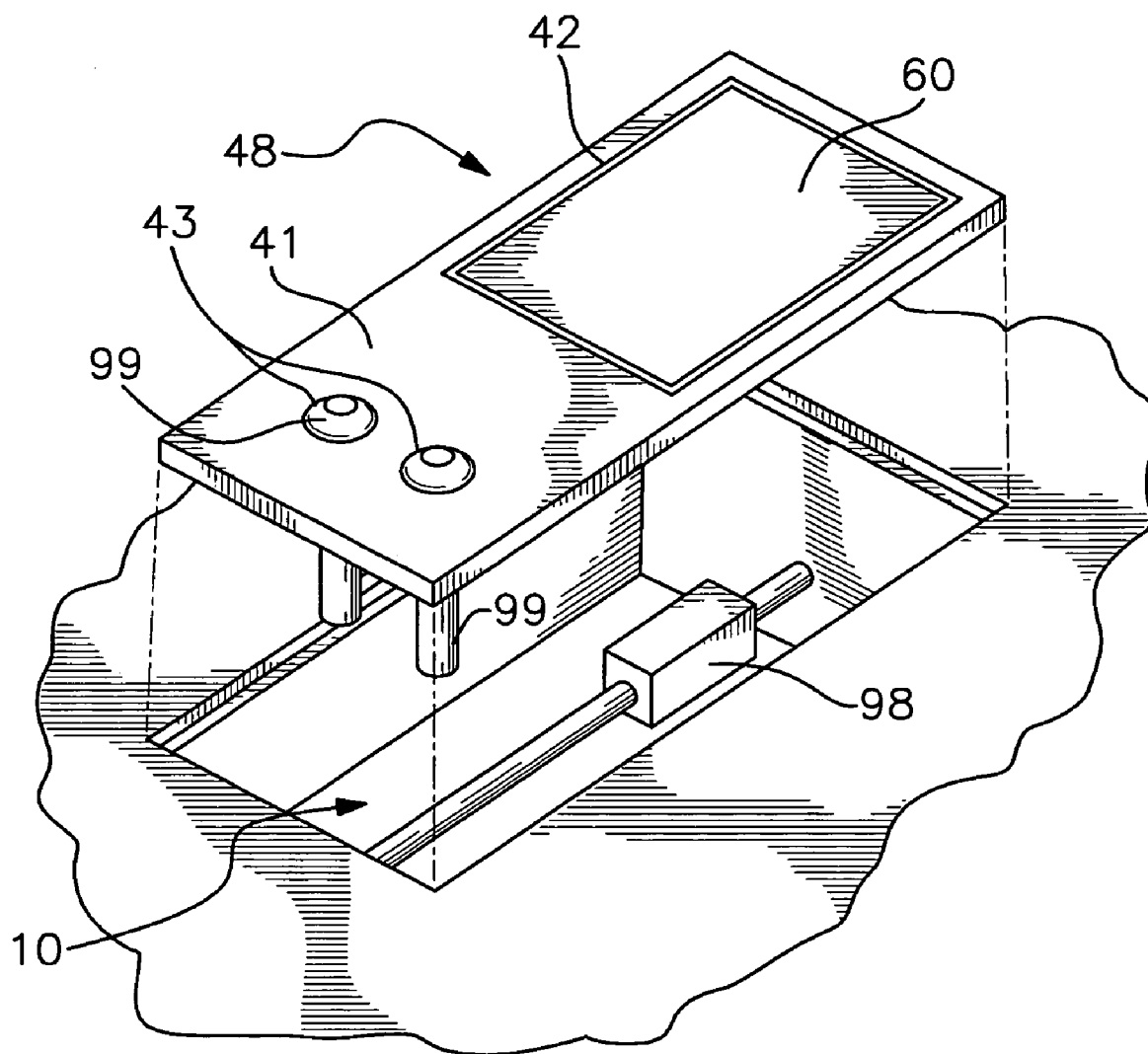




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Arn(10) **Pub. No.: US 2008/0217339 A1**(43) **Pub. Date: Sep. 11, 2008**(54) **METER BOX ASSEMBLY****Publication Classification**(76) Inventor: **Robert W. Arn**, Jacksonville, FL
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JACKSONVILLE, FL 32207 (US)(52) **U.S. Cl. 220/484**(21) Appl. No.: **12/072,335**(22) Filed: **Feb. 26, 2008****Related U.S. Application Data**(60) Provisional application No. 60/903,476, filed on Feb.
26, 2007.(57) **ABSTRACT**

A meter box assembly having a vault with a top wall, the top wall having a shelf and an opening to receive a removable lid, at least one electronic meter reading transmitter mounted in the shelf of the top wall, such that the lid may be removed from the meter box assembly to provide access to the interior of the vault without removing the at least one electronic meter reading transmitter.



