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[54] **METHOD AND APPARATUS FOR STORING BURIED TELEPHONE DISTRIBUTION WIRES**

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[51] **Int. Cl.**..... **H02g 9/00,** B65d 21/00, B65h 49/00

[58] **Field of Search**..... 174/37, 38, 50, 52 R; 61/72.1; 206/46 Y, 52 W; 220/4 B, 18, 97 R, 97 F; 242/129, 137, 138, 146

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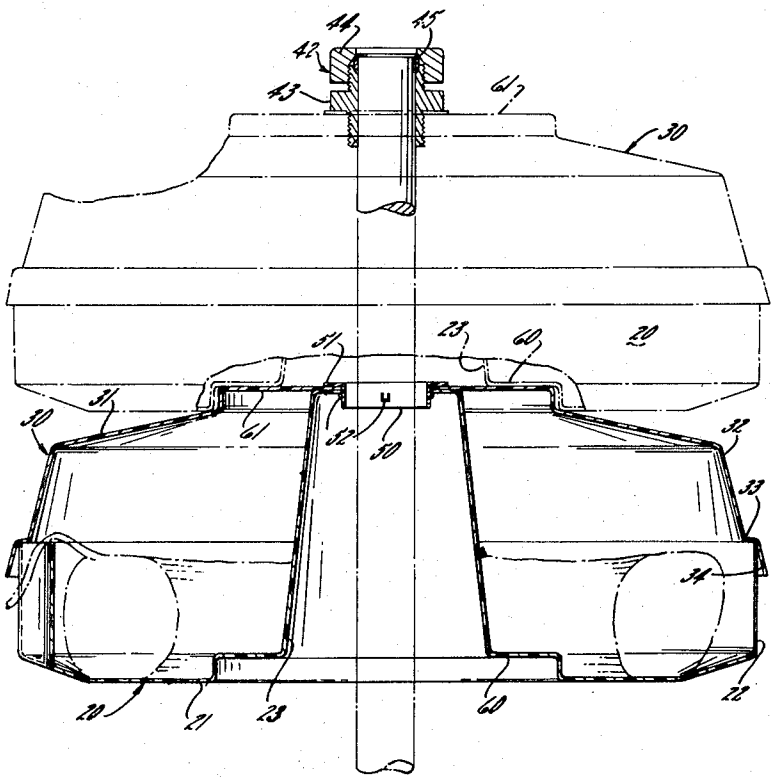
[57] **ABSTRACT**

A method of installing buried distribution wires (BDW) which are spliced into a buried telephone cable with the resulting splices enclosed below ground level before completion of the subscriber facilities to be served by the distribution wires. Each spliced BDW is rolled into a coil and placed in a separate container, and a plurality of the separate containers are stacked on top of each other and secured to the earth, either above or below ground level. Later, when the respective subscriber facilities are completed, each BDW is removed from its container and the free end thereof is connected to the respective subscribed facility without making any additional buried splices. Each of the containers for one BDW comprises two annular sections with the lower section forming a frusto-conical hollow core member. The top section includes a lateral flange on the lower end which bears against the top of the outer sidewall of the lower section so that weight applied to the top of the container is transmitted both through the sidewalls and through the core member. Apertures are formed in the centers of both the upper and lower sections to permit a stake to be passed through a stack of the containers for securing them to the earth. A security cover may be placed over the entire stack of containers, and this cover may also be secured to the earth by the same stake which is passed through the stack of containers. An opening is formed in the sidewalls of each container to pass that portion of the BDW that is spliced to the underground cable. The top of each container has a central raised portion which fits into the open lower end of the core member in another container so that the containers nest together when they are stacked.

