

SPECIFICATION

Test station apparatus for flush mounting

- 5 This invention relates to a cathodic test station apparatus for mounting in a flush relation with the ground surface and for providing access to test leads while coupled to terminals on a block member that is removably supported within an airtight pocket formed in the apparatus.

- 10 Cathodic test stations are used to provide aboveground access to lead wires for monitoring of electrical currents and potentials associated with numerous types of underground piping, cables and other metallic structures. Such test stations provide terminals to which the leads are connected for measuring underground structure-to-soil potentials, cathodic protection anode currents, the resistive integrity of insulation between various types of underground structures including a pipe, its casing or carrier. They are also used to detect and measure stray electrical currents in underground or subterranean structures as well as for reading electrical potential.

- When a test station apparatus is made of cast aluminium, it is subject to destructive corrosion and offers no protection to personnel against electrical shock. A test station of this type, when embedded in streets or sidewalks, becomes filled with surface and subsurface water, causing deterioration of the internal parts. At subfreezing temperatures, the formation of ice prevents access to the terminals and breakage of the cast structure. Even if plastic material is used to form the test station, the ingress of water deteriorates the bared ends of lead wires and test terminals.
- 40 The formation of ice within the test station prevents access to the terminals.

- It is an object of the present invention to provide a cathodic test station apparatus providing a flush-mounting load-bearing subterranean structure including a removable member called herein an "enclosure member" itself forming an airtight pocket wherein a terminal support member is contained for coupling to leads extending beneath the ground surface.

- 50 Accordingly the invention provides a cathodic test station apparatus for enabling coupling of electrical leads from piping, cables and the like to a device responsive to an electrical current or potential, comprising a cathodic test station apparatus for enabling coupling of electrical leads from piping, cables or the like to a device responsive to an electrical current or potential, comprising a generally hollow housing having a flanged upper end for extending essentially flush with a ground surface for access from above ground after implantation in the ground such that the lower portion of the housing extends into the ground for protectively receiving a conductor passing into the housing, a one-piece withdrawable enclosure member having a tubular wall section projecting from a solid end wall, which tubular wall section and end wall define an airtight pocket, said tubular wall section extending into and being a loose fit within the housing so as to be unsupported by any side wall of the housing, said enclosure member also having a flange extending outwardly from said solid end wall which flange is received in a recess in the flanged upper end of said housing so as to be supported thereby, and a terminal block member comprising a terminal carrierplate and a wall for releasably mounting said terminal block member within said enclosure member so that when so mounted the terminal block member comprising a terminal carrier plate and a wall for releasably mounting said terminal block member within said enclosure member so that when so mounted the terminal carrier plate extends within the pocket away from said solid end wall, the arrangement being such that when the enclosure member is supported by the housing the invention employs an improved anchor arrangement to not only maintain the apparatus at the desired flush-mounting relation with the ground but at the same time prevent rotary movement of the test station apparatus about a vertical axis for protection against damage to test leads coupled to the apparatus. Plastics material is used to form the essential parts of the apparatus to provide protection for users of the apparatus against electrical shock and at the same time embody a design to prevent the infiltration of water into the apparatus by providing an airtight pocket within an enclosure member for a terminal board that is removably supported in a housing.
- 105 In the said preferred form, the housing has a generally tubular configuration. To prevent rotation of the housing in the ground, radially-projecting ribs extend at spaced-apart locations along the substantial part of the outer surface of the housing. An anchor rod supported by the lower end of the housing extends outwardly into the ground for maintaining the upper end of the housing flush with the ground. In the airtight pocket of the enclosure member, an array of support surfaces extends from the end wall to engage the mounting wall of the terminal block. Clamping means is provided for the terminal block member which takes the form of a back section with a depending section at opposite ends each having a support web for releasable engagement portions which project from the tubular wall. The back section extends along a recess formed in the array of support surfaces on the end wall of the enclosure member.
- 125 Implanted in the end wall is a magnetic insert retained in place by the back section of the clamping means for detecting the implantation site of the housing through a metal detector. The housing includes a support ledge within the upper end thereof to receive the flange of