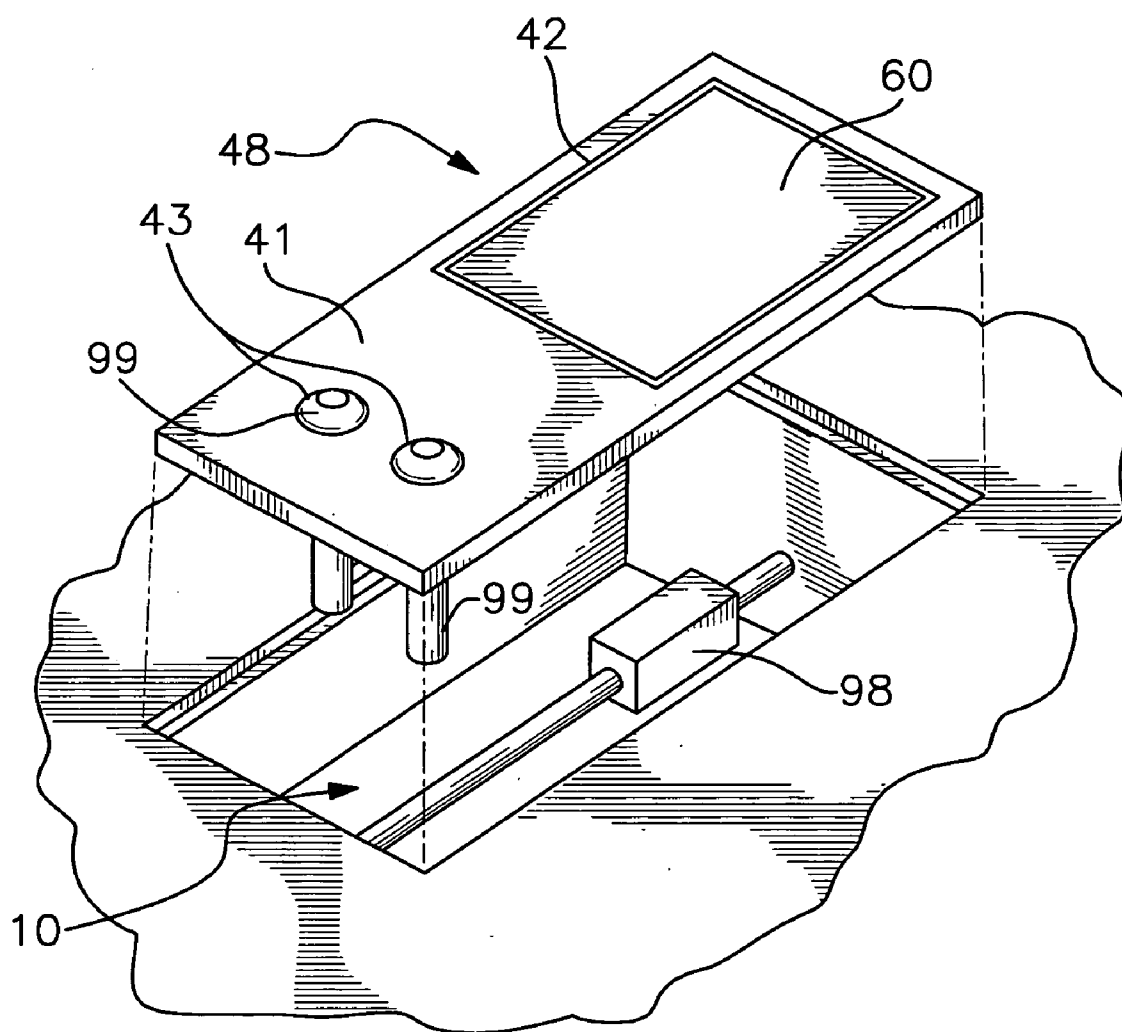


Fig. 1

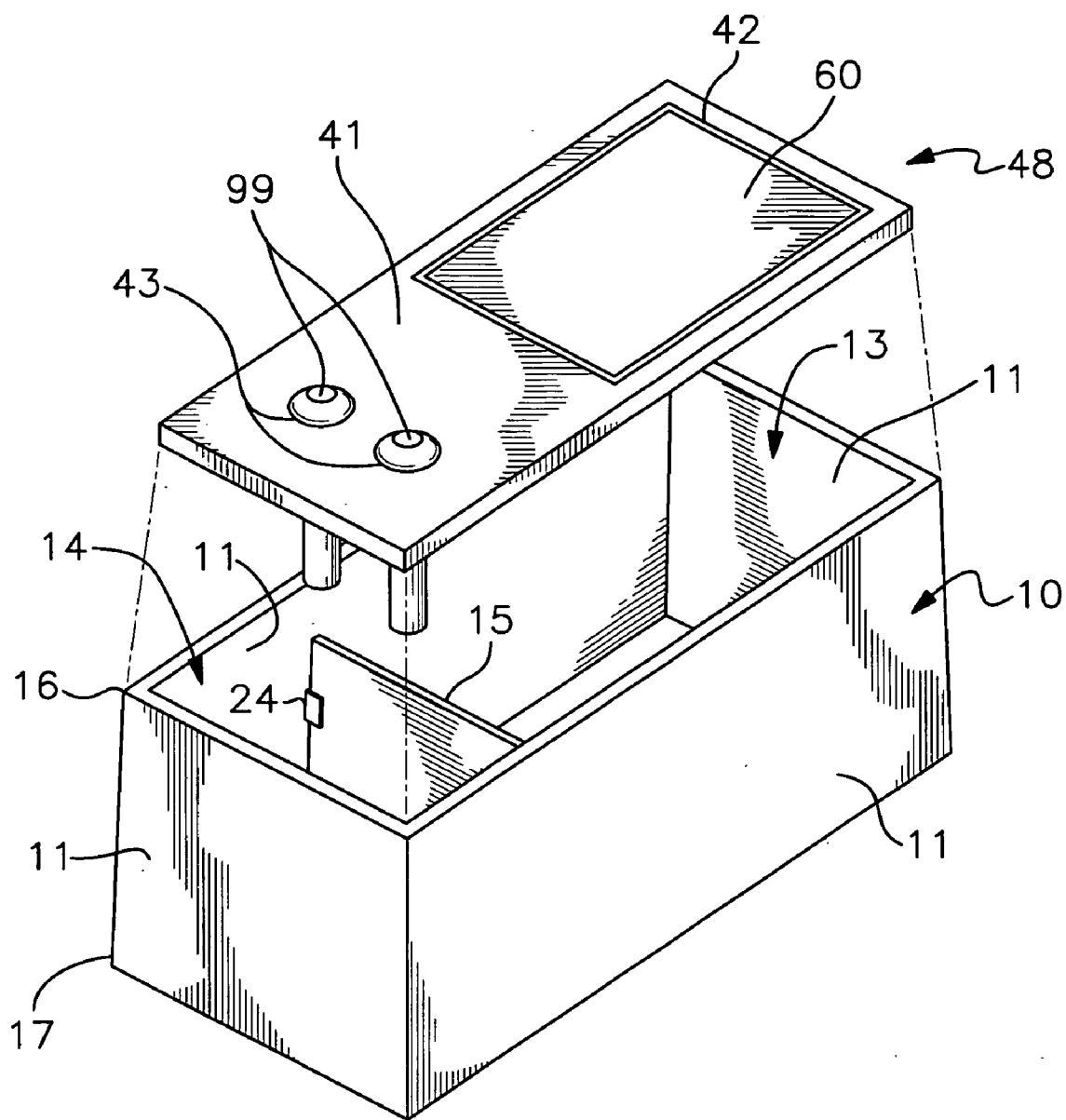


Fig. 2

Fig. 3

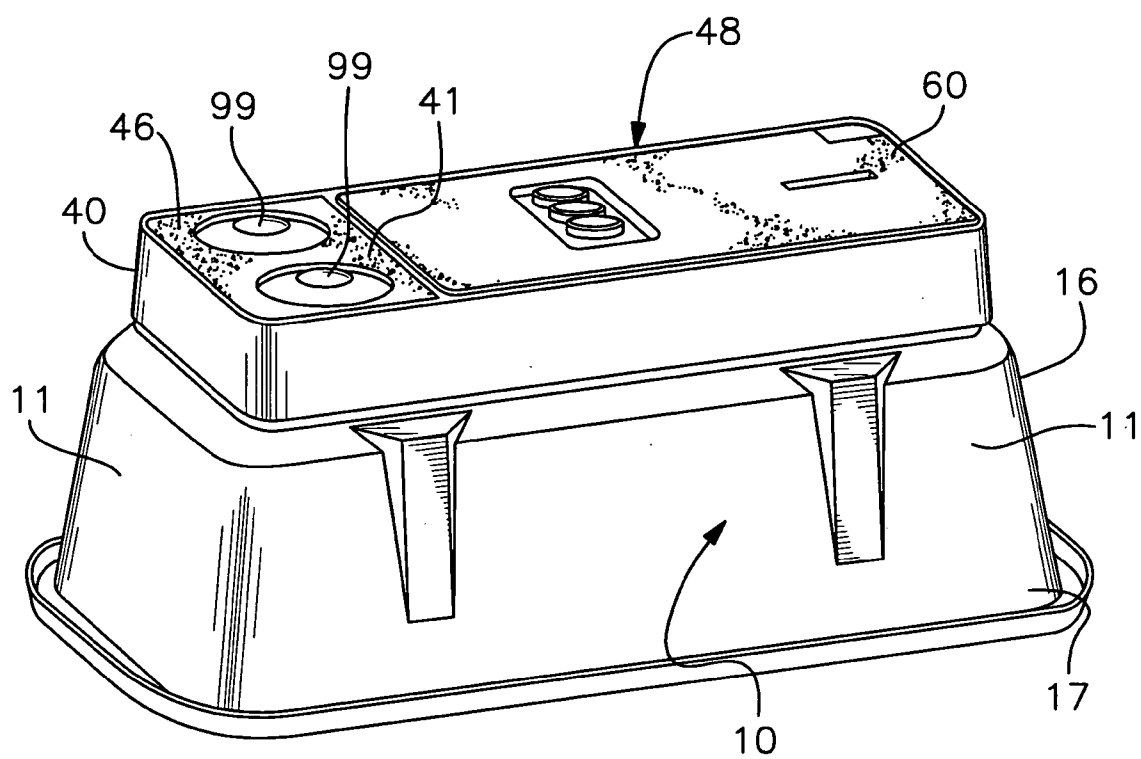


Fig. 4

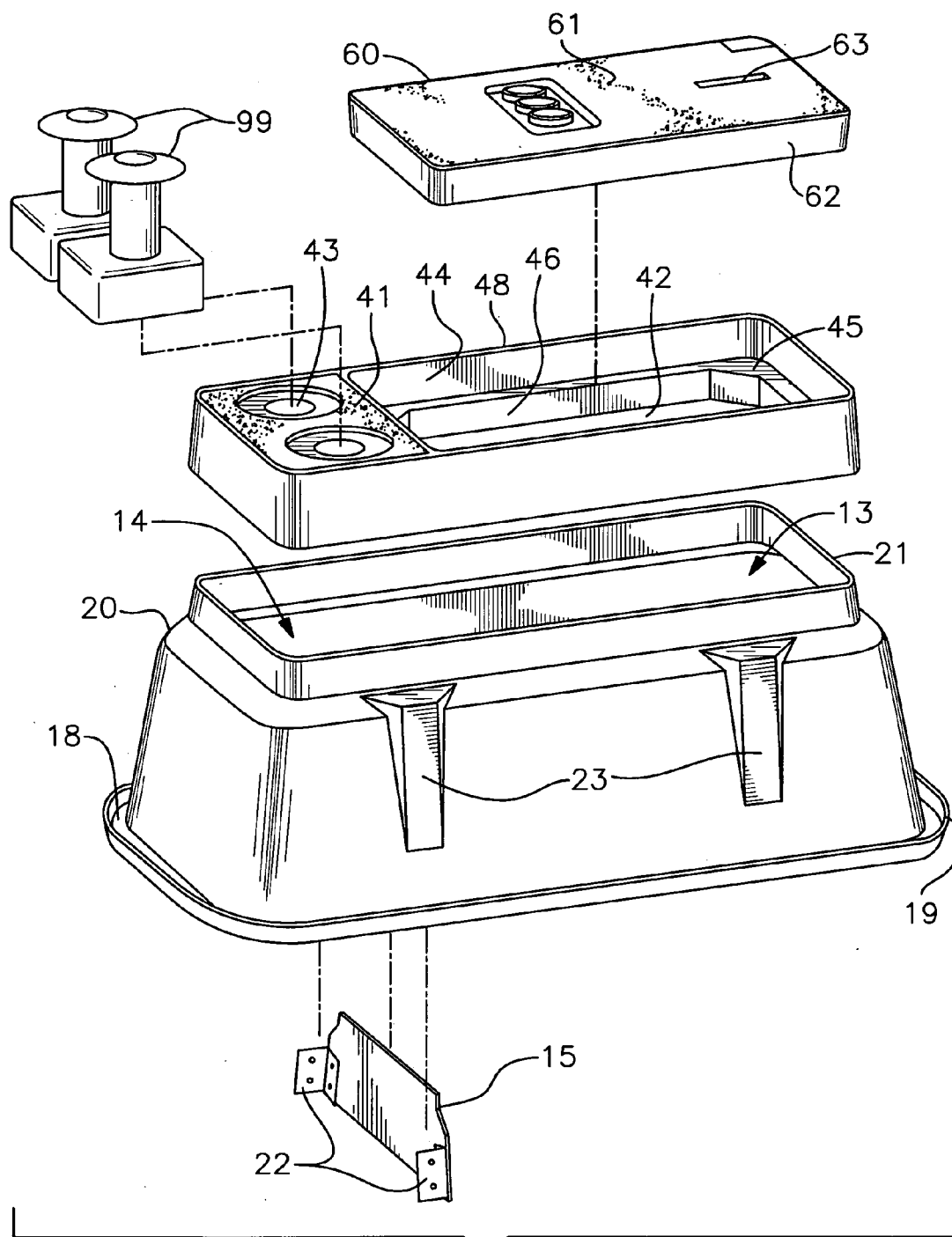


Fig. 5

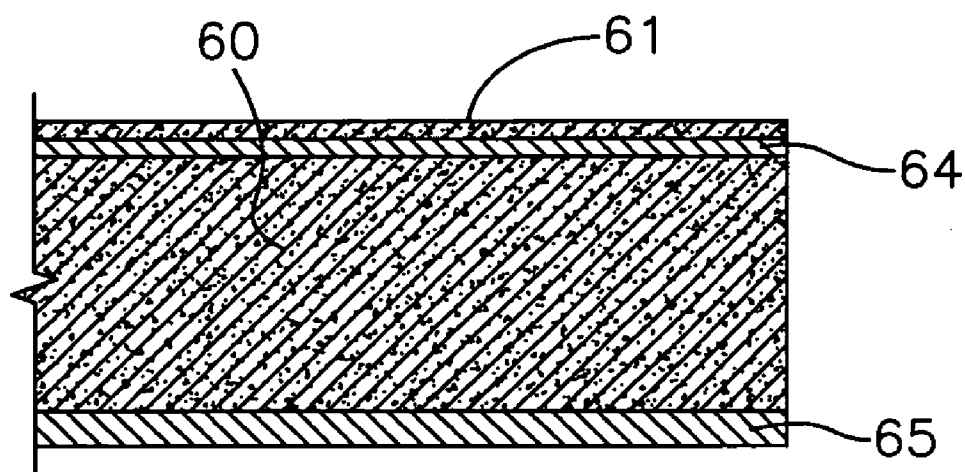


Fig. 6

