a side view of an earthing sleeve for use with the solenoid of Fig. 4;

Fig. 5a is a view in direction "D" of Fig. 5.

Referring to Figs. 1, 2 and 3 of the drawings, a solenoid valve generally indicated at 1 comprises a body 2 having a water inlet 3 and a water outlet 4. Water inlet 3 is tubular and is formed with a screw-thread 6 around its outer periphery to receive a corresponding threaded nut of a cold water supply pipe fitment. A section 5 projects forwardly of inlet 3

- 4 -

and has a diameter smaller than the diameter of the remainder of the inlet measured from the bottom of the screw thread. A flat recess 7 is formed in the outer surface of the inlet and has its axis parallel to the axis of the inlet, the base of the recess is at the same level as the outer diameter of the projecting portion 5.

An earthing ring, illustrated in Figs. 2 and 2a comprises a split ring generally indicated at 20 having a gap 21 between the two ends thereof. A "tag" 22 extends outwardly of the "inner" edge 24 of the ring to

- 5 -

which is soldered an electrical lead 23, the opposite end of which (not shown) conveniently includes means for attachment to the metal parts of the fitment.

The inside diameter of edge 24 of ring 20 is smaller than the outside diameter of projecting portion 5 of valve inlet 3, the "outer" face portion 25 of the ring 20 having a bevelled edge 26.

As shown in Fig. 3 a copper water supply pipe 10 is a sliding fit in water inlet 3 and is retained in position by screw threaded nut 8 and copper olive 9.

In use ring 20 is clipped in position on portion 5 at the end of inlet 3 of solenoid valve 1 with edge 24 abutting the shoulder of projecting portion 5 of inlet 3, the tag 22 lying in the recess 7. The water supply pipe 10, nut 8 and olive 9 are then presented to the water inlet 3. The nut 8 is then tightened onto screw-threaded portion 6, compressing the olive 9 onto pipe 10 to provide a water tight seal, and also forcing the ring 20 into permanent contact with both nut 8 and olive 9. Because the other end of the cable 23 is already attached to a metal part of the heater during manufacture, a satisfactory earth bond is obtained during installation of the heater.

25 Figs. 3 and 4 illustrate an alternative form of

- 6 -

earth bonding where the solenoid has a tubular inlet portion 30 onto which the water supply pipe is clamped. using a standard compression joint.

The bonding is achieved by use of a copper sleeve 5 generally indicated at 40 in Fig. 4 which has a body portion 41 and an end portion 42 of slightly wider diameter, an electrical cable 43 is soldered onto portion 42 and conveniently also includes a tag (not shown) for connection to a metal portion of the fitment. The diameter of portion 41 is such that sleeve 40 is a force fit over the inlet 30 of solenoid 1, portion 42 providing a convenient lead-in. The instantaneous water heater will normally be provided with solenoid 1 already fitted with sleeve 40 and the connection between the sleeve and metal part of the heater fitment made during manufacture. On installation of the heater clamping of the mains water supply pipe, again using a compression joint, to the water inlet provides the required bonding.

20

25

- 7 -

CLAIMS:

1. A method of providing an electric fitment with an earth bond, the fitment having a non-conductive body portion (2) containing metallic elements associated with electrically operative parts of the fitment and provided with a water supply thereto, comprises providing a conductive device (20,40) positioned at the fitment water supply inlet (3,30) to provide an electrical connection to an electrically conductive supply pipe (10), said device (20,30) having a portion (23,43) connected to a said metallic element within the fitment (1).

2. A method according to claim 1 wherein the fitment water supply inlet includes a plastic pipe (3, 30) to which the electrically conductive water supply pipe (10) is connected.

