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A waterproofing recessed electrical junction box

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Abstract

A recessed electrical junction box designed to house electrical apparatus within walls and ceilings consists of a container with an integrated flange that interfaces with the container's rim. The container and flange are one piece, often plastic injection-moulded, and create a flush surface with the interior wall when installed. The flange can be sealed to the wall or a waterproof barrier, forming a watertight seal meeting codes and standards related to internal wet area waterproofing. Installation may involve inserting the container through a wall opening, allowing the flange to interface with a waterproof membrane to prevent water ingress. Holes for electrical cabling can be made and sealed, or the container may have destructible tabs for creating these holes. The junction box may also include angled sides to allow for stacking and prevention of water collection. The container may have interior side projections which serve as attachment holes for the electrical apparatus and through which electrical wiring may be run.

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A waterproofing recessed electrical junction box

Field of the Invention

[0001] This invention relates generally to electrical junction boxes and, more particularly, to a waterproofing recessed electrical junction box.

Background of the Invention

[0002] An electrical outlet enclosure is a protective housing designed to encase and safeguard electrical outlets and apparatus installed within a wall. This enclosure is typically made of durable materials such as plastic or metal and may feature a cover that can be securely sealed to prevent dust, moisture, or contaminants from infiltrating the electrical components.

[0003] These enclosures not only enhance safety but also ensure compliance with electrical codes and standards, including codes and standards related to internal wet area waterproofing.

[0004] Various types of enclosures exist including US6239365B1 (2001-05-29) McEvers which discloses a one-piece, unitary sealable electrical junction box with built-in sealing chambers for electrical wires. The wires pass through these chambers before entering the main box, and they can be sealed with expandable foam to create an airtight barrier. The box has an outer flange that allows for a vapor barrier to be securely attached, ensuring an airtight seal around the outside.

[0005] The junction box includes a front flange that protrudes outward from its outer wall. This front flange is positioned parallel to the box's front opening and set back to accommodate a wall lining such as sheetrock, It features attachment holes for securing the box to a stud using nails, screws, or similar means. The flange's width allows for the attachment of a vapor barrier using adhesive.

[0006] US4757158A (1988-07-12) Lentz discloses a five-sided air-vapor barrier box used to seal an electrical outlet box within a building's wall. The barrier box features outwardly extending reinforced flanges around its open side, with these flanges secured to a wall stud. The electrical outlet box and barrier box are attached to the stud, and a moisture-proof sheet is placed over them, with an opening cut to match

the barrier box's open side. Caulk is applied to the flanges, and the film is pressed against them to create an airtight and moisture-proof seal. The entire assembly is then covered with the final wall finish. The barrier box walls have varying thicknesses, with thicker portions near the flanges for added strength and thinner sections near the back wall for easier wire insertion.

[0007] US4673097A (1987-06-16) Schuldt discloses an electrical box which is designed for wall and ceiling installation to enclose the ends of sheathed electrical conductors connected to a switch or socket within the box's hollow interior. It features an integrally moulded flange that surrounds the box's exterior walls and is parallel to its open front face. The flange is set back from the open face to ensure it aligns with the interior wall's surface when installed. This flange can be secured to the wall material or a vapor and air barrier using adhesive, preventing moisture and air from passing through the box. Additionally, alignment spacers are included for precise installation on a rigid building wall surface.

[0008] The present invention seeks to provide a recessed electrical junction box which will overcome or substantially ameliorate at least some of the deficiencies of the prior art, or to at least provide an alternative.

[0009] It is to be understood that, if any prior art information is referred to herein, such reference does not constitute an admission that the information forms part of the common general knowledge in the art, in Australia or any other country.

Summary of the Disclosure

[0010] There is provided herein a recessed electrical junction box comprising a container defining an interior for accommodating electrical apparatus and a surrounding flange interfacing a rim of the container.

[0011] The container and the flange are integrally formed as one piece to form a simple and reliable watertight barrier, unlike the multi-compartmental arrangements of the aforedescribed prior art which may require sealant and/or caulking.

[0012] Furthermore, an intersection of the container and the flange defines an opening, and no part of the junction box protrudes beyond a front face of the flange.

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[0013] As such, unlike the aforedescribed prior art arrangements wherein the flange is set back from the opening to accommodate a specific thickness of wall lining and installed behind the wall lining, the present arrangement having no part of the junction box protrudes beyond a front face of the flange allows for flush mount retrofitting to existing wall linings wherein the flange interfaces flush against the front surface of the wall lining.

