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(54) CASING HAVING AN ACCESS PANEL WITH A TOOL ATTACHMENT PORTION

(57) The invention relates to a casing (1) having an interior volume (2) adapted to at least partially receive an electric terminal (4), particularly a bushing (40). Furthermore, the casing (1) comprises an access panel (6) which, in a closed position (8), covers an access opening (10) for accessing the interior volume (2) from outside the casing (1), wherein the access panel (6) is configured to be movable into an open position (12), in which the access opening is open. In order to allow a movement of the access panel (6) from a secure distance, the access panel (6) comprises at least one tool attachment portion (14) for attaching a tool (16).

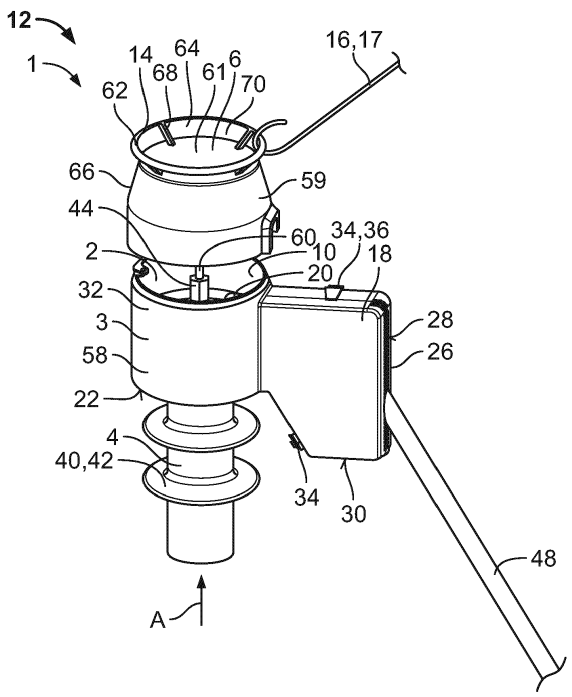

Fig. 3

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Description

[0001] The invention relates to a casing for an electric terminal.

[0002] Such casings may be used, for example, for substation, distribution or switch gear equipment such as bushings or insulators, particularly for transformers. The casing is installed for protection and insulation enhancement. For maintenance and close inspection of the electric terminal the casing is removed and subsequently reinstalled. Therefore, for safety reasons the electric terminal needs to be de-energised, whereby it is simply assumed to be safe. When a fault occurs, the exact state of the electric terminal may not be certain. This, however makes the maintenance or close inspection dangerous, time consuming and laborious.

[0003] Therefore, it is the objective of the invention to provide a casing for an electric terminal that allows safe and swift access to the electric terminal.

[0004] In accordance with the present invention, the problem is solved by an inventive casing for an electric terminal, the casing having an interior volume adapted to at least partially receive the terminal, the casing comprising an access panel which is configured to be movable from a closed position, in which an access opening for accessing the interior volume from an outside of the casing is covered into an open position in which the access opening is open to the outside. The access panel further comprises at least one tool attachment portion for attaching a tool to move the access panel between the closed position and the open position.

[0005] The inventive casing allows utilities to safely gain access to a potentially energised electric terminal so that an earthing or ground stick can be applied for perfect grounding of the electric terminal. Thus, it is safe for a worker to inspect and potentially remove the casing completely, for maintenance for example or as part of a routine check, while being assured that the electrical terminal is grounded.

[0006] The invention can be further improved by the following features, which are independent from one another with respect to their respective technical effects and which can be combined arbitrarily.

[0007] For example, the tool attachment portion may be configured to be engaged by a hook and/or a hot stick. Therefore, the access panel may be moved easily from a safe distance providing a physical separation from the electric terminal, to reduce for example the chance of burns, which might result from electrical arcing if there is any malfunction of the electric terminal.

[0008] The casing may particularly be adapted for a bushing, preferably in a medium-voltage range from about 36 to 42 kV.

[0009] Preferably, the at least one tool attachment portion may protrude from an outward facing surface of a casing wall of the access panel. The at least one tool attachment portion may thus allow for a hook, particularly a hot stick, to be easily attached and move the access panel applying little force in a direction perpendicular to the top surface.

[0010] The at least one tool attachment portion may preferably be rotationally symmetrical so that the worker may access the at least one tool attachment portion from various different angles, further increasing the practicality of the casing. The at least one tool attachment portion may be at least two-fold rotationally symmetrical.

[0011] To allow for easy access, particularly from a greater distance between the worker and the casing, the at least one tool attachment portion may comprise a rail or at least a rail-like portion spaced apart from the casing wall of the access panel. The tool may be clamped around the rail allowing for greater handleability of the access panel with the tool, reducing the risk of the access panel falling off the tool.

[0012] The rail may be attached to the casing wall of the access panel by ribs extending from the outward facing surface of the top wall to the rail. Therefore, an eyelet may be formed between the rail and the top wall, the eyelet extending between two adjacent ribs.

[0013] Preferably, the rail may extend around a closed circumference, so that the rail may be accessible from 360°, further facilitating the opening and closing of the access panel with the tool.

[0014] For allowing the rail to be easily clamped by the tool and to reduce the potential for damage of the housing wall, the rail may extend radially beyond the circumference of the housing wall. Preferably, the inner diameter of the rail may be larger than the outer diameter of the housing wall. Therefore, the tool, particularly the hook may be easily clamped around the rail without the housing wall being in the way.

[0015] According to a further advantageous embodiment, the access panel may be held in the closed position by friction fit only. Therefore, little force has to be applied to move the access panel between the open position and closed position. The access panel may for example be a removable cover that can be put on top of the remainder of the casing in the closed position, whereby the friction between the cover and the remainder of the casing is sufficient to securely mount the cover to the casing. Therefore, the access panel may be moved easily by a simple pulling or pushing motion relative to the remainder of the casing.

[0016] A form lock or form fit requires rather large forces to unlock. Therefore, casings, wherein the access panel is locked via form locking mechanisms, such as mechanisms requiring the deflection of the latches, may not be adapted for handling with tools. However, the access panel may also be locked in the closed position by a form fit, which does not require extensive force to unlock but a movement in a certain direction, such as a bayonet mount.

[0017] The access panel may be put at least partially over the remainder of the casing in the closed position, so that the overlap between the opposing surfaces of the access panel and the remainder of the casing may pro-

vide a higher force of friction lock. Hence, the access panel may be prevented from accidentally moving to the open position, for example by wind or an animal, such as a cat. The overlap may be between about 6 cm to about 7 cm for example.