17 Claims, 7 Drawing Figures



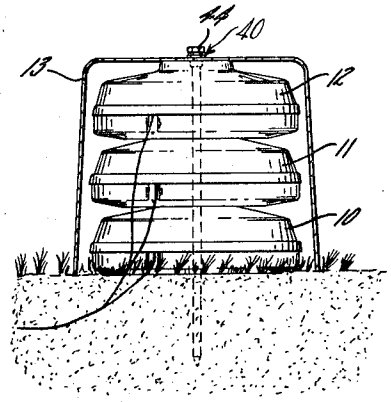


Fig. 1

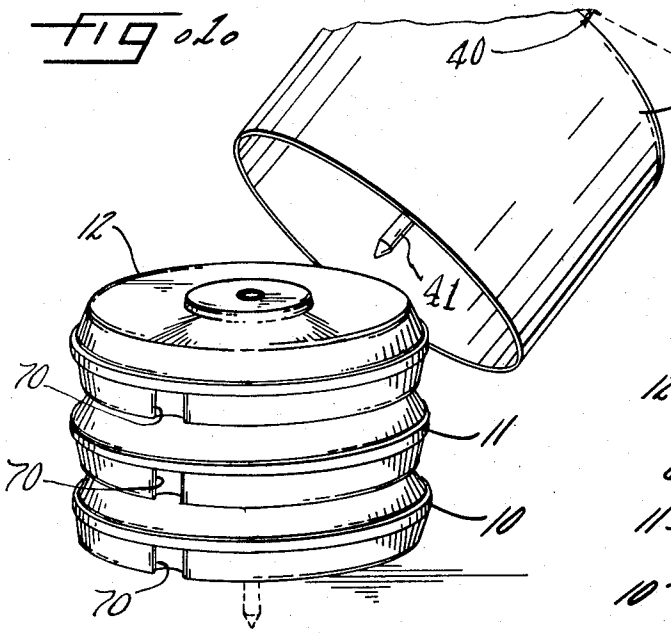


Fig. 2

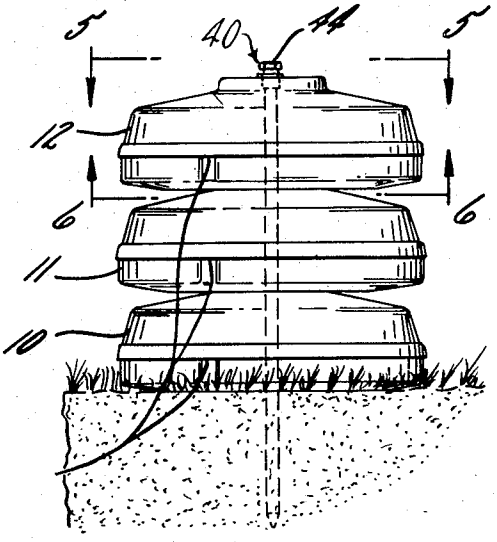


Fig. 3

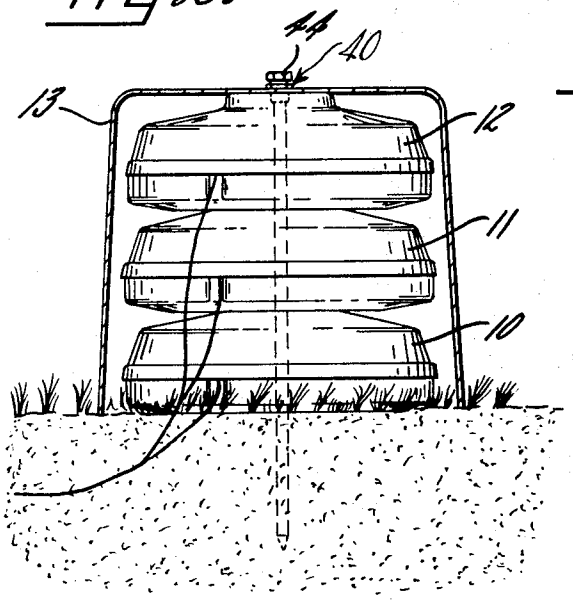


Fig. 4

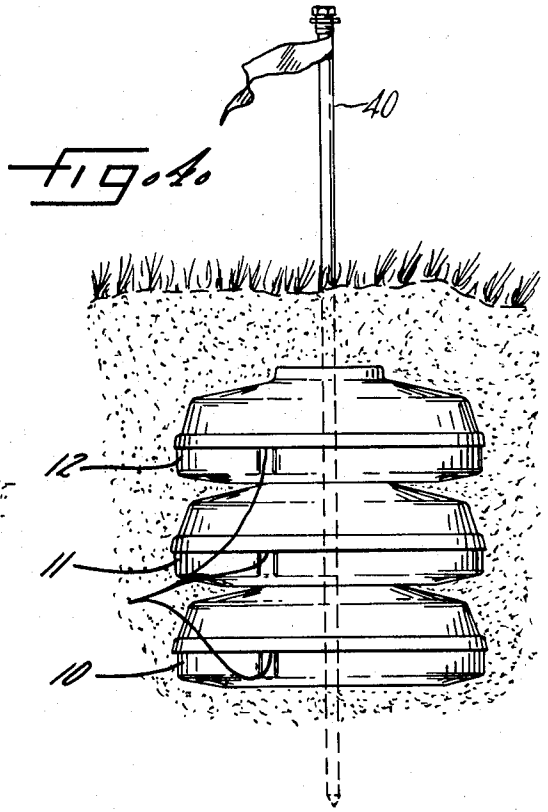


FIG 5

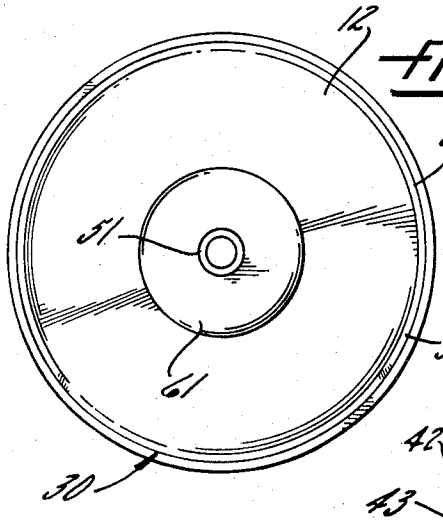


FIG 6

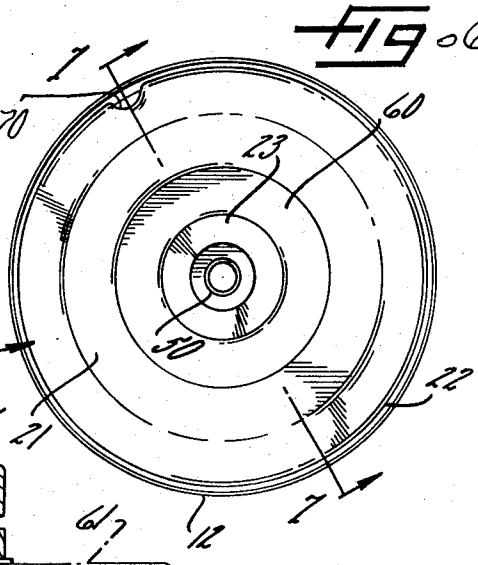
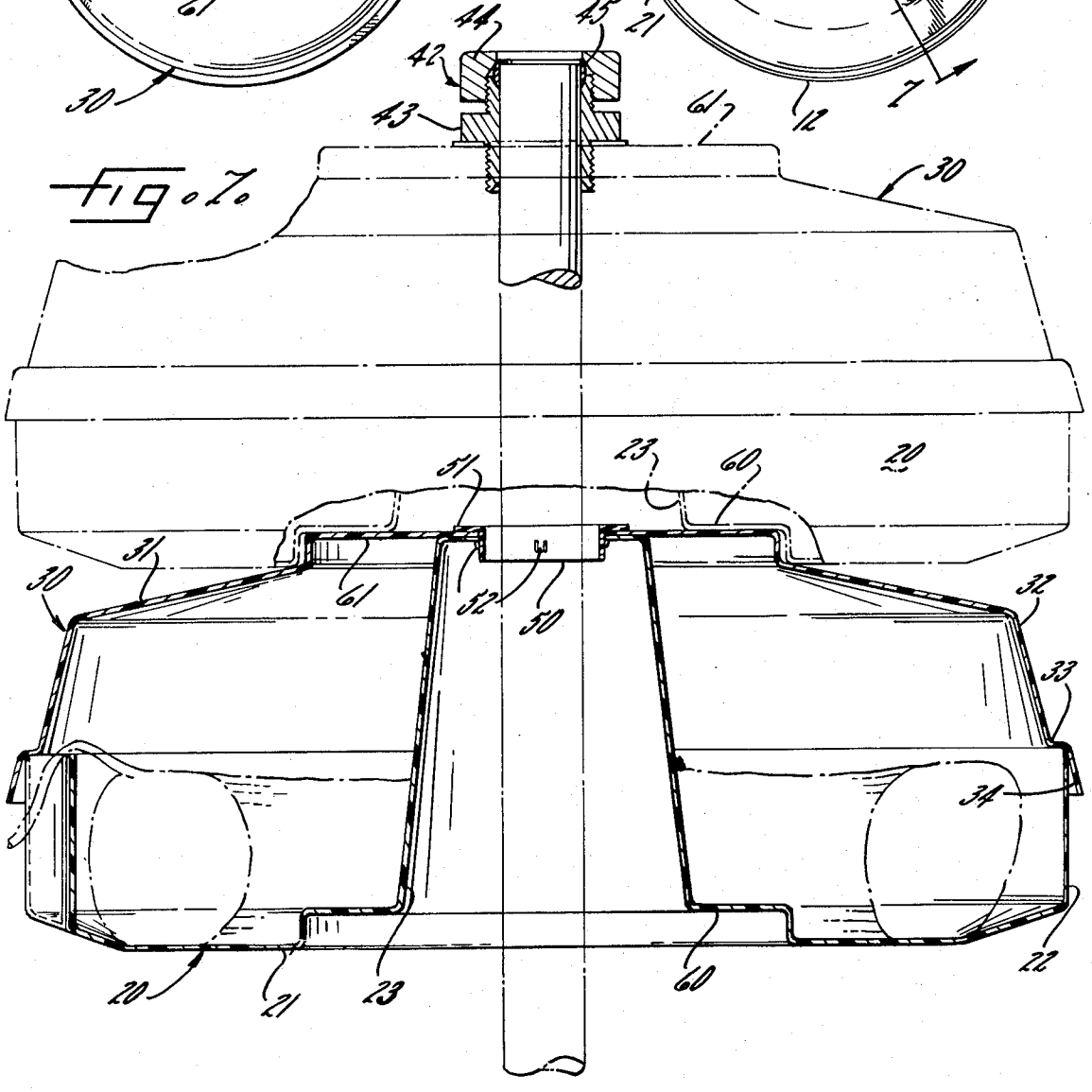


FIG 7



METHOD AND APPARATUS FOR STORING BURIED TELEPHONE DISTRIBUTION WIRES

DESCRIPTION OF THE INVENTION

The present invention relates generally to the installation of buried telephone distribution wires and, more particularly, to an improved method of installing buried distribution wires and to a container for use in the improved installation method. The buried distribution wire is commonly referred to as "BDW," both before and after it is actually buried in the earth, and it will be referred to as such hereinafter.

It is a primary object of the present invention to provide an improved method of installing BDW which permits a plurality of subscriber facilities to be connected to a buried telephone cable at any desired time after burial of the cable without making any additional buried splices and without exposing the BDW to construction equipment.

It is another object of the invention to provide such a method which saves both time and labor in the installation of BDW.

Still another object of the invention is to provide a method of the foregoing type which reduces the risk of personal injury or damage to either construction equipment or the telephone cable and BDW.