[0014] Moreover, the present junction box can yet alternatively be installed with the flange behind the wall lining wherein the thickness of a cover plate of the electrical apparatus installed in the junction box is chosen according to the thickness of the wall lining so that a front face of the electrical apparatus is flush with the wall lining.

[0015] The container may comprise attachment holes therein having entrances coplanar with a front face of the flange to allow flush mounting of cover plates of the electrical apparatus.

[0016] In preferred embodiments, the container has at least one interior angled surface so that any water pooled therein flows down towards the opening.

[0017] Furthermore, the container may have angled sides so that multiple containers can be stacked together.

[0018] In embodiments, the container may have interior side projections with respect to a frontal plane. These interior side projections may define the attachment holes. The container may further comprise exterior side recesses corresponding to respective interior side projections.

[0019] These interior side projections are preferably sufficiently wide so that electrical wiring can be run through holes formed therethrough. Also, any such electrical wiring can be tucked away inside the corresponding exterior side recesses to allow insertion or removal of the junction box through an aperture in the wall lining without hindrance.

[0020] When the junction box is installed, a bottom one of these interior side projections may define a raised surface which directs water away from electrical wiring penetrating therethrough.

[0021] Exterior surfaces of the exterior side recesses may be angled away from the flange when the junction box is installed to prevent pooling of water therein.

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[0022] Other aspects of the invention are also disclosed.

Brief Description of the Drawings

[0023] Notwithstanding any other forms which may fall within the scope of the present invention, preferred embodiments of the disclosure will now be described, by way of example only, with reference to the accompanying drawings in which:

[0024] Figure 1 shows a front view of an electrical junction box in accordance with an embodiment;

[0025] Figure 2 shows a rear perspective view of the junction box; and

[0026] Figure 3 shows a side cross-sectional view of the junction box.

Description of Embodiments

[0027] A recessed electrical junction box 100 is designed for accommodating electrical apparatus, such as nurse call points, electrical outlets and the like.

[0028] The junction box 100 comprises a container 101 which is recessed in a wall cavity in use. The container 101 defines an interior 103 for accommodating the electrical apparatus.

[0029] The junction box 100 further comprises a surrounding flange 102 interfacing a rim 116 of the container 101.

[0030] The container 101 and the flange 102 are integrally formed as one piece. In embodiments, the junction box 100 may be plastic injection moulded.

[0031] An intersection of the container 101 and the flange 102 defines an opening 104 which is coplanar with the flange 102. No part of the junction box 100 protrudes beyond a front face 105 of the flange 102. In other words, when the junction box 100 is installed, no part of the junction box 100 protrudes beyond the front face 105 of the flange 102.

[0032] The container 101 has interior attachment holes 106 recessed with respect to the opening 104. These attachment holes 106 are spaced to align with fixation screws of the electrical apparatus.

[0033] For installation, an aperture is made through a wall lining into a wall cavity therebehind. The container 101 is then inserted through the aperture until the flange

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102 lies flat against the wall lining. The surface area of the flange 102 interfaces a waterproofing membrane applied over the wall lining so that the junction box 100 forms a watertight barrier to prevent water ingress or egress thereby meeting the applicable codes or standards relating to internal wet area waterproofing.

[0034] A hole may be drilled through the container 101 for electrical cabling and which may be sealed with a plug or sealant. Alternatively, the container 101 may comprise destructible tabs which are pushed out to form these holes for electrical cabling.

[0035] According to an alternative installation, the junction box 101 is installed with the flange 102 against a rear surface of the wall lining and wherein a thickness of a cover plate of the electrical apparatus is chosen so that a front surface of the electrical apparatus to substantially flush with a front surface of the wall lining. In this way, the thickness of the cover plate is chosen to conform with the thickness of the wall lining, thereby allowing for the use of the junction box 101 with wall linings of various thicknesses. According to this installation, the waterproofing barrier would be installed behind the wall lining.

[0036] As best shown in Figure 3, openings 107 to the attachment holes 106 are preferably coplanar with the opening 104. As such, faceplate of the electrical apparatus can be applied flush across the front face 105 of the flange 102.