[0018] The access panel and the remainder of the casing may be separate parts, which are removed from one another in the open position. This may allow for complete removal of the access panel in the area of interest for the worker.

[0019] Alternatively, the access panel may be fixed to the remainder of the casing. The access panel may be hinged to the remainder of the casing forming a flap, which may be pivoted between the open and closed position. Accidental dropping of the access panel may be prevented, as the access panel is fixed to the remainder of the casing.

[0020] Depending on the application, the access panel may close the access opening formed on a side surface, top surface or the like of the remainder of the casing, in the closed position. According to a further aspect of the invention, multiple access panels may be provided, each adapted for closing a separate access opening at a different position and/or orientation on the remainder of the casing in the closed position. Therefore, depending on the position of the worker or the position of interest an access panel may provide a better access to the electric terminal than the other access panel.

[0021] The casing may comprise at least one insertion opening which is configured for insertion of the electric terminal into the interior volume. The at least one insertion opening may be framed by multiple deflectable fingers, allowing for the casing to be adapted for a predetermined range of terminals having varying radial sizes. Furthermore, the deflectable fingers may allow a tolerance in relative position of the electric terminal within the interior volume.

[0022] The casing may further comprise at least one insertion opening for a conductor, such as a cable lug to be connected to the electric terminal. The insertion opening may be formed by deflectable fingers, extending along a side surface of the casing remote from the access panel. The fingers may extend along a section of the side surface in an axial direction allowing the entrance of the conductor in different orientations into the interior volume.

[0023] The multiple fingers may be arranged opposite one another, whereby the conductor may deflect the fingers away from one another forming a structurally customized insertion opening for the conductor.

[0024] In order to further facilitate the mounting of the casing to the electric terminal, the casing may comprise two shell halves being hinged to one another. The shell halves may be easily closed around the electric terminal during installation.

[0025] Each shell half may comprise a plurality of deflectable fingers formed on a free end of the half directed to the other, so that the fingers of each half may interlock each other or be arranged opposite each other in the closed position framing the insertion opening.

[0026] The shell halves may comprise a form lock mechanism, such as a latching mechanism, to secure the shell halves in a closed position. Therefore, the shell halves may be prevented from accidentally opening, for example due to strong vibrations or mechanical stress.

[0027] The access panel may be arranged to be mounted to the shell halves in the closed position, when the shell halves are secured to one another.

[0028] Preferably, the access panel may be dome shaped. Thus, the interior volume enclosed by the casing in the closed position may be enlarged by the additional receptacle volume of the dome than in the open position. A grounding tip of the electric terminal may protrude into the receptacle volume of the dome in the closed position, so that in the open position, the grounding tip may protrude from the interior volume of the casing allowing a free access to the grounding tip for securely grounding the electric terminal.

[0029] A location disc may be provided the location disc being fixedly mountable to the electric terminal. The remainder of the casing may be mounted to the location disc further securing the position of the casing to the electric terminal.

[0030] A positioning notch may be provided on an interior surface of the casing, the positioning notch being adapted to receive the location disc.

[0031] The invention further relates to an electric terminal, particularly a bushing, comprising an insulator and a terminal end protruding from the insulator, wherein a casing according to any of the above embodiments is provided, the casing at least partially receiving the electric terminal in its interior volume.

[0032] A conductor may be provided, the conductor entering the interior volume and being connected to the terminal end. The conductor may particularly be a cable lug, which may allow for an essentially coaxial connection between the electric terminal and a cable. An orifice of the cable lug may be penetrated by the terminal end, whereby the cable lug may be further secured by a nut. If a location disc is provided, the location disc may be also mounted to the terminal end and secured by the nut. The location disc may be pressed between the cable lug and the nut or between an abutment surface of the electric terminal and the cable lug.

[0033] For allowing an easy access to the electric terminal for grounding purposes, the electric terminal may comprise a grounding tip protruding, in the open position, from the interior volume through the access opening to the outside.

[0034] In the following, exemplary embodiments of the casing according to the invention is explained in greater detail with reference to the accompanying drawings.

[0035] In the figures, the same reference numerals are used for elements that correspond to one another in terms of their function and/or structure.

[0036] According to the description of the various as-

pects and embodiments, elements shown in the drawings can be omitted if the technical effects of these elements are not needed for a particular application, and *vice versa*: i.e. elements that are not shown or described with reference to the figures, but are described above, can be added if the technical effect of those particular elements is advantageous in a specific application.

[0037] In the figures:

Fig. 1 shows a schematic perspective view of a first exemplary embodiment of the inventive casing;

Fig. 2 shows a schematic perspective explosion view of the first embodiment of the inventive casing and an electric terminal;

Fig. 3 shows a schematic perspective view of the casing shown in Figs. 1 and 2 mounted to the electric terminal in the open position;

Fig. 4 shows a schematic perspective view of Fig. 3 in the closed position;

Fig. 5 shows a schematic perspective view of a second exemplary embodiment of the inventive casing in the open position;

Fig. 6 shows a schematic perspective view of the second exemplary embodiment of the inventive casing in the closed position; and

Fig.7 shows a schematic perspective view of a third exemplary embodiment of the inventive casing in an open position.

[0038] A first exemplary embodiment of a casing 1 according to the invention is explained in detail with reference to Figs. 1 to 4.

[0039] The casing 1 has an interior volume 2 adapted to at least partially receive an electric terminal 4. Furthermore, the casing 1 comprises an access panel 6 which, in a closed position 8, covers an access opening 10 for accessing the interior volume 2 from outside the casing 1, wherein the access panel 6 is configured to be movable into an open position 12, in which the access opening is open. In order to allow a movement of the access panel 6 from a secure distance, the access panel 6 comprises at least one tool attachment portion 14 for attaching a tool 16, such as a hook 17, particularly a hot stick having a hook or clamp formed at the end.

[0040] The casing 1 may be formed of an insulating material, particularly a plastic material. The casing 1 may for example be formed in an injection moulding process or the like.

[0041] As can be seen in Fig. 1 to 4, the casing 1 may comprise a sleeve 3 extending in an axial direction A. Therefore, after mounting the casing 1 to the electric terminal 4 the casing 1 may surround the electric terminal 4 essentially at about 360°. In this exemplary embodiment, the sleeve 3 may comprise an essentially cylindrical shape extending along the axial direction A.

[0042] An extension 18 may be formed protruding radially from the sleeve 3 of the casing 1, so that an end of a conductor 20 may also be received in the interior volume 2 and protected by the casing 1.