A further object of this invention is to provide an improved container for use in a method of the type described above. More specifically, one particular object of the invention is to provide such a container for securely storing the BDW either above or below ground level.

Another particular object of the invention is to provide such a container which is capable of being stacked in a stable and secure assembly for storing multiple BDW at a single location.

A still further object of the invention is to provide such a container which is strong and sturdy enough to be reused time after time, and yet can be manufactured at a low cost.

Yet another object of the invention is to provide such a container which is easy to use.

Other objects and advantages of the invention will be apparent from the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a stack of containers embodying this invention, with a cover for the container stack shown in exploded position;

FIG. 2 is a side elevation illustrating one manner of using the stack of containers shown in FIG. 1;

FIG. 3 is a side elevation illustrating one manner of using both the containers and the cover shown in FIG. 1;

FIG. 4 is a side elevation illustrating another manner of using the stack of containers shown in FIG. 1;

FIG. 5 is a top plan view of one of the containers shown in FIG. 1;

FIG. 6 is a bottom plan view of one of the containers shown in FIG. 1; and

FIG. 7 is an enlarged section taken along line 7—7 in FIG. 6, showing the container holding a coil of BDW, and showing a second container stacked on the first in broken lines.

While the invention will be described in connection with certain preferred embodiments, it will be understood that it is not intended to limit the invention to these particular embodiments. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention.

Turning now to the drawings and referring first to FIG. 1, there is shown a stack of three individual containers 10, 11 and 12 for holding three separate coils of BDW and a security cover 13 adapted to fit over the container stack. The BDW contained in each of the containers 10, 11 and 12 is the wire that is typically connected to a subscriber facility such as a private home or the like and extends underground from the point of access to the subscriber facility to the buried telephone cable which serves multiple subscribers.

In accordance with one particular aspect of the present invention, each of BDW housed in the containers 10, 11 and 12 is spliced to the buried telephone cable below ground level at any desired time prior to completion of the subscriber facility to be served by the BDW, the resulting splice is buried by backfilling the trench in which it is made or otherwise covering it with earth, and the free length of BDW is placed in one of the containers 10, 11 and 12 where it is stored until it is desired to connect it to the subscriber facility. At this time, which may be days, months or even years after the initial splice is made, the BDW is simply removed from the containers 10, 11 or 12 and connected to the subscriber facility in the usual manner, without making any additional buried splices. This method represents a significant improvement over previous methods of installing BDW which always involved additional buried splices made at the time of connection of the BDW to the subscriber facilities or exposure of long lengths of BDW to construction equipment.

In keeping with the invention, the container in which the BDW is housed between the time it is spliced to the underground cable and the time it is connected to subscriber facility includes a first unitary annular section forming an annular bottom wall, an upstanding outer side wall formed around the outer periphery of the bottom wall, and an upstanding inner side wall formed around the inner periphery of the bottom wall and extending upwardly beyond the outer side wall to form a hollow core member. Thus, in the illustrative embodiment, each of the individual containers 10, 11 and 12 includes a first unitary annular section 20 forming an annular bottom wall 21 with an outer side wall 22 extending upwardly from the outer periphery thereof. At the inner periphery of the bottom wall 21, an upwardly extending inner side wall 23 forms a frustoconical hollow core member extending well above the top edge of the outer side wall 22. As illustrated in FIG. 7, the coil of BDW stored in each container 10, 11 or 12 is disposed around the hollow core member formed by the inner side wall 23.