[0037] At least one side 108 of the container 101 is preferably angled with respect to the flange 102 so that when the junction box 100 is installed with the flange 102 vertical in use and the at least one side 108 at the bottom of the container 101 as is shown in Figure 3, an interior 109 of the at least one side 108 angles down towards the opening 104. As such, any water collected within the container 101 would flow down to the opening 104 as opposed to pooling within the container 101.

[0038] Preferably the container 101 has angled sides 108 so that the container 101 can be stacked within adjacent similar container 101.

[0039] In the embodiment shown, the container 101 has a generally rectangular cross-section defined by four planar angled side walls 108. The container 101 may have a planar floor 117 between the sides.

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[0040] The container 101 may comprise interior side projections 110 with respect to a frontal plane given in Figure 1. The sides 108 may be of uniform thickness so that the container 101 defines exterior side recesses 111 corresponding to respective interior side projections 110.

[0041] These interior side projections 110 are preferably sufficiently wide (i.e. substantially wider than the attachment apertures 106) so that electrical wiring can be run through holes formed therethrough. Any such electrical wiring can be tucked away inside the corresponding exterior side recesses 111.

[0042] Preferably, exterior surfaces 112 of the exterior side recesses 111 are angled with respect to the flange 102. As such, with reference to Figure 3, when the junction box 100 is installed with the flange 102 vertical, a top one of the exterior surfaces 112 is angled down away from the flange 102. As such, any water collected within the exterior side recess 111 would flow away from the flange 102 and from the rear of the container 101 as opposed to pooling within the recess 111.

[0043] The interior side projections 110 may define the attachment holes 106. As is further shown in Figure 3, the interior side projections 110 may comprise a thick section 113 at the opening 104 and wherein the attachment holes 106 are blind holes within these thick sections 113. These blind holes 106 would not compromise the watertight integrity of the junction box 100.

[0044] With reference to Figure 1, the container 101 may be elongate and wherein the container 101 defines a pair of interior side projections 110 at respective ends of the container 101.

[0045] With further reference to Figure 1, when the junction box 101 is installed with the flange 102 vertical, a bottom interior side projection 110 defines a raised surface 114 with respect to adjacent surfaces 115. As alluded to above, electrical wiring may be run through holes formed through the interior side projections 110. As such, any water collected within the container 102 pools against the adjacent surfaces 115 away from any electrical wiring through the bottom interior side projection 110.

[0046] The interior side projections 110 further preferably have angled sides so that the container 101 can be stacked within adjacent similar container 101 in use.

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[0047] The flange 102 may define attachment apertures 116 therethrough. In embodiment shown, the flange 104 defines attachment apertures 116 at respective corners thereof.

[0048] The foregoing description, for purposes of explanation, used specific nomenclature to provide a thorough understanding of the invention. However, it will be apparent to one skilled in the art that specific details are not required in order to practise the invention. Thus, the foregoing descriptions of specific embodiments of the invention are presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed as obviously many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the following claims and their equivalents define the scope of the invention.

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Claims

1. A recessed electrical junction box comprising:

a container defining an interior for accommodating electrical apparatus; and

a surrounding flange interfacing a rim of the container, wherein:

the container and the flange are integrally formed as one piece;

an intersection of the container and the flange defines an opening and no part of the junction box protrudes beyond a front face of the flange; and

the container has interior attachment holes recessed with respect to the opening.

2. The junction box as claimed in claim 1, wherein openings to the attachment holes are coplanar with the opening.

3. The junction box as claimed in claim 2, wherein the attachment holes are blind holes.

4. The junction box as claimed in claim 1, wherein sides of the container are angled with respect to the flange so that when the flange is installed vertically in use, a bottom one of the sides is angled down towards the opening.

5. The junction box as claimed in claim 1, wherein the container has angled sides so that the container can be stacked with an adjacent similar container.

6. The junction box as claimed in claim 5, wherein the container has four planar angled side walls.

7. The junction box as claimed in claim 1, wherein the container defines interior side projections with respect to a frontal plane.

8. The junction box as claimed in claim 7, wherein the interior side projections are sufficiently wide to allow reticulation of electrical wiring therethrough.

9. The junction box as claimed in claim 7, wherein the container defines exterior side recesses corresponding to respective interior side projections.

10. The junction box as claimed in claim 9, wherein exterior surfaces of the exterior side recesses are angled with respect to the flange.

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11. The junction box as claimed in claim 10, wherein, when the flange is installed vertically in use, a top one of the exterior surfaces is angled down away from the flange.