[0043] As can be seen in Fig. 1, a bottom surface 21 of the sleeve 3 may comprise an insertion opening 22 for insertion of the electric terminal 4 into the interior volume 2. The insertion opening 22 may be defined by a central hole 24 framed by a plurality of deflectable fingers 26 extending parallel to one another essentially perpendicular to the axial direction A. The fingers 26 may be deflected by the electric terminal 4 increasing the diameter of the central hole 24. Consequently, the casing 1 may be used for various electric terminals 4 within a predetermined diameter range.

[0044] The fingers 26 may also ensure that the electric terminal 4 is fittingly inserted into the insertion opening 22, whereby the fingers 26 nestle onto the outer circumference of the electric terminal 4 at the insertion opening 22. Therefore, the casing 1 may act as a hindrance for the insertion of body parts, such as the paws of animals, into the interior volume 2 after installation.

[0045] The extension 18 may also comprise a plurality of fingers 26 parallel to one another extending along a side surface 28 remote from the sleeve 3 and/or along a bottom surface 30 of the extension 18, the bottom surface 30 being essentially parallel to the bottom surface 21. A pair of fingers 26 may be arranged opposite to one another having abutting tips, whereby the fingers 26 of said pair may be adapted to be deflected away from one another. Thus, a customized insertion opening may be provided for the conductor by the deflection of the pair of fingers.

[0046] By having multiple fingers, particularly pairs of fingers, extending parallel to one another along the side surface 28, the relative angle at which the conductor 20 enters the interior volume 2 may vary, e.g. from about 0° to about 45°. The provision of the fingers 26 at the bottom surface may allow the conductor 20 to enter the interior volume essentially parallel to the electric terminal 4.

[0047] As can be seen in Fig. 2, the casing 1 may comprise two shell halves 32 which are hinged to one another at one end allowing a pivoting motion of the shell halves 32 away from one another (see Fig. 2) or towards each other (see Figs. 1, 3 and 4). Therefore, the installation of the casing 1 onto the electric terminal 4 may be further facilitated.

[0048] The shell halves 32 may be locked to one another, when the shell halves are pivoted towards each other, in order to prevent accidental dismounting of the casing 1 from the electric terminal 4. For this, the shell halves may comprise a latching mechanism 34, such as clips 36, which may interlock when the shell halves 32 are pivoted towards each other.

[0049] As can be seen in Figs. 1 to 4, the latching mech-

anism 34 may comprise multiple clips 36 arranged on the extension 18. One clip 36 may be provided at a top surface of the extension 18 and one clip 36 may be provided at a side surface of the extension approximate to the cylindrical part of the casing 1.

[0050] Now the electric terminal 4 and the mounting of the casing 1 to the electric terminal is further described in detail with reference to Fig. 2.

[0051] The electric terminal 4 may particularly be a bushing 40, such as for a transformer. The electric terminal 4 may preferably be a medium voltage terminal at a range of about 36 to about 42 kV. However, the casing 1 may also be adapted for low voltage applications or high voltage applications.

[0052] The bushing 40 may comprise an insulation 42, such as a porcelain or resin insulation 42 and a terminal end 44 protruding in the axial direction A from the insulation 42. The conductor 20 may be a cable lug 46, which may be fixed to the terminal end 44 for assuring an electrical connection to the bushing 40. The cable lug 46 may be attached to a cable 48, which may be at least partially arranged at an angle, in this case at approximately 45° degrees to the electric terminal 4.

[0053] The casing 1 may further comprise a location disc 50, which may be fixedly mounted to the terminal end 44. The location disc 50 may be formed of an electrically insulating material and may comprise a webbing structure. The web structure allowing for both a light weight and increased stability in terms of breaking strength.

[0054] The location disc 50 may comprise a recess 52, such as a cut out, which can be directed towards the conductor 20. Thus, the angle at which the conductor 20 is arranged relative to the electric terminal 4 is not restricted by the location disc 50.

[0055] The casing 1, particularly the shell halves 32, may comprise a positioning notch 54 formed on an inner surface of the casing 1, particularly the shell halves 32, facing towards the interior volume 2. The positioning notch 54 may be formed between two radially inward protruding brackets 56 being distant from one another in the axial direction A. The positioning notch 54 may be adapted to receive the location disc 50, so that the relative position of the casing 1 to the electric terminal 4 may be determined and secured by the location disc 50 and the notch 54.

[0056] In Figs. 3 and 4, the casing 1 is shown mounted to the electric terminal 1. Thereby, the shell halves 32 are closed around the electric terminal 4 and the conductor 20, surrounding at least the electric terminal 4 at around 360° in a plane essentially perpendicular to the axial direction A.

[0057] It should be noted that even though the embodiment shows a casing 1 comprising shell halves 32 being pivotable relative to one another, the casing 1 may also comprise an essentially closed body, whereby the electric terminal 4 may be inserted into the interior volume 2 via the insertion opening 22.

[0058] Therefore, to avoid any confusion, the part of the casing 1, which may be fixedly mounted to the electric terminal 1, such as the two shell halves 32, is referred to as the main body 58, which may comprise the sleeve 3 and the extension 18.

[0059] The sleeve 3 may comprise the access opening 10 for allowing access to the terminal end 44 of the electric terminal 4 from outside the casing 1. The access opening 10 may be arranged at an end of the sleeve 3 opposite to the insertion opening 22 of the sleeve 3. Consequently, the worker may gain direct access to the terminal end 44 in the interior volume 2 without interference of the electric terminal's 4 insulation 42.

[0060] In order to close the access opening 10 the access panel 6 is provided, which is movable relative to the main body 58 between the closed position 8 (see Figs. 1 and 4) and the open position 12 (see Fig. 3).

[0061] According to the first exemplary embodiment, the access panel 6 and the main body 58 may be separate parts, being detached from one another in the open position 12. The access panel 6 may be formed as a lid 59, which may at least partially be put over the sleeve 3, so that an inner surface of the lid 59 glides at least partially along an outer surface of the sleeve 3. The overlap between the lid and the sleeve 3 may create a friction interface between the lid 59 and the sleeve 3 for securing the lid 59 to the sleeve 3 by friction. Furthermore, the lid 59 and the sleeve 3 may be arranged in such a manner that the gravitational force pulls the lid 59 to the sleeve 3. Therefore, the force required to move the lid 59 between the closed position 8 and the open position 12 may not be too high allowing for easy handling especially from greater distances. However, the force may still be high enough to prevent an accidental dismounting of the lid 59 for example by strong winds.