The top of each container comprises a second unitary annular section 30 forming an annular top wall 31 and a depending outer side wall 32 formed around the outer periphery thereof. The upper portion of the side wall 32 has an outside diameter smaller than the inside diameter of the lower side wall 22, and the lower portion of the side wall 32 forms a lateral shoulder 33 extending outwardly over the top edge of the lower side wall 22. As can be seen most clearly in FIG. 7, the two sections 20 and 30 are dimensioned so that the lateral flange 33 rests on the top edge of the lower side wall

22 when the central portion of the top wall 31 is resting on the top of the frustoconical core member formed by the inner side wall 23. Consequently, any weight applied to the top of the container is supported by both the outer side walls 32 and 22 of the two cooperating sections as well as the central core member formed by the inner side wall 23. At the outer extremity of the lateral flange 33, a depending flange 34 telescopes downwardly over the outside surface of the top portion of the lower outside wall 22 to prevent the entry of dirt or other contaminants between the two container sections.

It can be seen that each of the two annular sections 20 and 30 comprises a single unitary structure which can be efficiently manufactured at a low cost. For example, each of the two annular sections 20 and 30 may be easily molded from polyethylene or the like. And yet the strength of the container formed by the two annular sections is high enough to resist crushing of the container under loads of the type encountered in normal usage. For example, when the illustrative container is made of molded polyethylene having a thickness of only 0.40 inch, with an outside diameter of about 13 inches, it has been found that the container will easily support the weight of an average adult standing or sitting on the container.

To permit the container to be fastened to the earth, either above or below ground level, a pair of registered apertures are formed in the centers of the top wall 31 and the top of the hollow core member formed by the inner wall 23, so that a stake 40 may be driven downwardly through the hollow core of the container. The stake 40 has a shank portion 41 adapted to pass through the two apertures and to be driven into the earth beneath the bottom wall 21, and a head portion 42 for engaging the top wall 31 so as to hold the container firmly against the earth. The head 42 comprises a conventional externally threaded compression fitting which in the illustrative arrangement includes a nut 44 threaded onto a flanged sleeve 43 carrying a compression washer 45 in its upper end so that downward threading of the nut 44 presses the washer 45 in against the shank 41 to hold the head 42 in place. The nut 44 can be removed from the stake to permit one of the containers 10, 11 or 12 to be removed therefrom without removing the stake from the earth. The inside diameter of the aperture in the top wall 31 is substantially smaller than the minimum inside diameter of the hollow core member so that downward forces applied to the top wall are transmitted at least in part to the core member formed by the inner side wall 23.

In keeping with another feature of the invention, a grommet 50 extends through the two apertures and forms a lateral flange 51 resting on the top wall 31 to provide reinforcement around the peripheries of the two apertures. In addition, the grommet 50 preferably includes one or more resilient latching elements 52 adapted to snap under the top of the hollow core member to latch the grommet to the core member, whereby the two container sections 20 and 30 are also latched together. For example, the resilient latching elements 52 may be small tangs molded as integral parts of the grommet and normally extending slightly beyond the outside surface of the main body portion of the grommet, but with sufficient resilience to be cammed inwardly when the grommet is inserted downwardly through the apertures in the two container sections. When the grommet is in place, the tangs snap outwardly to their normal positions, thereby providing a latching action which resists removal of the grommet upwardly through the apertures.

In accordance with still another specific feature of the invention, the bottom wall of the lower container section forms an annular recess in the underside thereof around the base of the hollow core member, and a circular central portion of the top wall of each upper section 30 is raised above the outer portions of the top wall so that the top of one container nests in the bottom of another container when they are stacked together. More specificaly, the bottom wall 21 forms an annular recess 60 around the outside of the base of the frusto-conical core member formed by the inner side wall 23, and the top wall 31 forms a raised circular central portion 61. The outside diameter of the raised top portion 61 is slightly smaller than the inside diameter of the bottom recess 60 so that when two similar containers are stacked on top of each other, the raised central portion 61 nests in the bottom recess 60. This nesting action makes a stack of the containers relatively stable even before the stake 40 is driven downwardly therethrough, thereby facilitating usage of the containers.

In order to provide access to the interior of the container when the upper and lower sections 20 and 30 are secured to each other, a recess 70 is formed in the top of the outer side wall 22 of the lower container section 20. This recess 70 extends radially inwardly beyond the lateral shoulder 33 so that it provides entry into the main interior cavity of the container in which the coil of BDW is stored. Thus, the end of the BDW which is spliced to the underground cable may be passed through the side wall of the container via the recess 70.