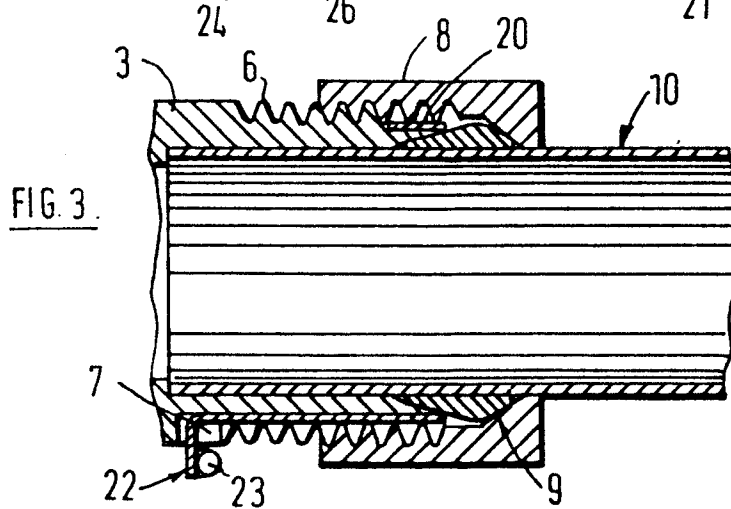
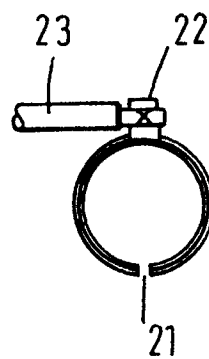
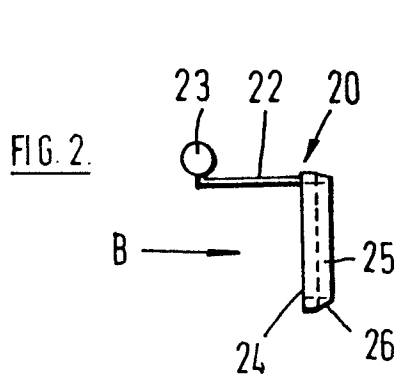
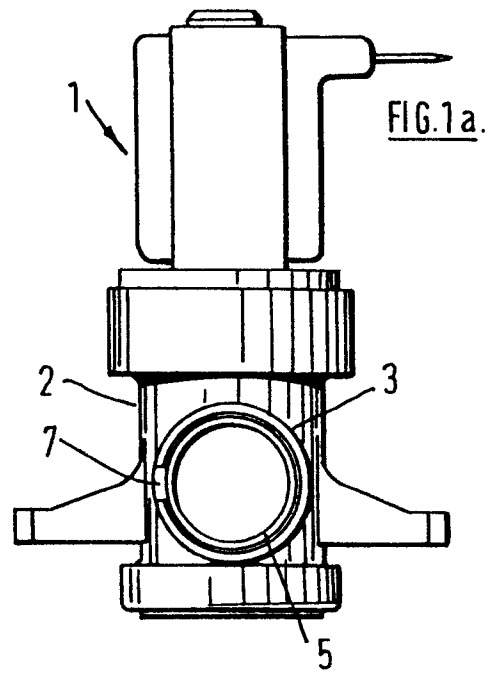
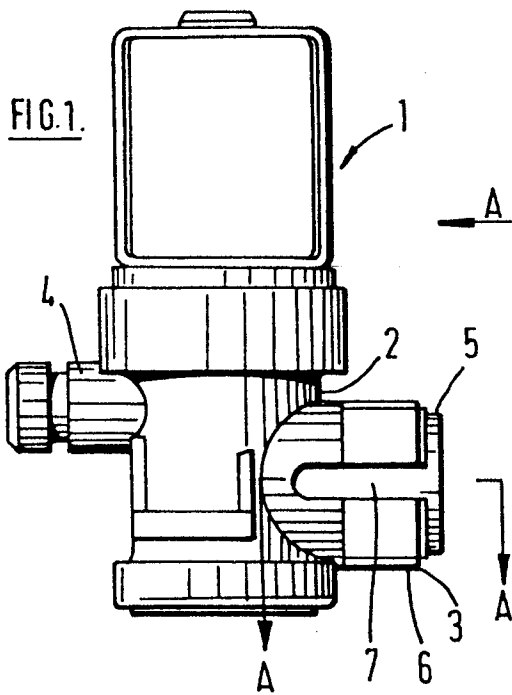
3. A method according to claim 2 wherein the said inlet pipe (3) includes an annular shoulder (5) formed at the open end thereof, the pipe (3) being threaded (6) to receive a supply pipe connecting nut (8); the conductive device (20) comprising; a split ring (20) of electrically conductive material dimensioned to be a fit onto the said annular shoulder (5) and project outwardly of the end of the said pipe (3), the supply pipe (10) being a sliding fit into the in-