[0062] The access panel 6 may particularly be dome-shaped, so that in the closed position 8, the interior volume 2 enclosed by the casing 1 may be increased by the additional volume of the access panel's 6 recess.

[0063] The electric terminal 4 may comprise a grounding tip 60 extending from the terminal end 44 in the axial direction A. The grounding tip 60 may preferably at least partially protrude from the access opening 10 in the axial direction A in the open position 12 and be at least partially received in the access panel's receptacle in the closed position 8. Therefore, the grounding tip 60 may easily be accessed for grounding the electric terminal 4 in the open position 12 especially from greater distances, ensuring a safe working environment.

[0064] In order to safely move the access panel 6 between the open and closed position, the access panel 6 comprises at least one tool attachment portion 14. As can be seen in Figs. 1 to 4, the tool attachment portion 14 may protrude in the axial direction A from an outward facing top surface of a casing wall 61 access panel 6, the casing wall 61 being adapted to cover the access opening 10 in the closed position.

[0065] Of course, it may also be possible for at least

one tool attachment portion 14 to radially protrude from a side surface of the access panel 6 essentially perpendicular to the axial direction A. However the manageability of the tool attachment portion 14 has been proven to be improved by providing the at least one tool attachment portion 14 essentially parallel to a mounting direction, which is in the case of the first embodiment essentially parallel to the axial direction A.

[0066] The at least one tool attachment portion 14 may preferably be rotationally symmetrical, in case of the first exemplary embodiment, the at least one tool attachment portion 14 may be 4-fold rotationally symmetrical. This allows for the worker to access the at least one tool attachment portion 14 from different positions and/or angles with the tool 16.

[0067] Preferably, the at least one tool attachment portion 14 may comprise a rail 62 spaced apart from the top surface of the access panel 6. Therefore, a gap 64 is formed between the top surface and the rail 62 allowing for the tool 16, such as a hook or a hot stick, to grip around the rail 62. Hence, the access panel may be prevented from accidentally falling off the tool 16.

[0068] The rail 62 may preferably extend, particularly continuously, along a closed circumference allowing the tool to be attached to the tool attachment portion 14 at various positions 360° around the axial direction A.

[0069] The at least one tool attachment portion 14 and the access panel 6 may be formed integrally with one another as a monolithic component 66, e.g. by an injection moulding process.

[0070] The rail 62 may particularly be ring shaped being connected to the top surface via ribs 68. According to the first embodiment, four ribs 68 may be provided arranged equidistantly along a circumferential direction on the top surface and the rail 62. Thus, an eyelet 70 may be formed bordered by two adjacent ribs 68 in the circumferential direction and in the axial direction A by the rail 62 and the top surface.

[0071] According to a further advantageous aspect, ring shaped rail 62 may comprise an inner diameter that is larger than an outer diameter of the circumference. In other words, the rail 62 may extend essentially parallel to the radial direction beyond the outer circumference of the top surface. Therefore, when attaching the tool 16 to the rail 62 the tool 16 is not hindered by the top surface of the access panel 6.

[0072] Now the second embodiment of the inventive casing 1 is further elucidated on with reference to Figs. 5 and 6. For the sake of brevity, only the differences to the first embodiment are highlighted in the following.

[0073] As can be seen in Fig. 5, the casing 1 according to the second embodiment may comprise two separate parts, the main body 58 and the access panel 6, which may be detachably mounted to one another.

[0074] The main body 58 may be formed of the sleeve 3 and the extension 18 formed thereto, extending radially from the sleeve 3. Similar to the first embodiment, the main body 58 may comprise two shell halves 32 being pivotable to one another.

[0075] The extension 18 may be nose shaped, wherein multiple deflectable fingers may be provided parallel to one another along the whole circumference of the nose in a plane arranged essentially parallel to the axial direction A. Therefore, the conductor 20 may enter the interior volume 2 from various directions.

[0076] The latching mechanism 34 for fastening the shell halves to one another may be provided on a radially outward facing surface of the sleeve 3, preferably at the edges of the shell halves 32 directed towards the opposite shell half.

[0077] According to the second embodiment of the inventive casing 1, the access panel may be adapted to be secured in the closed position 8 via a bayonet locking mechanism.

[0078] In contrast to the first embodiment, the sleeve 3 may comprise a rim portion 72 protruding radially inwardly from a top edge of the sleeve 3 opposite the insertion opening 22. The rim portion 72 may thus form a frame framing the access opening 10.

[0079] At a front face of the rim portion 72 facing away from the interior volume 2 towards the outside, the rim portion 72 may comprise at least one, preferably two, latching protrusions 74, protruding in the axial direction A. The at least one latching protrusion 74 may comprise the shape of a hook, especially of a double hook or mushroom hook.

[0080] The access panel 6 may be essentially planar having a slot 76 formed complementary to the latching protrusion 74, having a widened section for insertion of the latching protrusion 74 into the slot 76, whereby the widened section extends circumferentially into a narrow section. Hence, by rotating the access panel 6 after insertion of the latching protrusion 74 into the slot 76 via the widened section, the access panel 6 may be secured to the remainder of the casing 1, i.e. the main body 58, in the closed position 8 via a form lock acting essentially parallel to the axial direction A. The form lock may easily be terminated by rotating the access panel 6 relative to the main body 58. Thus, no extensive force is necessary to move the access panel 6 between the open and closed position, making the casing adaptable for handling with the tool, particularly from greater distances.

[0081] As can be seen in Fig. 5, the electric terminal 4 does not comprise a grounding tip 60 extending from the terminal end in the axial direction beyond the access opening 10. However, such a grounding tip 60 may also be provided in the second embodiment. The access panel may thus be adapted to at least partially receive the grounding tip.

[0082] The casing 1 may also comprise multiple access panels 6 arranged at different positions for allowing access to the interior volume 2 through different access openings 10. Such a casing 1 is shown in Fig. 7.

[0083] The casing 1 may be box shaped, whereby an extension is omitted. However, if desired, the casing 1 may also be provided with an extension.

[0084] Instead of the extension, the deflectable fingers 26 may be provided on a side surface of the sleeve 3. As can be seen in Fig. 7 deflectable fingers 26 may be provided at every edge of a shell half 32 so that when the shell halves 32 are pivoted to one another, an insertion opening 22 may be provided at each surface formed by the adjoining shell halves. Consequently, the electric terminal 4 and/or the conductor 20 may enter the interior volume 2 at four different orientations.