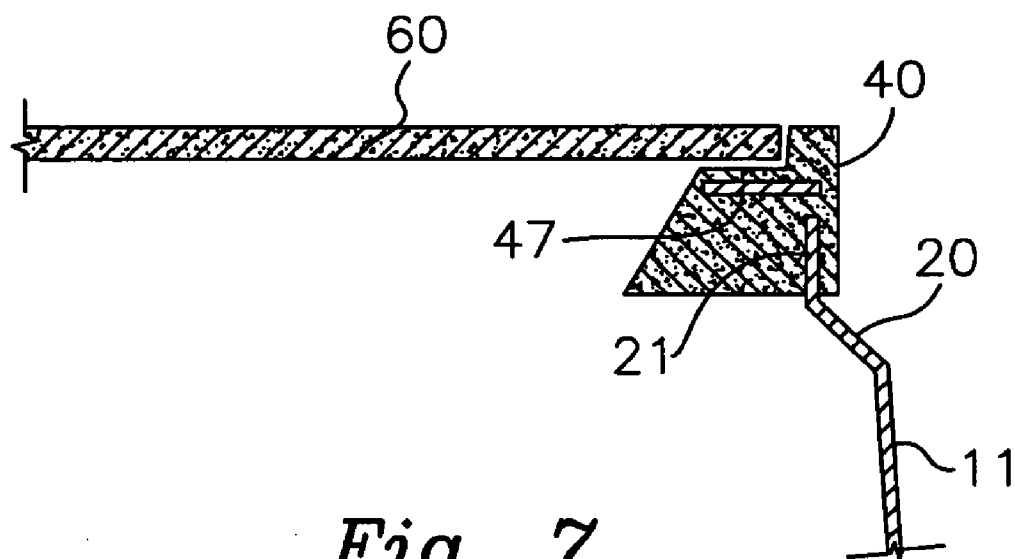


Fig. 7

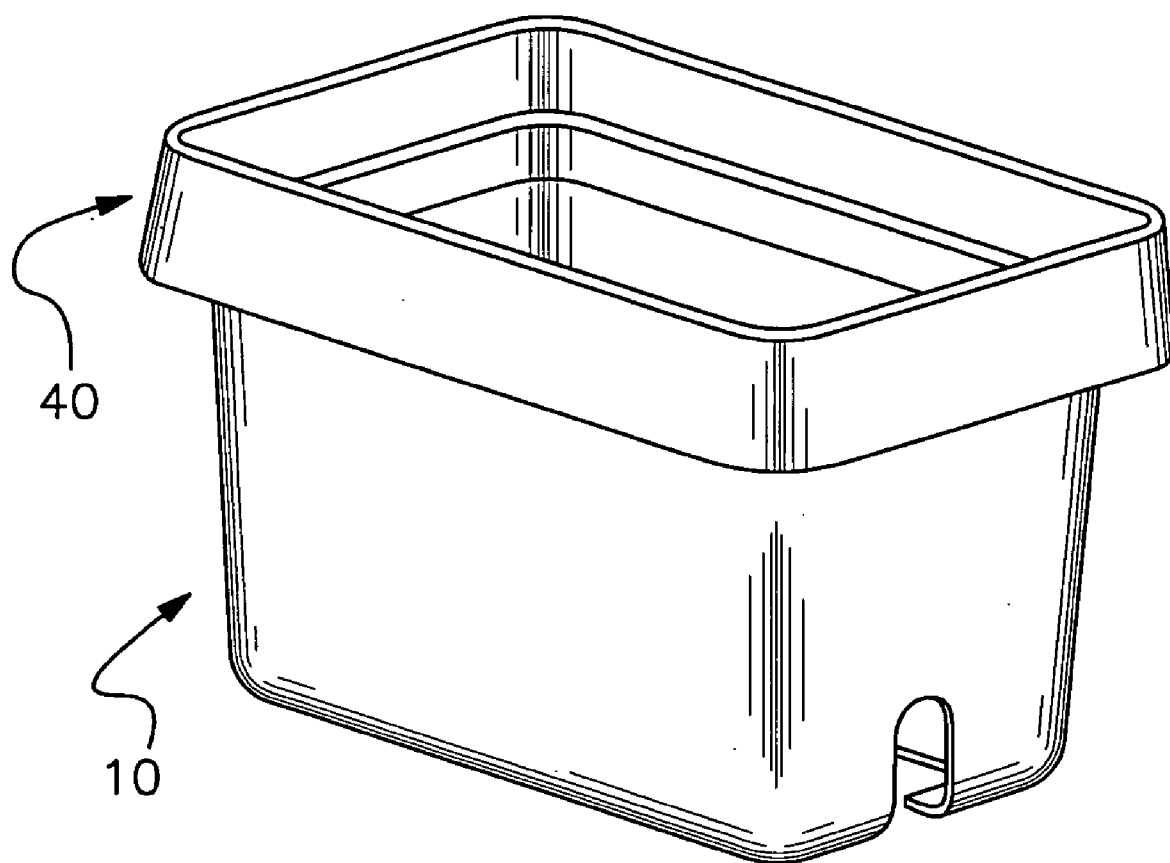


Fig. 8

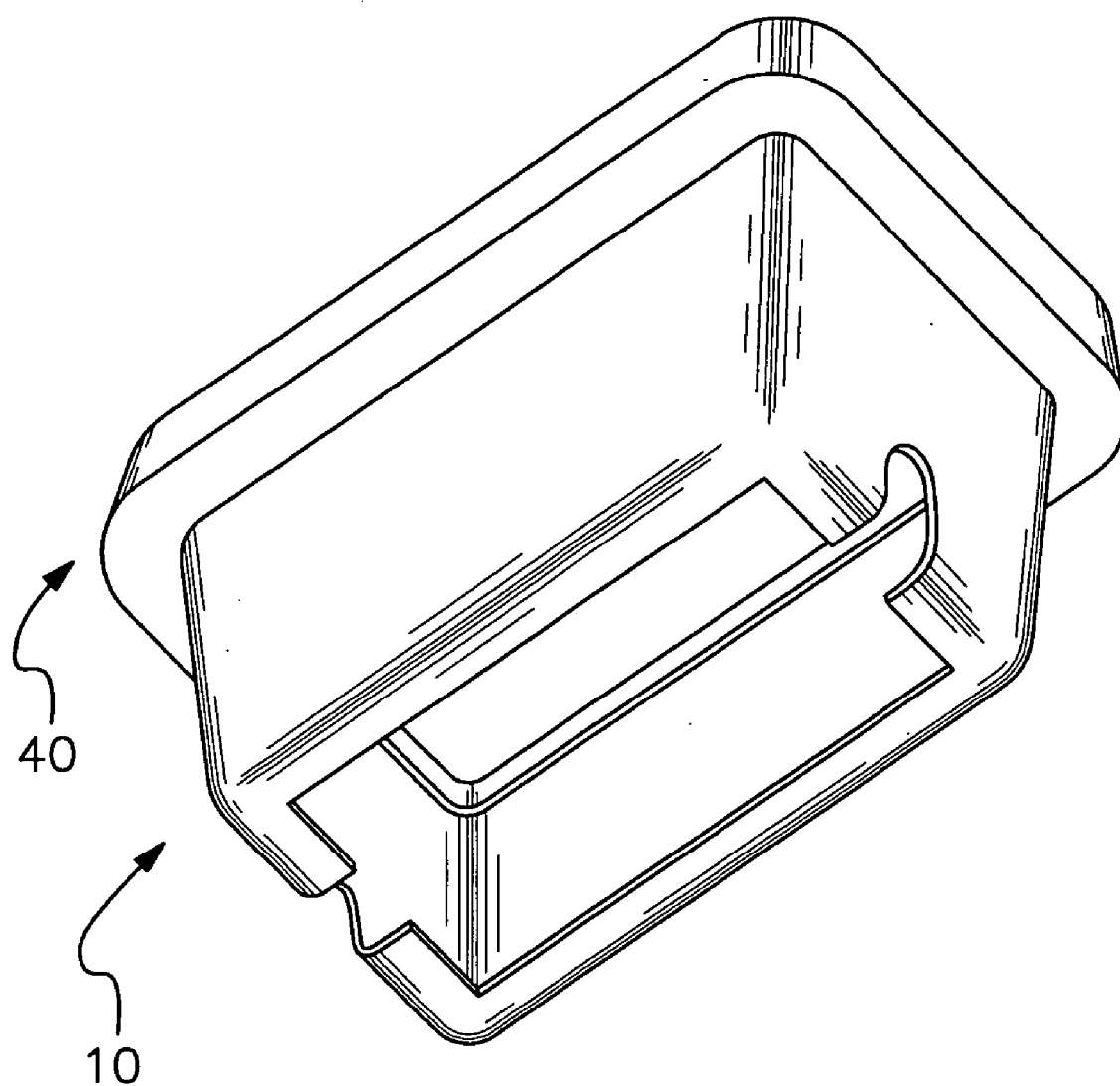


Fig. 9

METER BOX ASSEMBLY

[0001] This application claims the benefit of U.S. Provisional Patent Application Ser. No. 60/903,476, filed Feb. 26, 2007, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] This invention generally relates to meter box assemblies used to house electronic meter reading equipment for public utilities or similar applications, such as for example in public electric or water systems where frequent readings of electric or water consumption are taken for billing purposes. The meter boxes are typically located outside a building or along roadsides and buried at ground level or at a shallow depth.