- 8 -

let pipe (3) and secured thereto by tightening said nut (8) against an electrically conductive compressive seal (9) acting between the inlet pipe (3) and the supply pipe (10), said seal (9) being forced
5 into contact with the projecting portion of the said split ring (20) by said tightening action, and an electrical conductor (22) extending from the ring and connected to a said metallic element within the fitment (1).

10 4. A method according to claim 2 wherein the conductive device comprises; a sleeve (40) dimensioned to be a watertight fit on the inlet pipe (30) and to which the supply pipe (10) is secured by means of a compression joint; and a conductor (43) extending
15 from the sleeve (40) to a metallic element contained within the fitment.

5. A method according to any one of the preceding claims wherein the fitment is an instantaneous water heater and the water inlet pipe is secured to a
20 solenoid operated inlet valve contained within the fitment.



Neu eingereicht 02.1962
 Neu eingereicht 02.1962

FIG. 4.

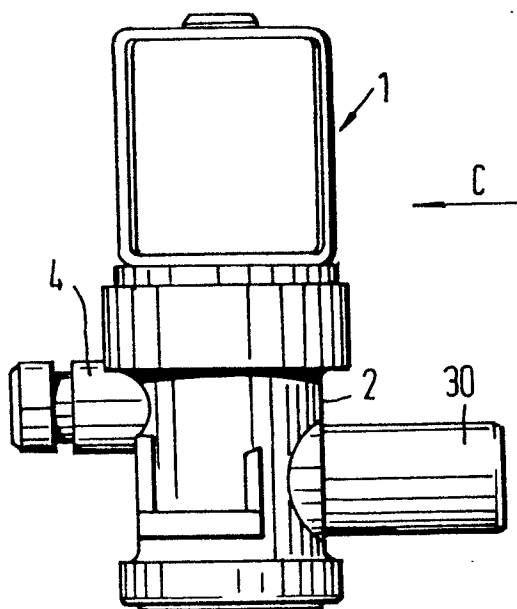


FIG. 4a.

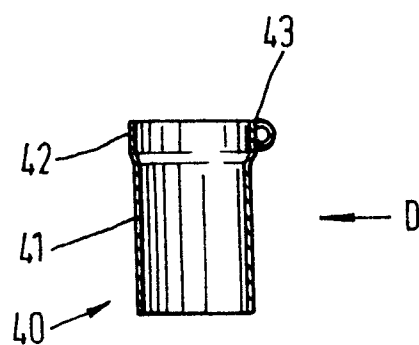
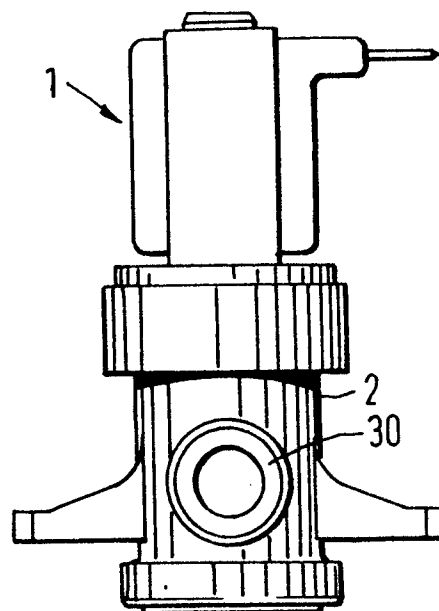


FIG. 5.

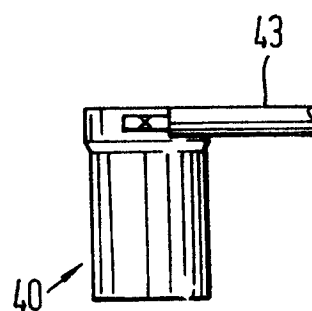


FIG. 5a.