- sure member having a tubular wall section projecting from a solid end wall, which tubular wall section and end wall define an airtight pocket, said tubular wall section extending into and being a loose fit within the housing so as to be unsupported by any side wall of the housing, said enclosure member also having a flange extending outwardly from said solid end wall which flange is received in a recess in the flanged upper end of said housing so as to be supported thereby, and a terminal block member comprising a terminal carrierplate and a wall for releasably mounting said terminal block member within said enclosure member so that when so mounted the terminal block member comprising a terminal carrier plate and a wall for releasably mounting said terminal block member within said enclosure member so that when so mounted the terminal carrier plate extends within the pocket away from said solid end wall, the arrangement being such that when the enclosure member is supported by the housing the invention employs an improved anchor arrangement to not only maintain the apparatus at the desired flush-mounting relation with the ground but at the same time prevent rotary movement of the test station apparatus about a vertical axis for protection against damage to test leads coupled to the apparatus. Plastics material is used to form the essential parts of the apparatus to provide protection for users of the apparatus against electrical shock and at the same time embody a design to prevent the infiltration of water into the apparatus by providing an airtight pocket within an enclosure member for a terminal board that is removably supported in a housing.

- In the said preferred form, the housing has a generally tubular configuration. To prevent rotation of the housing in the ground, radially-projecting ribs extend at spaced-apart locations along the substantial part of the outer surface of the housing. An anchor rod supported by the lower end of the housing extends outwardly into the ground for maintaining the upper end of the housing flush with the ground. In the airtight pocket of the enclosure member, an array of support surfaces extends from the end wall to engage the mounting wall of the terminal block. Clamping means is provided for the terminal block member which takes the form of a back section with a depending section at opposite ends each having a support web for releasable engagement portions which project from the tubular wall. The back section extends along a recess formed in the array of support surfaces on the end wall of the enclosure member.
- 125 Implanted in the end wall is a magnetic insert retained in place by the back section of the clamping means for detecting the implantation site of the housing through a metal detector. The housing includes a support ledge within the upper end thereof to receive the flange of

the enclosure member. The housing further includes an internal ledge to support the lower end of the enclosure member to thereby provide structural integrity and withstand imposed loads by vehicle traffic aboveground.

Hereinafter the invention is described by way of example and with reference to the accompanying drawings, wherein:

Figure 1 is an elevational view in section through the cathodic test station apparatus of the present invention;

Figure 2 is a sectional view taken along line II-II of Fig. 1;

Figure 3 is a sectional view taken along line III-III of Fig. 1;

Figure 4 is an isometric view of a terminal plate member forming part of the test station apparatus of the present invention; and

Figure 5 is an isometric view of the clip apparatus used to support the terminal plate member shown in Fig. 4 and forming part of the test station apparatus.

As shown in Figs. 1-3, the preferred form of the cathodic test station apparatus of the present invention includes a generally tubular-shaped housing 10 with the upper end thereof enlarged by a flange 11 which forms a shelf recess on which a flange of a carrier 12, forming the enclosure member, is supported. As will be described in greater detail hereinafter, the carrier includes a solid end wall 13 which is supported by the outwardly-extending flange to form a nested flush relation in the shelf recess in the housing 10. When implanted in the ground, the upper ends of the housing and carrier are radially positioned in flush relation with the surface of the ground. This avoids excessive impact loading upon the test station by a vehicle or other traffic moving along the surface of the ground. An anchor tube or rod 14 is passed through an opening at each of diametrically opposite sites at the lower end of the housing 10 to extend outwardly therefrom into the soil and prevent a raising or lowering of the housing at the implantation site. The housing also includes a lower shelf surface 15 and an upper shelf surface 16 forming additional load-bearing surfaces primarily against the downward movement of the housing. Large ribs 17 and small ribs 18 extend radially at spaced-apart locations from the outer side wall surface of the housing forming cavity areas therebetween into which soil is received to form an anchor against rotation by the housing about a vertical axis. This anchoring of the housing resists an imposed force on one upper edge of the housing tending to produce rotation.

The carrier 12 is a unitary member with a tubular wall section 19 extending from the end wall 13. The space enclosed by the tubular wall and end wall forms an airtight pocket 20 into which there is releasably received a terminal block 22. As best shown in

Fig. 4 but also shown in Figs. 1-3, the terminal block member 22 includes a carrier plate 23 having a plurality of openings such as shown at 24 to receive terminal members, not shown, for the attachment of test leads fed into the housing 10 and passed therealong into the airtight pocket 20. The carrier plate projects from a lateral base or mounting wall made up of arcuate segments 25 and 26 at each side of the plate. Each segment 25 has an inclined face surface formed by a progressively increased thickness to the segment. The smallest thickness of segment 25 is extended by segment 26 having a uniform thickness. The inclined face surfaces of segments 25 lie at opposite sides of plate 23. The segments 26 have flats forming outer side edges that extend between annular edges of segments 25. The terminal block member 22 is releasably attached within the airtight pocket 20 by passing, as a leading end, the portion of the base or mounting wall made up of segments 25 and 26 into the airtight pocket with the flat side edges of segments 26 arranged to pass between projected ends of a clip member 27.