[0003] Historically, utility meters have been placed into the ground near the building supported by the utility in question or along roadsides. These utility meters often are housed inside a protective enclosure, often bottomless, which typically comprises a vault or housing with a cover or lid, the cover or lid being disposed at or near the ground surface to provide easy access to the underlying utility and meter equipment. The grade level or subsurface protective enclosures are often referred to as meter boxes, and may also be known as grade level enclosures, underground enclosures, pull boxes, pit boxes, valve boxes, splice boxes or junction boxes. The meter boxes are typically composed of metal, plastic, concrete or a concrete/polymer composite. The lids of these meter boxes can vary greatly in weight, ranging for example from five to 500 pounds depending on the size of the meter box and material of composition.

[0004] For many years, the utility meters have consisted of analog or digital displays that are read visually by an employee of the utility after lifting the lid from the meter box. In recent years, these enclosures have been equipped with electronic meter reading equipment that enables utility providers to more easily collect consumption data. The modern electronic meter reading equipment is generally one of two types, both comprising transmitter means in hard-wired communication with the metering device that is connected in-line to the water conduit. The first type transmits a signal, such as by radio frequency, to a remote data collection device that may be stationary or mobile, for example mounted into a truck. The second type transmits a signal to a handheld device through contact, commonly known as a touchread system. For the purposes of the discussion herein, the term "electronic meter reading equipment" and "transmitter means" encompasses any of these type devices. In all known systems, the electronic equipment is formed as a part of or attached to the heavy lid of the meter box. This causes problems in that it is often necessary to remove the lids to access the internal equipment, and the electronic equipment attached to the lid is often damaged when the employee does not carefully rest the lid on the ground after removal, or is not careful enough during the actual removal or replacement of the lid. It is estimated that in many large utility systems up to 15% of the electronic meter reading equipment is non-functional at any given time due to improper handling.

[0005] It is an object of the present invention to provide a meter box assembly having electronic meter reading equipment that better protects the electronic components, and in particular the transmitter means for delivering a signal. It is a

further object to provide such a meter box assembly where the lid can be safely removed and the internal utility meter and equipment serviced without exposing the transmitter means to damage, in that the transmitter means is mounted or attached to a portion of the meter box housing or vault rather than to the meter box lid. It is another object of the present invention to provide a meter box assembly that can withstand substantially heavy loads, such as a wheel load from a utility truck.

SUMMARY OF THE INVENTION

[0006] The present invention is a grade level or subsurface meter box assembly comprising a sturdy vault or housing having a top wall, the top wall comprising a generally horizontally disposed shelf member and an opening disposed in a portion of the top wall, the opening retaining a detachable lid to provide access to the interior of the vault, and electronic meter reading equipment comprising distance or touchread transmitter means mounted or attached to the shelf of the top wall. An embodiment of the invention may also include a collar disposed atop the vault, either permanently or removably attached, such that the lid is retained within an opening in the top wall of the collar. The top wall shelf contains at least one opening for receiving and retaining at least one transmitter means. Thus, no elements of the electronic meter reading equipment are mounted or attached to the removable lid.

[0007] In an alternative embodiment, a generally vertically disposed protective partition may be provided to separate the interior into at least two sections, the partition being positioned between the transmitter means or other electronic meter reading equipment and the area of the vault beneath the opening. The partition member may be connected to the side-walls of the vault or may depend from the top wall. With this structure the lid can be removed as needed to provide access to the utility meter without exposing the electronic meter reading equipment to possible damage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is an exploded isometric view of a basic embodiment comprising a top wall member and a slab vault.

[0009] FIG. 2 is an exploded isometric view of an alternative basic embodiment comprising a top wall member and a vault housing the utility equipment, as well as a partition member.

[0010] FIG. 3 is an exploded isometric view of an alternative embodiment comprising a top wall member having a depending partition member and a vault having a bottom.

[0011] FIG. 4 is an isometric view of one assembled embodiment.

[0012] FIG. 5 is an exploded isometric view of one embodiment.

[0013] FIG. 6 is a cross-sectional view of an embodiment of the lid showing one embodiment of reinforcing members.

[0014] FIG. 7 is a cross-sectional view of an embodiment of the lid, collar, and vault assembly and depicting the optional horizontal reinforcing member in the sill of the collar.

[0015] FIG. 8 is a perspective view of an alternative embodiment of the vault and collar.

[0016] FIG. 9 is a perspective view of the alternative embodiment of FIG. 8, shown from the underside.

DETAILED DESCRIPTION OF THE INVENTION

[0017] With reference to the drawings, the invention will now be described with regard for the best mode and the preferred embodiment. In general, the invention is a grade level or subsurface meter box assembly comprising electronic meter reading equipment affixed to the top of the assembly at a location distinct from the lid of the assembly. The present invention may also be used as an assembly for pull boxes, valve boxes, junction boxes, splice boxes or the like.