[0085] The casing 1 may be provided with two access openings 10 formed on opposite sides of the casing 1. In the case of the third embodiment, each shell half 32 may be provided with the access opening 10 at a side distal from the opposite shell half 32. Therefore, depending on the relative position of the worker to the casing 1, one access opening 10 may be more accessible than the other. Furthermore, the access openings 10 in the third embodiment may be arranged to be accessible in a direction essentially perpendicular to the axial direction A.

[0086] The separate access panel 6 may be provided for each access opening 10 allowing the access openings 10 to be opened or closed independently from one another.

[0087] In order to prevent the access panel 6 from falling off the remainder of the casing, the access panel may be hinged to the remainder of the casing forming a flap 78 for opening and closing the respective access opening 10 to the outside. The flap 78 may be provided with a rail 62 and ribs 68 as described in reference to the first embodiment, whereby the rail 62 and ribs 68 may preferably form the shape of a handle bar.

[0088] With the use of a casing 1 according to the invention, it is possible to access the electric terminal 4, conductor 20 and/or the connection between the conductor 20 and the electric terminal 4, without dismounting the entire casing 1, particularly the main body 58. The tool attachment portion 14 may allow for the access panel 6 to be handled by a tool, such as a hook, particularly a hot stick, from a safe distance. Therefore, the electric terminal 4 may be securely grounded from a greater distance before the worker may approach the electric terminal for inspection through the access opening 10.

Reference numerals

[0089]

1 casing
2 interior volume
3 sleeve
4 electric terminal
6 access panel
8 closed position
10 access opening
12 open position
14 tool attachment portion
16 tool
17 hook
18 extension
20 conductor
22 bottom surface
24 central hole
26 finger
28 side surface
30 bottom surface
32 shell half
34 latching mechanism
36 clip
38 side surface
40 bushing
42 insulation
44 terminal end
46 cable lug
48 cable
50 location disc
52 recess
54 notch
56 bracket
58 main body
59 lid
60 grounding tip
61 casing wall
62 rail
64 gap
66 monolithic component
68 rib
70 eyelet
72 rim portion
74 latching protrustion
76 slot
78 flap

A axial direction

Claims

1. Casing (1) for an electric terminal (4), the casing having an interior volume (2) adapted to at least partially receive the electric terminal (4), the casing (1) comprising an access panel (6) which is configured to be movable from a closed position (8),in which an access opening (10) for accessing the interior volume (2) from an outside of the casing (1) is covered by the access panel (6), into an open position (12), in which the access opening (10) is open to the outside of the casing (1), wherein the access panel (6) further comprises at least one tool attachment portion (14) for attaching a tool (16) to move the access panel (6) between the closed position (8) and the open position (12).

2. Casing (1) according to claim 1, wherein the at least one tool attachment portion (14) is configured to be engaged by a hook.

3. Casing (1) according to claim 1 or 2, wherein the at least one tool attachment portion (14) protrudes from a surface of a casing wall (61) of the access panel (6) facing away from the central opening (10).

4. Casing (1) according to claim 3, wherein the at least one tool attachment portion (14) comprises a rail (62) being spaced apart from the casing wall (61) of the access panel.

5. Casing (1) according to claim 4, wherein the rail (62) extends along a closed circumference.

6. Casing (1) according to claim 4 or 5, wherein at least one eyelet is formed between the casing wall (61) and the rail (62).

7. Casing (1) according to any one of claims 4 to 6, wherein the rail (62) is arranged radially beyond an outer circumference of the surface of the casing wall (61).

8. Casing (1) according to any one of claims 1 to 7, wherein the access panel (6) is dome shaped.

9. Casing (1) according to any one of claims 1 to 8, wherein, in the open position (12), the access panel (6) is detached from the remainder of the casing (1).

10. Casing (1) according to any one of claims 1 to 8, wherein the access panel (6) is hinged to the remainder of the casing (1).

11. Casing (1) according to any one of claims 1 to 10, wherein the casing (1) comprises two shell halves (32) being hinged to one another.

12. Casing (1) according to any one of claims 1 to 11, wherein the access panel (6) is secured in the closed position (10) by a bayonet lock.

13. Casing (1) according to any one of claims 1 to 12, wherein the casing (1) further comprised a location disc (50), the location disc (50) being adapted to be fixedly mounted to the electric terminal (4).

14. Electric terminal (4), particularly a bushing (40), comprising an insulation (42) and a terminal end (44) protruding from the insulation, wherein the electric terminal (4) is at least partially received in a casing (1) according to any one of claims 1 to 13.

15. Electric terminal (4) according to claim 14, wherein the electric terminal (4) comprises a grounding tip (60), which, in the open position (12) protrudes beyond the access opening (10) to outside the casing (1).

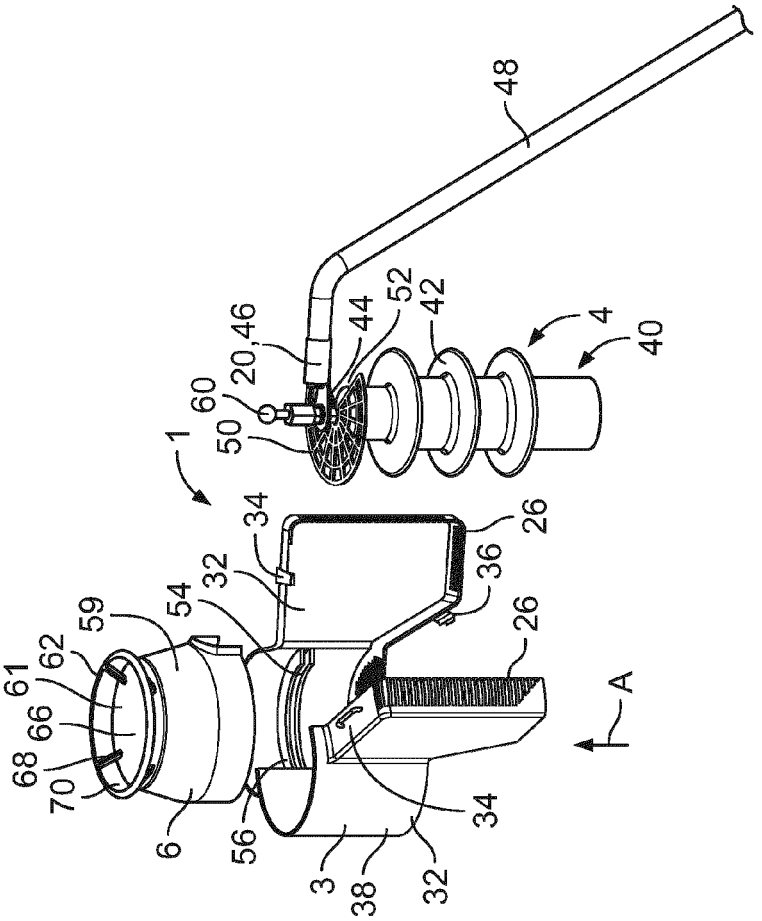
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Fig. 2