The containers provided by this invention may be used in a number of different ways, three of which are illustrated in FIGS. 2 through 4. Thus, in FIG. 2 the three containers 10, 11 and 12 are stacked on top of each other on the surface of the ground and held in place by the stake 40 driven downwardly through the centers of the three stacked containers and into the earth. In FIG. 3, the containers are stacked in the same manner illustrated in FIG. 2, with the addition of the security cover 13 over the stack of containers. The security cover is provided with an aperture of the same size as that provided in the top wall 31 of each container, so that the head 42 of the stake 40 bears against the top of the cover to hold both the cover and the underlying containers firmly against the ground. In FIG. 4, the containers are stacked in the same manner illustrated in FIGS. 2 and 3, but below ground level. In this case, the stake 40 is driven downwardly through the stacked containers, but the head portion 42 of the stake remains above ground level to mark the underground location of the containers.

I claim as my invention:

1. A container for telephone distribution wires of the type that are normally buried when they are in use in the field, said container comprising the combination of

a. a first unitary annular section forming an annular bottom wall, an upstanding outer sidewall formed around the outer periphery of said bottom wall, and an upstanding inner sidewall formed around the inner periphery of said bottom wall and extend-

ing upwardly beyond said outer sidewall to form a hollow core member,

b. a second unitary annular section forming an annular top wall and a depending outer sidewall formed around the outer periphery of said top wall, the upper portion of said depending sidewall having an outside diameter smaller than the inside diameter of the outer sidewall on said first section, the lower portion of said depending sidewall forming a lateral shoulder extending outwardly over the top of the outer sidewall on said first section, and a depending flange telescoping downwardly over the outside surface of the top portion of the outer sidewall on said first section,

the axial lengths of said hollow core member and said outer sidewalls of both the first and second sections being proportioned so that said top wall rests on the top of said core member when said lateral shoulder rests on the top of the outer sidewall on said first section,

c. and means securing said first and second sections to each other.

2. a container as set forth in claim **1** wherein said hollow core member has a frusto-conical shape with the larger diameter at the bottom thereof and the smaller diameter at the top.

3. A container as set forth in claim **1** wherein registered apertures are formed in the centers of said top wall and the top of said hollow core member, the inside diameter of the aperture in said top wall being smaller than the inside diameter of the top of said core member so that a downward force applied to said top wall is transmitted at least in part to said core member.

4. A container as set forth in claim **3** in which said securing means includes a grommet extending through said apertures and forming a lateral flange resting on said top wall.

5. A container as set forth in claim **4** wherein said grommet includes at least one resilient latching element under the top of said hollow core member latching the grommet to said core member, whereby said first and second sections are also latched together.

6. A container as set forth in claim **3** which includes a stake having a shank portion passing through said apertures and adapted to be driven into the earth beneath said bottom wall, and a head portion for engaging said top wall for holding the container firmly against the earth.

7. A container as set forth in claim **6** in combination with a cover fitting over said container, the top of said cover forming an aperture in register with the apertures in said top wall and said core member, said aperture in the top of said cover having an inside diameter smaller than the diameter of the head portion of said stake, said stake passing through said cover and the top wall and core member of said container so that the head portion of said stake engages the top of said cover to hold the cover firmly against the earth.

8. A container as set forth in claim **1** wherein the outer sidewall on said first section forms a recess extending radially inwardly beyond said lateral shoulder on the depending sidewall of said second section to provide access to the interior of said container when said first and second sections are secured to each other.

9. A container as set forth in claim **1** wherein said bottom wall forms an annular recess in the underside thereof, around the inner periphery thereof, and opening into the hollow interior of said core member,

and a circular central portion of said top wall is raised above the other portions of the top wall, said raised central portion having an outside diameter slightly smaller than the inside diameter of said annular recess so that said raised central portion on the top of one container nests in said annular recess in the bottom of another container when a plurality of said containers are stacked on top of each other.