[0018] Referring to FIG. 1, an embodiment of the invention is shown to comprise a top wall member 48, which may be made of concrete-based materials, polymer, metal, fiberglass, carbon fiber material, plastic, or ceramic. The top wall member 48 is structured so as to be received by a supporting vault member 10, formed as a portion of a concrete slab for example and containing a utility meter 98, such as for example an in-line meter to register water consumption. The top wall member 48 comprises a generally horizontally disposed shelf member 41 and a lid opening 42. Lid member 60 is received and retained by the lid opening 42. Additionally, the top wall 48 includes at least one transmitter opening 43 for transmitter means 99 for transmitting or delivering a signal or information regarding consumption of the utility through various means, such as for example by radio frequency or through touchread equipment. Thus, the transmitter means 99 is not disposed in or connected to the lid 60.

[0019] FIG. 2 shows another basic embodiment comprising the top wall member 48 assembly and a generally rectangular, open-bottomed vault 10 for housing the utility equipment 98, the vault 10 comprising sidewalls 11, which may be made of concrete-based materials, polymer, metal, fiberglass, carbon fiber material, or ceramic. The top wall member 48 is placed atop, removably attached to, or permanently attached to the vault 10 depending upon the particular need. Alternatively, the top wall 48 and the vault 10 may be formed integrally as a single member.

[0020] The invention may further comprise a partition member 15 removably affixed or permanently attached to the sidewalls 11 of vault 10 by mounting means 24. Alternatively, the partition member 15 may be formed as an integral component of the vault 10. Further alternatively, the partition member 15 may be attached to the underside of the top wall 48 such that it is suspended within the interior of the vault 10, as shown in FIG. 3. The partition member 15 divides the interior of the vault 10 into two sections—a first section 13 being beneath the opening 42 and lid 60 and the second section 14 being beneath the shelf member 41 and transmitter means 99. The purpose of the partition member 15 is to protect the transmitter means 99 when the lid 60 is removed to access the utility meter 98.

[0021] FIG. 3 also shows still another embodiment wherein the invention may further comprise a vault 10 with an optional bottom wall 12, which may have drainage openings 25 or even larger cut-out portions. In this embodiment, the meter box assembly, comprised of the top wall 48, the vault 10, and the lid 60, may be sealed such that water is prevented from entering into the interior of the vault 10. Another possible element of the alternative embodiment disclosed in FIG. 3 is the provision in shelf member 41 of a removable panel 49, the transmitter means 99 being mounted in this removable panel 49. This structure allows the removable panel 49 and transmitter means 99 to be removed from the shelf member 41 is repair or access to the transmitter means 99 is required. The removable panel 41 may be connected and secured in any

suitable manner, but preferably with specialty mechanical fasteners such that removal of the transmitter means 99 is only attainable by authorized personnel.

[0022] In all embodiments, the vault sidewalls 11 and bottom wall 12 are preferably made of a material suitable to support substantial loads of from several hundred pounds for pedestrian traffic up to tens of thousands of pounds generated by live loads such as the wheel of a vehicle. Such materials may include concrete-based materials, polymer, metal, fiberglass, carbon fiber material, or ceramic.

[0023] A preferred commercial embodiment of the invention is shown in FIGS. 4, 5, 8 and 9. The vault 10 has a top portion 16 and a bottom portion 17. The interior of the vault 10 may be partitioned into a first section 13 and a second section 14 wherein the first section 13 houses the utility equipment 98, and the second section 14 houses the transmitter means 99. The sections 13 and 14 may be formed by attaching at least one partitioning member 15 to the sidewalls 11 of the vault 10. The partitioning member 15 need not extend the full depth of the vault 10. The partitioning member 15 may be made of a concrete-based material, polymer-based material, metal, fiberglass, carbon fiber material, plastic or ceramic. The purpose of the partitioning member 15 is to protect the transmitter means 99 from any inadvertent damage or tampering that may occur while the utility equipment in the first section is being viewed, serviced or repaired. The partitioning member 15 can be mechanically fastened, removably affixed or permanently attached to opposing sidewalls 11 of the vault 10. Alternatively, the partition member 15 may be attached to the underside of the top wall shelf 41.

[0024] A collar 40 is disposed above vault 10 and may be made of concrete-based materials, polymer, metal, fiberglass, carbon fiber material, plastic, ceramic, etc. The collar 40 may be manufactured integrally with the vault 10. Alternately, the collar 40 may be separable from the vault 10 after both pieces are manufactured and fully cured, with the collar 40 either resting atop the vault 10 or affixed thereto using mechanical fasteners or the like. The collar 40 may or may not be made of the same material as the vault 10. The collar 40 is connected to the vault 10 at or near the top portion 16. The collar 40 comprises the top wall 48 and has shelf 41 located above the second section 14, and the collar 40 completely encloses the top of the vault 10 with the exception of a lid opening 42 disposed above the first section 13, and at least one transmitter opening 43 disposed within the shelf 41. The lid opening 42 is configured to receive and support the lid 60, which is of smaller overall dimension than the top wall 48. The transmitter opening 43 is configured to receive at least one transmitter means 99. The lid 60 may be hinged or preferably is freely removable from the collar 40, and the lid 60 may be composed of the same material as the vault 10 or a different material having sufficient strength to withstand an appreciable vertical load.

[0025] The components of the meter box assembly may be either cast or molded, and a preferred embodiment is described below. In the vault 10, the sidewalls 11 may be tapered such that in elevation view the vault 10 is trapezoidal in shape. Thus, the cross sectional area of the vault 10 is smaller at the top portion 16 than at the bottom portion 17. The sidewalls 11 may be reinforced by bracing members 23. A bottom rim 18 may be disposed at the bottom of the sidewalls 11. The bottom rim 18 is configured substantially horizontal, and a lip 19 is formed at the outer edge of the bottom rim 18 and extends generally vertically toward the top portion

16. A top rim 20 is formed at the top portion 16 to the top of the sidewalls 11, and the top rim 20 is tapered toward the interior of the vault 10 as the top rim 20 extends vertically. A flange 21 is formed at the tip of the top rim 20. The partition member 15 may be mounted, temporarily or permanently, to the sidewalls 11 by any suitable means, such as for example adhesives, mechanical fasteners, etc. In the embodiment shown, the partition member 15 is mechanically affixed to the sidewalls 11 by angled brackets 22 and mechanical fasteners, such as screws or bolts. Alternatively, the partition member 15 may be affixed to the sidewalls 11 of the vault 10 by mounting means 24 such as tabs permanently affixed to the sidewalls 11 and having pre-drilled fastener holes. The partition member 15 is then secured to the tabs 24 by aligning the holes in the partition member 15 with the holes in the permanently affixed tabs 24 and installing a mechanical fastener through the aligned holes.