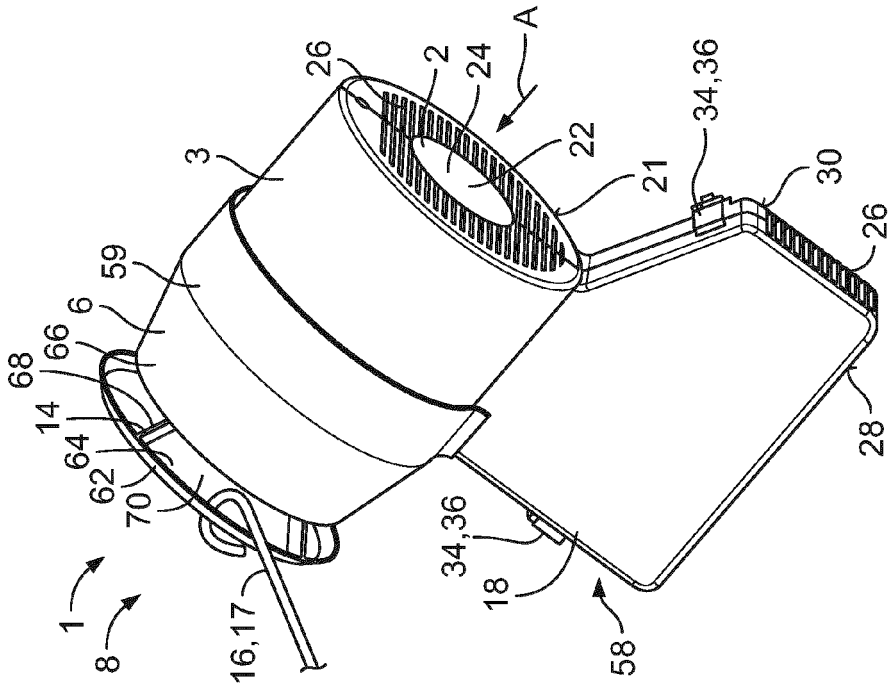
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Fig. 1

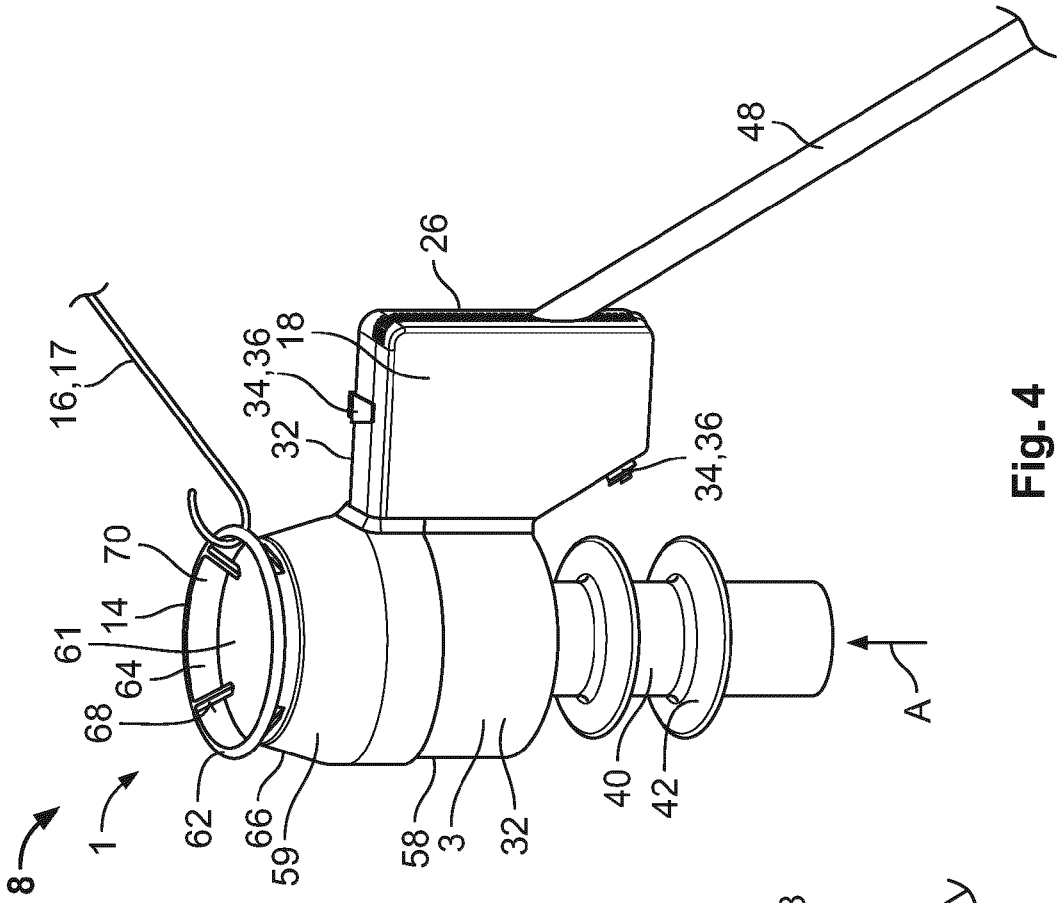
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Fig. 4