12. The junction box as claimed in claim 7, wherein the interior side projections define the attachment holes.

13. The junction box as claimed in claim 12, wherein the interior side projections comprise a thick section at the opening and wherein the attachment holes are blind holes in the thick sections.

14. The junction box as claimed in claim 7, wherein the container is elongate and wherein the container defines a pair of interior side projections at respective ends of the container.

15. The junction box as claimed in claim 7, wherein, when flange is installed vertically in use, a bottom one of the interior side projections defines a raised surface with respect to adjacent surfaces.

16. The junction box as claimed in claim 15, further comprising wiring penetrating the raised surface.

17. The junction box as claimed in claim 7, wherein the interior side projections have angled sides so that the container can be stacked with an adjacent similar container.

18. An installation comprising:

wall lining; and

the junction box as claimed in claim 1, wherein the flange interfaces flush against the front surface of the wall lining.

19. The installation as claimed in claim 18, further comprising the junction box as claimed in claim 7, further comprising electrical wiring through at least one of the interior side projections.

20. The installation as claimed in claim 18, further comprising the junction box as claimed in claim 3, wherein a bottom one of the sides is angled down towards the opening.

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21. The installation as claimed in claim 18, further comprising the junction box as claimed in claim 11, wherein a top one of the exterior surfaces is angled down away from the flange.

22. The installation as claimed in claim 18, further comprising the junction box as claimed in claim 12, wherein a bottom one of the interior side projections defines a raised surface with respect to adjacent surfaces.

23. An installation comprising:

wall lining; and

the junction box as claimed in claim 1, wherein the flange is installed against a rear surface of the wall lining.

24. The installation as claimed in claim 23, further comprising the electrical apparatus and wherein a front face of the electrical apparatus is flush with a front surface of the wall lining.

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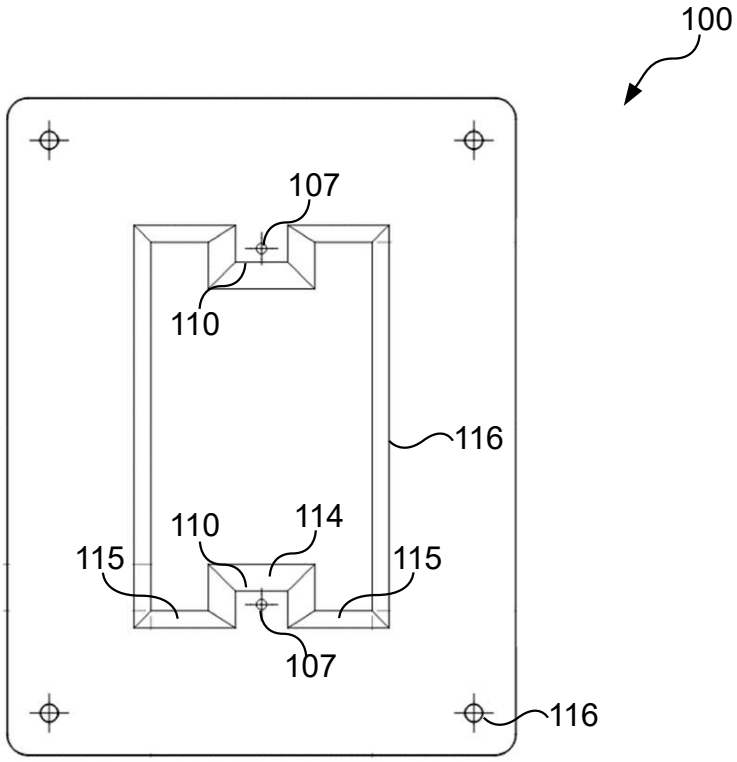

