

ENCLOSURE SEALING DEVICE

The present invention relates to a sealing device for an enclosure and relates particularly, but not exclusively, to a device for sealing an aperture through which a fixing is inserted and thereby sealing the enclosure against infiltrations of liquids under pressure, such as water from a jet washing system.

It is well known to use conduit and trunking when installing electrical cables in order to keep such cables in tidy order. Such conduit and trunking also allows for easy cleaning, whereas loose cables provide large surface areas which are difficult to clean. In the pharmaceutical, food and beverage industries it is commonplace to make such trunking and conduit from stainless steel with as smooth an external surface as is possible so as to provide an easy to clean surface with as few sharp corners, crevices and other hard to clean features as possible. Such trunking and conduit provide an electrical cable carrying system which can be kept hygienically clean with as little effort and expense as possible.

An example of a component of a trunking or conduit system is the box shown in Figure 1. The box 1 comprises a body 2 and lid 3. Lid 3 may be attached to body 2 by screw fixings 4 and is typically sealed by a rubber gasket (not shown) inside lid 3. Box 1 may be attached to a wall by a fixing means, such as a screw, through holes 5.

Where such boxes are installed, a commonly used method of cleaning is pressure washing using water directed at the article to be cleaned under high pressure. The velocity and pressure of water used in this method of cleaning can cause infiltration of water into the box 1 through holes 5. Clearly, water entering a system carrying electric cables is undesirable. The gasket within lid 3 is sufficient to prevent

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water entry at the junction between lid 3 and body 2. Plastic washers have been used in an attempt to provide a seal between the fixing used and hole 5. However, such attempts at sealing often prove inadequate, as seals may not align correctly, may split under the application of pressure or perish, thereby allowing water to continue to enter box 1.

Figure 2 shows an example of an attempted solution to this problem. Body 2 has a rear attaching plate 6 connected to it, the plate 6 having holes 7 therein through which fixings can attach the body 2 to a wall. Although such a method of fixing, having the holes outside the box, prevents the above mentioned problem of water ingress, this arrangement has the disadvantages that even with fixings in holes 7 some dirt is able to become lodged therein, and the joint between plate 6 and body 2 indicated at 8 and 9 can also trap dirt since it is difficult or expensive to make these junctions smooth.

An alternative to this box is shown in Figure 3 in which a plate 10, having holes 11 therein, is bent so as to provide clearance between body 2 and the wall to which it is attached. The clearance provides the opportunity to clean behind body 2. However, the disadvantages of external fixings extending through apertures 11 are still retained in this example. Furthermore, larger articles may become stuck behind plate 10 which would be inclined to trap dirt and infestation.

Preferred embodiments of the present invention seek to overcome the above described disadvantages of the prior art.

According to the present invention there is provided a device for sealing an aperture for receiving a fixing for a sealed enclosure, the device comprising:-

a body having an aperture extending from a first surface of said body to a second surface of said body and adapted to receive a said fixing, a fixing engaging portion for engaging

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said fixing, and retaining means adjacent said first end for engaging and sealing said body within the aperture of the enclosure; and

a cap for engaging said body to close said aperture at said second surface.

By providing a sealing device as defined above, the advantage is provided that an enclosure can be attached to, for instance, a wall by a fixing which can be accessed from inside the enclosure whilst providing a water-tight seal for the enclosure even against water applied under high pressure such as by a jet washing system.

In a preferred embodiment, said retaining means is adapted to engage said enclosure by means of mutually engaging threads in said retaining means and said aperture of said enclosure.

By joining the body of the sealing device to the enclosure by means of mutually engaging threads, the advantage is provided that the sealing device can be subsequently removed from the enclosure.

In another preferred embodiment, said retaining means is adapted to be welded to said enclosure.

In a further preferred embodiment, said retaining means is adapted to be rivetted to said enclosure.

Rivetted and welded bodies have the advantage that once sealed they remain in position and are unlikely to become accidentally dislodged or unscrewed.

In a preferred embodiment, said body and said cap engage each other in use by means of mutually engaging threads.

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A screw-on cap has the advantage of easy access to the fixing below and can be opened and resealed repeatedly with limited risk of damage to the seal.