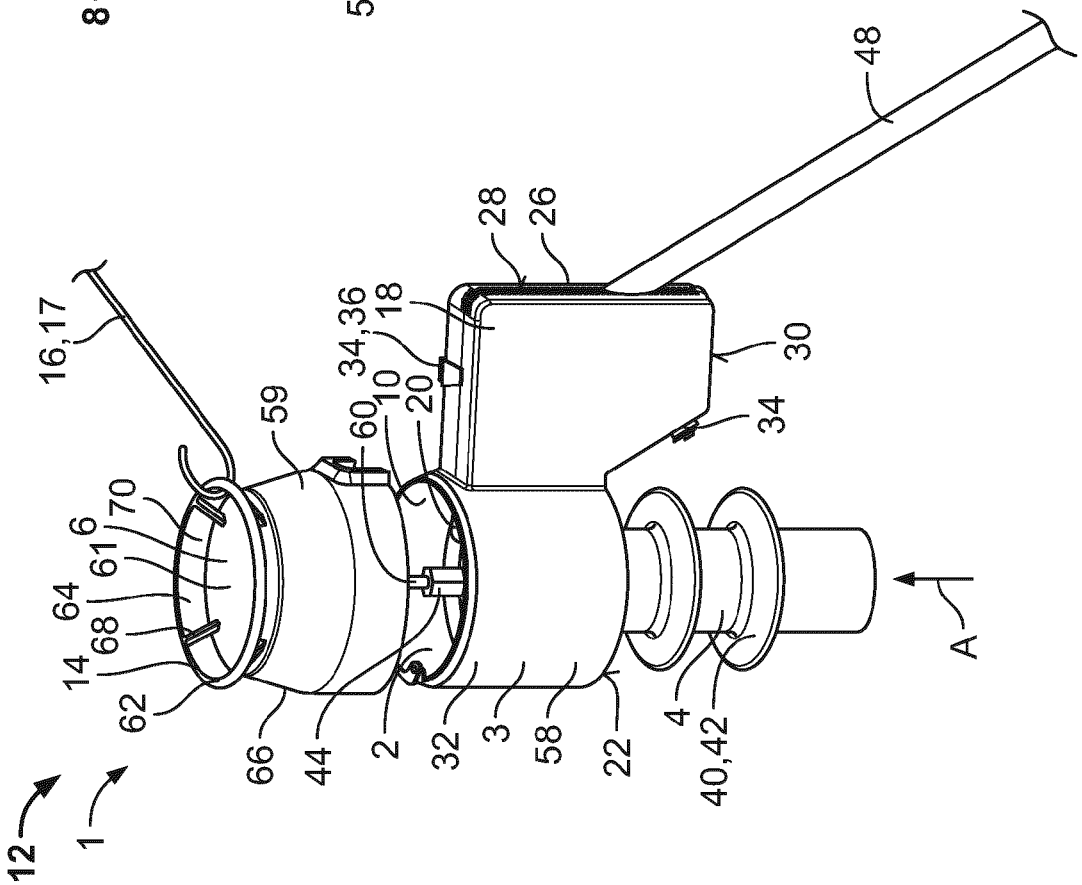
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Fig. 3

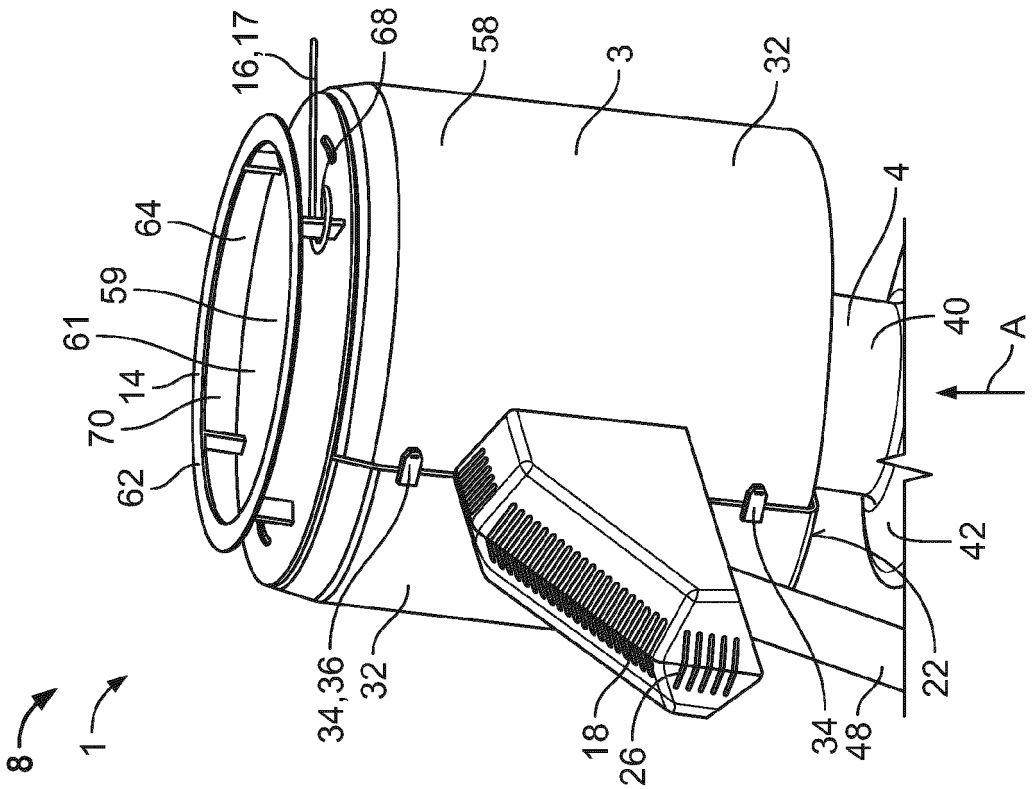
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Fig. 6