Figure 1

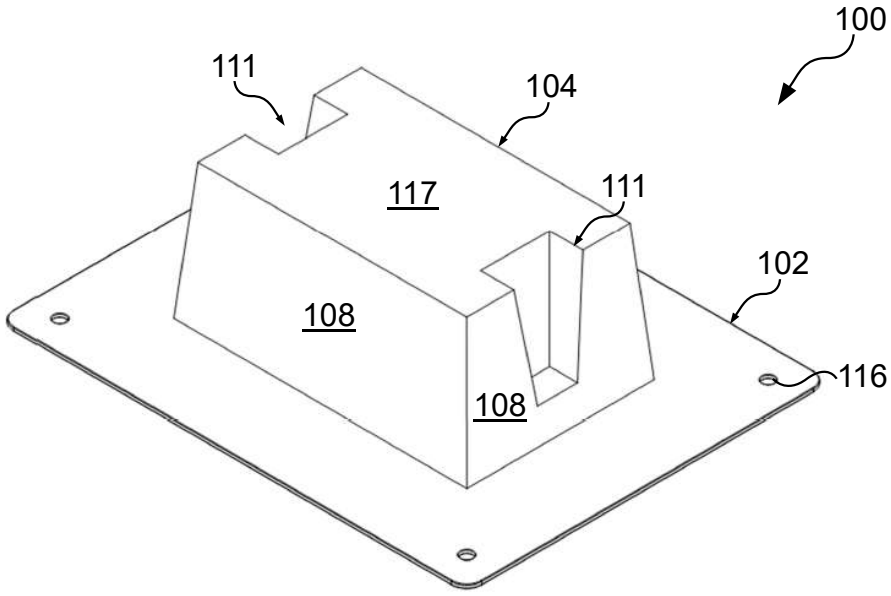

Figure 2

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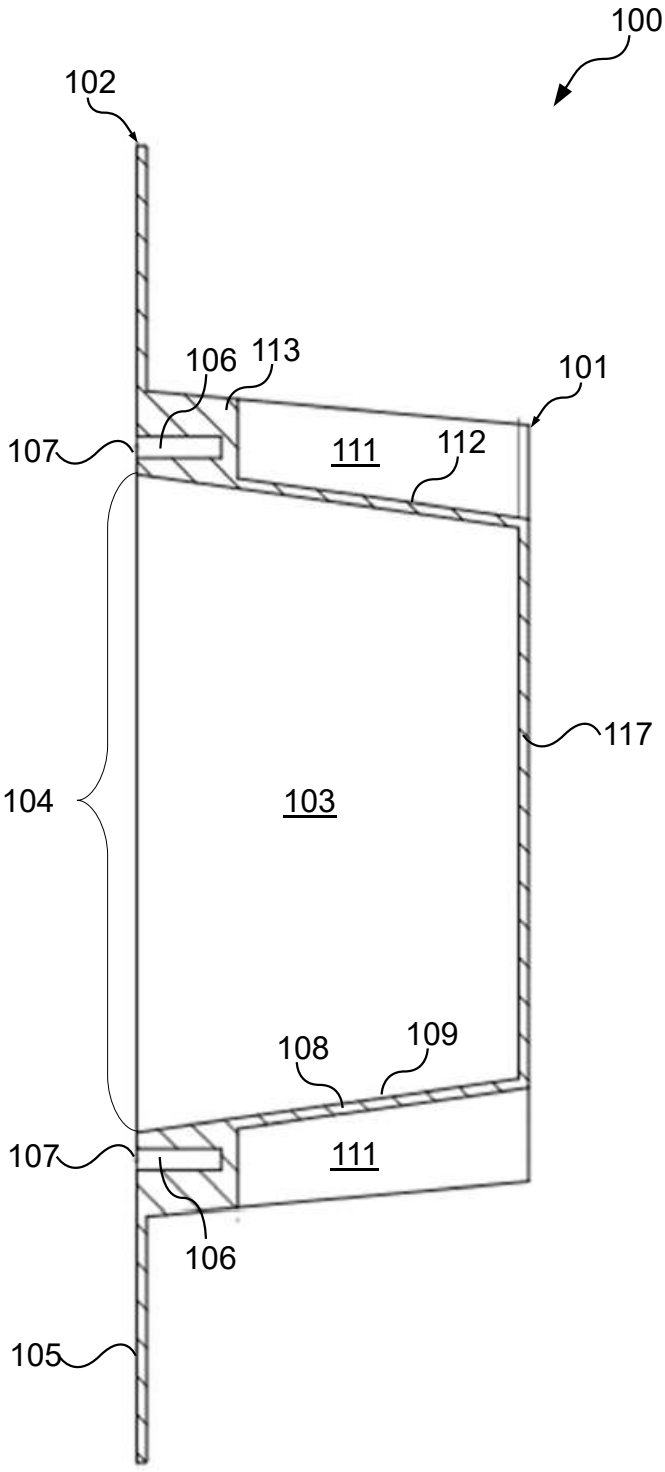

Figure 3