As shown in Fig. 5, the clip essentially comprises a back section 28 having at opposite ends upstanding side wall 29 that carry reverse bent portions 30. The bent portions 30 form the support surfaces which, after the base or mounting wall of the terminal block member is inserted beyond the edges, are brought first into engagement with the uniformly thick sections 26 and thence upon continued rotation with the inclined surface of segments 25. The back section 28 of the clip extends along a recess within an array of projecting support knobs or surfaces 31. These support surfaces engage the back surface of the base of the terminal block member. The back plate section 28 of the clip overlies one exposed face surface of an insert 32 made of magnetic ceramic material. The insert 32 is used to locate the site of the test station apparatus in the event the top surface thereof is not readily detectable. A threaded fastener 33 includes, for example, a bolt extending into the side wall of housing 10 and receives at its upper end a nut passed into a suitably dimensioned opening in the flange of the carrier. The fastener 33 is used to maintain the carrier in a supported position within the housing in which the carrier is preferably dimensioned so that the bottom end thereof engages a ledge 34 used to provide additional load-bearing support for the carrier. The fastener 33 is also used to prevent displacement of the carrier from the housing due to a buoyant force created by the airtight pocket 20 should water infiltrate into the housing 10. In this way, the fastener prevents the carrier from simply floating on the surface of the water and rising out of the housing as the water level increases.

Although the invention has been shown in connection with a certain specific embodiment, it will be readily apparent to those skilled in the art that various changes in form and arrangement of parts may be made to suit requirements without departing from the spirit and scope of the invention.

CLAIMS

10. 1. A cathodic test station apparatus for enabling coupling of electrical leads from piping, cables or the like to a device responsive to an electrical current or potential, comprising a generally hollow housing having a flanged upper end for extending essentially flush with a ground surface for access from above ground after implantation in the ground such that the lower portion of the housing extends into the ground for protectively receiving a conductor passing into the housing, a one-piece withdrawable enclosure member having a tubular wall section projecting from a solid end wall, which tubular wall section and end wall define an airtight pocket, said tubular wall section extending into and being a loose fit within the housing so as to be unsupported by any side wall of the housing, said enclosure member also having a flange extending outwardly from said solid end wall which flange is received in a recess in the flanged upper end of said housing so as to be supported thereby, and a terminal block member comprising a terminal carrier plate and a wall for releasably mounting said terminal block member within said enclosure member so that when so mounted the terminal carrier plate extends within the pocket away from said solid end wall, the arrangement being such that when the enclosure member is supported by the housing the air entrapped within the airtight pocket prevents ingress of water into the enclosure member.

2. A cathodic test station apparatus according to Claim 1, including means for clamping the terminal block to the enclosure member, which clamping means comprises portions projecting from the tubular wall of the enclosure member into said airtight pocket and spaced from the solid end wall of the enclosure member.

3. A cathodic test station apparatus according to Claim 2, wherein the projecting portions comprise walls which extend into said airtight pocket at diametrically opposite sides of said enclosure member.

4. A cathodic test station apparatus according to any one of Claims 1 to 3, wherein said housing has a generally tubular configuration.

5. A cathodic test station apparatus according to any one of the preceding claims, further including fastening means releasably to interconnect said housing and said enclosure member.

6. A cathodic test station apparatus ac-

ording to Claim 5, wherein said fastening means include a bolt extending into said housing, and a nut rotatably located in an opening in said enclosure member.

7. A cathodic test station apparatus according to any one of the preceding claims, wherein said housing includes radially projecting and spaced-apart ribs substantially along the length at the outside surface thereof to anchor against rotation in the ground after subterranean implantation.

8. A cathodic test station apparatus according to any preceding claim further including an anchor rod supported by the lower end of said housing to extend outwardly into the ground for maintaining the upper end of the housing flush with the ground.

9. A cathodic test station apparatus according to any preceding claim wherein the end wall of said enclosure member includes an array of support surfaces extending from said end wall into said airtight pocket to engage the mounting wall of said terminal block member.

10. A cathodic test station apparatus according to Claim 2 or any claim appendant thereto wherein said clamping means includes a cross wall of sufficient length to extend between and be supported by said projecting portions on the tubular wall of the enclosure member.