10. A container as set forth in claim **9** wherein registered apertures are formed in the centers of said top wall and the top of said core member with the inside diameter of the aperture in said top wall being smaller than the inside diameter of the top of said core member, and which includes a stake having an elongated shank portion passing through said apertures in a stack of said containers and adapted to be driven into the earth beneath said bottom wall, and a head portion for engaging said top wall for holding a stack of containers firmly against the earth.

11. A stack of containers each containing a coiled telephone distribution wire spliced to a buried telephone cable, and means securing said stack of containers to the earth, each of said containers comprising the combination of

a. a first unitary annular section forming an annular bottom wall, an upstanding outer sidewall formed around the outer periphery of said bottom wall, and an upstanding inner sidewall formed around the inner periphery of said bottom wall and extending upwardly beyond said outer sidewall to form a hollow core member,

b. a second unitary annular section forming an annular top wall and a depending outer sidewall formed around the outer periphery of said top wall, the upper portion of said depending sidewall having an outside diameter smaller than the inside diameter of the outer sidewall on said first section, the lower portion of said depending sidewall forming a lateral shoulder extending outwardly over the top of the outer sidewall on said first section, and a depending flange telescoping downwardly over the outside surface of the top portion of the outer sidewall on said first section, the axial lengths of said hollow core member and said outer sidewalls of both the first and second sections being proportioned so that said top wall rests on the top of said core member when said lateral shoulder rests on the top of the outer sidewall on said first section,

c. and means securing said first and second sections to each other forming a container containing one of said distribution wires, said container forming an opening through which is passed the portion of the distribution wire spliced to said buried cable.

12. A stack of containers as set forth in claim **1** wherein said bottom wall of each container forms an annular recess in the underside thereof, around the inner periphery thereof, and opening into the hollow interior of said core member,

and a circular central portion of said top wall of each container is raised above the other portions of the top wall, said raised central portion having an outside diameter slightly smaller than the inside diameter of said annular recess so that said raised central portion on the top of one container of the stack nests in said annular

recess in the bottom of another container of the stack.

13. A stack of containers as set forth in claim 11 which includes a cover placed over said stacked containers, the top of said cover forming an aperture in register with apertures formed in the top wall and core member of each container, and a stake passed through said apertures and driven into the earth securing both the cover and the stack of containers to the earth.

14. A method of installing buried telephone distribution wires comprising the steps of

splicing a plurality of buried distribution wires into a buried telephone cable and enclosing the resulting splices below ground level before completion of the subscriber facilities to be served by the distribution wires,

burying said splices by covering the same with earth,

enclosing coils comprising substantially the entire length of each of said distribution wires in containers until completion of the subscriber facility, and

subsequently removing each distribution wire from its container upon completion of the respective subscriber facilities and connecting the free end of each distribution wire to the subscriber facility without making any additional buried splices.

15. A method as set forth in claim 14 including the step of staking the containers in which coils of distribution wire are enclosed to the earth at ground level until the removal of said wire therefrom.

16. A method as set forth in claim 14 including the step of burying the containers in which said coils of distribution wire are enclosed beneath ground level until the removal of said wire therefrom.

17. A method of installing buried telephone distribution wires comprising the steps of

splicing a plurality of buried distribution wires into a buried telephone cable and enclosing the resulting splices below ground level before completion of the subscriber facilities to be served by the distribution wires,

burying said splices by covering the same with earth,

enclosing coils conprising substantially the entire length of each of said spliced distribution wires in separate containers,

stacking a plurality of the separate containers each containing a coil of one of said spliced distribution wires on top of each other and securing the resulting stack of containers to the earth, and

subsequently removing each distribution wire from its container upon completion of the respective subscriber facilities and connecting the free end of each distribution wire to the respective subscriber facility without making any additional buried splices.

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