In a preferred embodiment, the thread on the body is formed on a surface of the aperture of said body.

In a preferred embodiment, said body and said cap engage each other in use by means of a snap-on fitting.

In a preferred embodiment, said cap is provided with a gasket seal.

In a preferred embodiment, said body is made substantially of stainless steel.

In another preferred embodiment, said cap is made substantially of plastic.

A preferred embodiment of the present invention will now be described, by way of example only, and not in any limitative sense, with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of a first prior art enclosure;

Figure 2 is a perspective view of a second prior art enclosure;

Figure 3 is a perspective view of a third prior art enclosure;

Figure 4 is a partial cross-sectional view of a sealing device embodying the present invention; and

Figure 5 is a perspective view of the device of Figure 4.

Referring to figures 4 and 5, a device 20 for sealing an aperture 22 for a fixing such as a bolt 24 for a sealed enclosure 26 has a body 28 having an aperture 30 extending from

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a first surface 32 to a second surface 34. Body 28 also has a fixing engaging portion 36 and a retaining means 38 adjacent the first surface 32 to engage and seal the body 28 within aperture 22 of enclosure 26. The fixing engaging portion 36 is in the example shown a chamfered surface angled so as to engage a corresponding chamfered surface of the head of the bolt 24. Body 28 also has a cap engaging means 40 adjacent the second surface 34. The device also includes a cap 42, itself having engaging means 44 for engaging cap engaging means 40, and a sealing gasket 46. The engaging means 40, 44 may be cooperating threaded surfaces.

The enclosure 26, much like that shown in the prior art of Figure 1, has in at least one of its walls apertures 22 through which are inserted fixings 24 to fix the enclosure 26 to a wall or like surface. In order to provide an adequate seal preventing water entering enclosure 26, the body 28 is inserted into aperture 22 and attached to the aperture by means of welding. Alternatively, the engaging means 38 might be a rivetting, where the exposed first surface 32 of body 28 is beaten into engagement with the sides of aperture 22 (which may be angled, as though counter-sunk from outside the enclosure, to assist engagement), or threaded with the internal surface of aperture 22 being mutually threaded.

With the body 28 engaged with the aperture of enclosure 26, the enclosure can be offered to a wall and bolt 24 inserted through aperture 30 so as to engage a corresponding aperture (not shown) in the wall, thereby retaining the enclosure 26 against the wall. The cap 42 can then be located on body 28 and secured there by means of mutually engaging threads 40 and 44. Gasket 46 assists in sealing the cap 42 and body 28.

It will be appreciated by persons skilled in the art that the above embodiment has been described by way of example only, and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of

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the invention as defined by the appended claims. For example cap 42 may engage body 28 by means of a snap on fitting.

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Claims

1. A device for sealing an aperture for receiving a fixing for a sealed enclosure, the device comprising:-

a body having an aperture extending from a first surface of said body to a second surface of said body and adapted to receive a said fixing, a fixing engaging portion for engaging said fixing, and retaining means adjacent said first end for engaging and sealing said body within the aperture of the enclosure; and

a cap for engaging said body to close said aperture at said second surface.

2. A device according to claim 1, wherein said retaining means is adapted to engage said enclosure by means of mutually engaging threads in said retaining means and said aperture of said enclosure.

3. A device according to claim 1, wherein said retaining means is adapted to be welded to said enclosure.

4. A device according to claim 1, wherein said retaining means is adapted to be rivetted to said enclosure.

5. A device according to any one of the preceding claims, wherein said body and said cap engage each other in use by means of mutually engaging threads.

6. A device according to claim 5, wherein the thread on the body is formed on a surface of the aperture of said body.

7. A device according to any one of claims 1 to 4, wherein said body and said cap engage each other in use by means of a snap-on fitting.

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8. A device according to any one of the preceding claims, wherein said cap is provided with a gasket seal.

9. A device according to any one of the preceding claims, wherein said body is made substantially of stainless steel.

10. A device according to any one of the preceding claims, wherein said cap is made substantially of plastic.

11. A device for sealing an aperture for receiving a fixing for a sealed enclosure, the device substantially as hereinbefore described with reference to Figures 4 and 5 of the accompanying drawings.