[0026] During manufacture, the collar 40 may be cast or molded upside down. The flange 21 of the fully cured vault 10 is then inserted into the collar 40, and the vault 10 and collar 40 cure as an integral unit. If desired, the surface of the flange 21 may be roughened by a mechanical abrasive before the flange 21 is inserted into the collar 40. The shelf 41 completely covers and encloses the second section 14 with the exception of at least one equipment opening 43 disposed within the shelf 41 for the purpose of receiving transmitter means 99. The lid opening 42 is disposed in the collar 40 above the first section 13, and the lid opening 42 has an inner face 44. The inner face 44 is configured to fit inside the flange 21 at the top of the vault 10. A sill 45 is disposed at the bottom of the inner face 44 such that the lid 60 rests on the sill 45, thereby covering the first section 13. The collar 40 and lid 60 may contain reinforcing members 47 to increase strength properties. Such reinforcing 47 may be deformed metal reinforcing bars, wire mesh, deformed carbon composite bars, fiberglass, plastic or the like.

[0027] The lid 60 has a top side 61, an outer face 62 fitting inside the inner face 44 of the lid opening 42. The lid 60 and lid opening 42 are configured with a support means 46 for preventing the lid 60 from falling through the lid opening 42. Such support means 46 may be a sill, ledge, or shelf disposed in the lid opening 42 in a manner that supports the lid 60. Alternately, the outer face 62 of the lid 60 may be tapered such that the area of the lid 60 at the top side 61 is larger than the area of the lid opening 42, thus allowing the collar 40 to support the lid 60. A lifting means 63, such as a lifting hole or rod, may be disposed in the lid 60. The lid 60 may incorporate top reinforcement 64 and/or bottom reinforcement 65, as shown in FIG. 6. Preferably, the top reinforcement 64 is placed with a quarter inch cover, and the bottom reinforcement 65 may be placed with less than a quarter inch cover. As shown in FIG. 7, the sill 45 may contain horizontal reinforcement 47, which may be welded wire mesh, reinforcing fabric, reinforcing bars or any of the alternate means listed above.

[0028] The transmitter means 99 may be of any known type, such as a readable display, a touch-read device or a device transmitting a signal to a remote handheld recorder. The transmitter means 99 is disposed in the shelf 41 of the collar 40, and not disposed into or affixed to the lid 60. Thus, the lid 60 is removable without disturbing the transmitter means 99.

[0029] It is contemplated that equivalents and substitutions for elements set forth above may be obvious to those skilled

in the art, and therefore the true scope and definition of the invention is to be as set forth in the following claims.

I claim:

1. In a meter box comprising a vault surrounding a utility meter, a lid member providing access to the interior of said vault, and transmitter means for transmitting information regarding consumption of a utility, the improvement comprising:

a top wall member connected to said vault, said top wall member comprising a shelf member and an opening to receive said lid member, wherein said transmitter means is mounted to said shelf member such that said lid member is removable from said top wall member without moving said transmitter means.

2. The improvement of claim 1, further comprising a partition member positioned within said vault, said partition member dividing said vault into a first section and a second section, such that said first section is beneath said lid member and said second section is beneath said shelf member.

3. The improvement of claim 1, further comprising a removable panel positioned within said shelf member, and wherein said transmitter means are positioned within said removable panel.

4. The improvement of claim 2, further comprising a removable panel positioned within said shelf member, and wherein said transmitter means are positioned within said removable panel.

5. The improvement of claim 1, wherein said top wall member is connected to said vault by a collar member.

6. The improvement of claim 2, wherein said top wall member is connected to said vault by a collar member.

7. The improvement of claim 3, wherein said top wall member is connected to said vault by a collar member.

8. The improvement of claim 4, wherein said top wall member is connected to said vault by a collar member.

9. The improvement of claim 1, wherein said top wall member and said vault comprise an integral member.

10. A meter box comprising

a vault surrounding a utility meter,

a top wall member connected to said vault, said top wall member comprising a shelf member and an opening to receive a lid member,

a lid member positioned in said opening of said top wall member providing access to the interior of said vault,

transmitter means for transmitting information regarding consumption of a utility, wherein said transmitter means is mounted to said shelf member such that said lid member is removable from said top wall member without moving said transmitter means.

11. The meter box of claim 10, further comprising a partition member positioned within said vault, said partition member dividing said vault into a first section and a second section, such that said first section is beneath said lid member and said second section is beneath said shelf member.

12. The meter box of claim 10, further comprising a removable panel positioned within said shelf member, and wherein said transmitter means are positioned within said removable panel.

13. The meter box of claim 11, further comprising a removable panel positioned within said shelf member, and wherein said transmitter means are positioned within said removable panel.

14. The meter box of claim **10**, wherein said top wall member is connected to said vault by a collar member.

15. The meter box of claim **11**, wherein said top wall member is connected to said vault by a collar member.

16. The meter box of claim **12**, wherein said top wall member is connected to said vault by a collar member.

17. The meter box of claim **13**, wherein said top wall member is connected to said vault by a collar member.

18. The meter box of claim **11**, wherein said partition member is connected to said vault.

19. The meter box of claim **11**, wherein said partition member is connected to said shelf member.

20. The meter box of claim **10**, wherein said top wall member and said vault comprise an integral member.

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