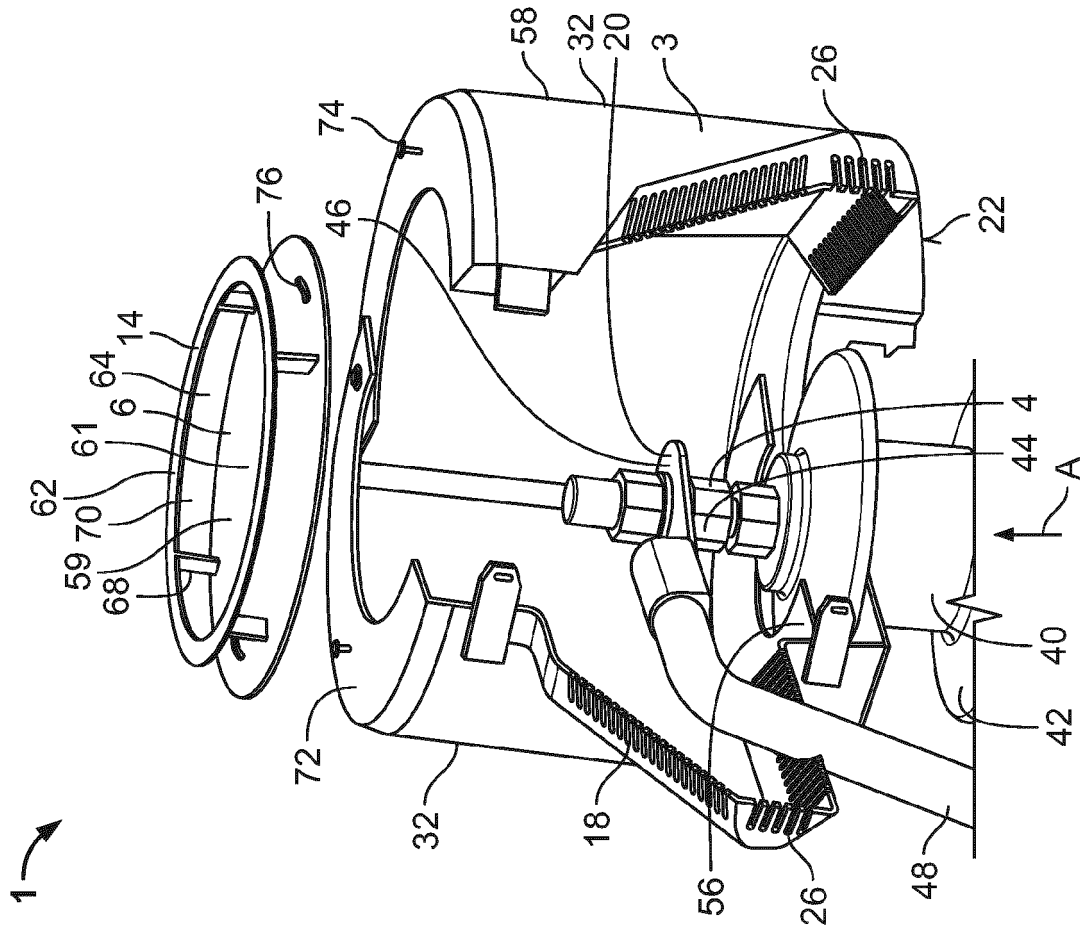
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Fig. 5

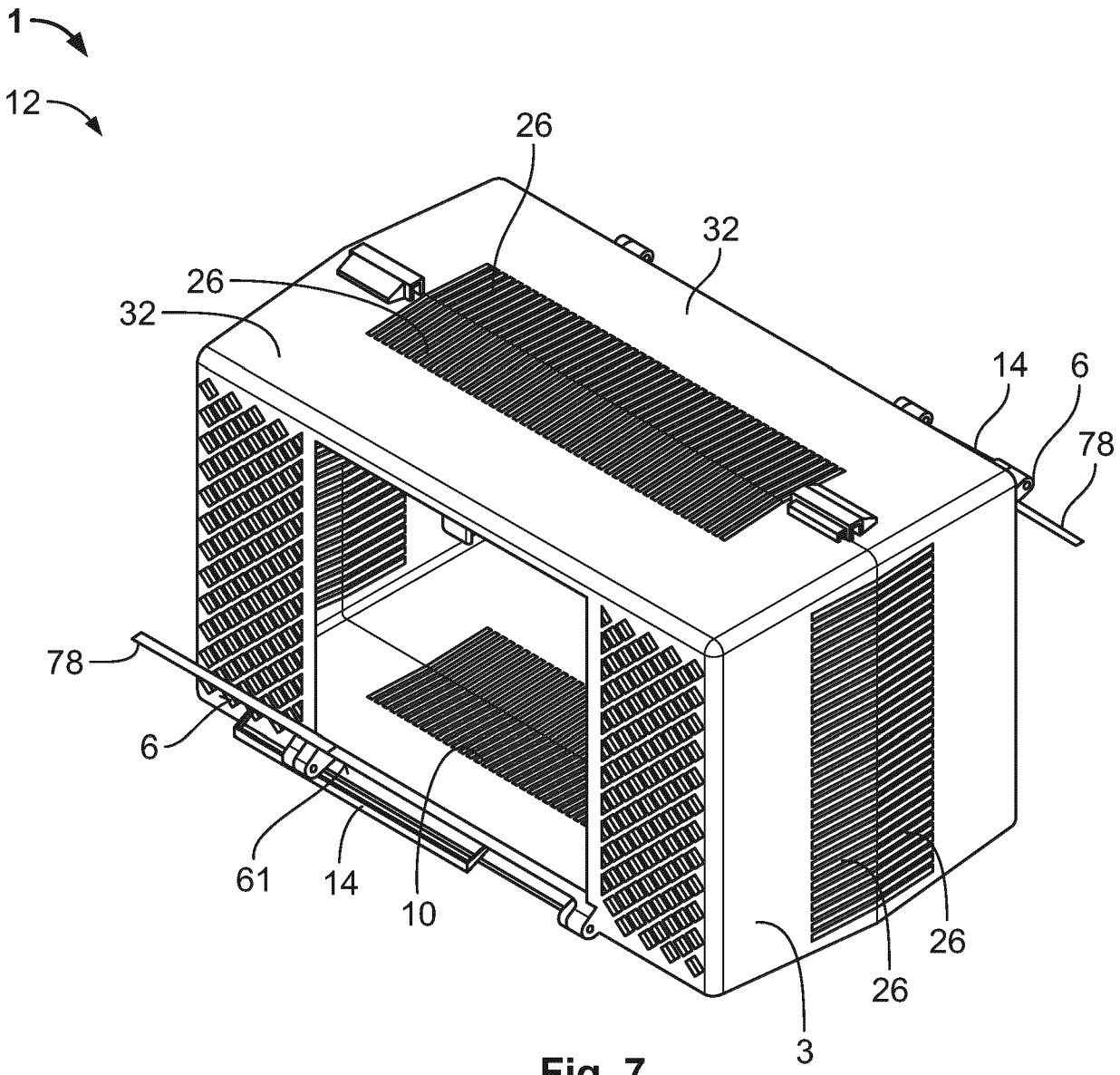

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 20 17 4421

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 210 378 718 U (CHEN JINLIN) 21 April 2020 (2020-04-21) * paragraphs [0024], [0030], [0031] * -----	1,8-15	INV. H01F27/29 H02B1/00
A	CN 206 379 652 U (ZHENGZHOU CHANGZHENG AUTOMATION EQUIPMENT CO LTD) 4 August 2017 (2017-08-04) * abstract * * * figure 1 * -----	1-15	
A	CN 201 732 651 U (JIANGSU SUNEL TRANSFORMER CO LTD) 2 February 2011 (2011-02-02) * abstract * * -----	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

H01B
H01F
H02B
H02G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 October 2020	Bernardini, Andrea

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08-10-2020

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82