11. A cathodic test station apparatus according to Claim 10 wherein the cross wall of said clamping means comprises a back section with a depending section at opposite ends of the cross wall, each depending section comprising a support web for releasable engagement with said projecting portions.

12. A cathodic test station apparatus according to any preceding claim further comprising a magnetic insert implanted within the end wall of said carrier and retained by said clamping means for detecting the implantation site of said housing.

13. A cathodic test station apparatus according to any preceding claim wherein said housing includes an internal ledge to support the lower end of the tubular wall section of said enclosure member.

14. A cathodic test station apparatus substantially as described herein with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon) Ltd.—1983.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

Although the invention has been shown in connection with a certain specific embodiment, it will be readily apparent to those skilled in the art that various changes in form and arrangement of parts may be made to suit requirements without departing from the spirit and scope of the invention.

CLAIMS

- 10 1. A cathodic test station apparatus for enabling coupling of electrical leads from piping, cables or the like to a device responsive to an electrical current or potential, comprising a generally hollow housing having a
- 15 flanged upper end for extending essentially flush with a ground surface for access from above ground after implantation in the ground such that the lower portion of the housing extends into the ground for protectively receiving a conductor passing into the housing,
- 20 a one-piece withdrawable enclosure member having a tubular wall section projecting from a solid end wall, which tubular wall section and end wall define an airtight pocket, said tubular wall section extending into and being a
- 25 loose fit within the housing so as to be unsupported by any side wall of the housing, said enclosure member also having a flange extending outwardly from said solid end wall
- 30 which flange is received in a recess in the flanged upper end of said housing so as to be supported thereby, and a terminal block member comprising a terminal carrier plate and a wall for releasably mounting said terminal
- 35 block member within said enclosure member so that when so mounted the terminal carrier plate extends within the pocket away from said solid end wall, the arrangement being such that when the enclosure member is
- 40 supported by the housing the air entrapped within the airtight pocket prevents ingress of water into the enclosure member.

2. A cathodic test station apparatus according to Claim 1, including means for
- 45 clamping the terminal block to the enclosure member, which clamping means comprises portions projecting from the tubular wall of the enclosure member into said airtight pocket and spaced from the solid end wall of the
- 50 enclosure member.

3. A cathodic test station apparatus according to Claim 2, wherein the projecting portions comprise walls which extend into
- 55 said airtight pocket at diametrically opposite sides of said enclosure member.

4. A cathodic test station apparatus according to any one of Claims 1 to 3, wherein said housing has a generally tubular configuration.

- 60 5. A cathodic test station apparatus according to any one of the preceding claims, further including fastening means releasably to interconnect said housing and said enclosure member.

- 65 6. A cathodic test station apparatus according to Claim 5, wherein said fastening means include a bolt extending into said housing, and a nut rotatably located in an opening in said enclosure member.

- 70 7. A cathodic test station apparatus according to any one of the preceding claims, wherein said housing includes radially projecting and spaced-apart ribs substantially along the length at the outside surface thereof to
- 75 anchor against rotation in the ground after subterranean implantation.

8. A cathodic test station apparatus according to any preceding claim further including an anchor rod supported by the lower end
- 80 of said housing to extend outwardly into the ground for maintaining the upper end of the housing flush with the ground.

9. A cathodic test station apparatus according to any preceding claim wherein the
- 85 end wall of said enclosure member includes an array of support surfaces extending from said end wall into said airtight pocket to engage the mounting wall of said terminal block member.

- 90 10. A cathodic test station apparatus according to Claim 2 or any claim appendant thereto wherein said clamping means includes a cross wall of sufficient length to extend between and be supported by said projecting
- 95 portions on the tubular wall of the enclosure member.

11. A cathodic test station apparatus according to Claim 10 wherein the cross wall of said clamping means comprises a back section with a depending section at opposite
- 100 ends of the cross wall, each depending section comprising a support web for releasable engagement with said projecting portions.

12. A cathodic test station apparatus according to any preceding claim further comprising a magnetic insert implanted within the
- 105 end wall of said carrier and retained by said clamping means for detecting the implantation site of said housing.

- 110 13. A cathodic test station apparatus according to any preceding claim wherein said housing includes an internal ledge to support the lower end of the tubular wall section of said enclosure member.

- 115 14. A cathodic test station apparatus substantially as described herein with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd.—1983.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.



* C L M S *