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3,115,267

CURB BOX CAP

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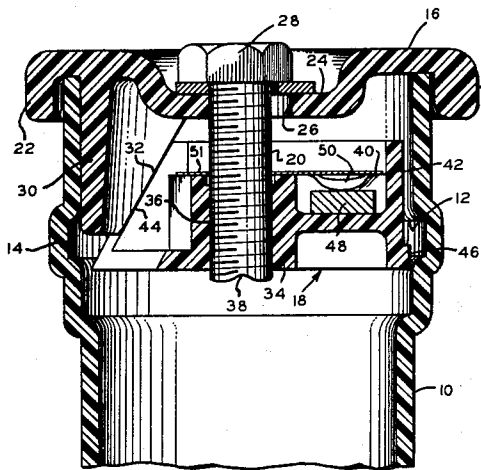


FIG. 1

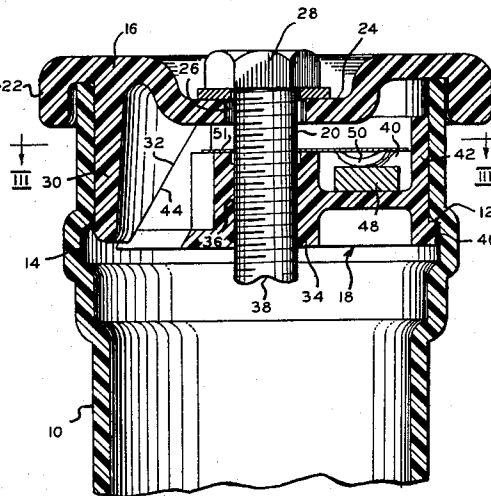


FIG. 2

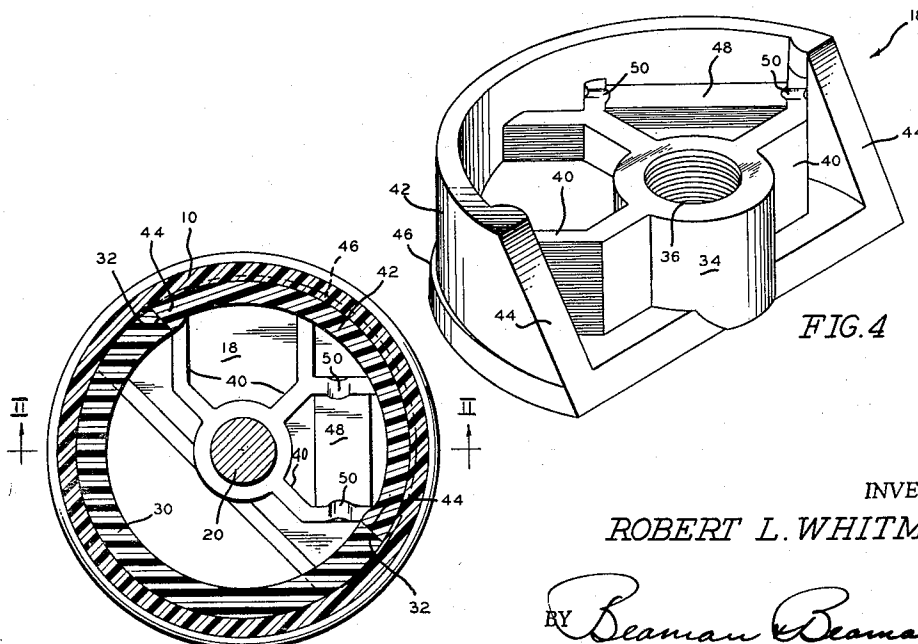


FIG. 3

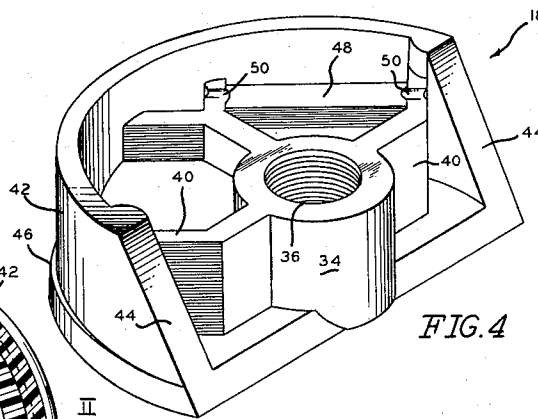


FIG. 4

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3,115,267 CURB BOX CAP

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The invention pertains to the curb box art and particularly relates to a cover structure for curb boxes.

Curb boxes have long been employed to provide access to water and gas valves, or the like, buried in the ground. Such boxes primarily consist of a tube having the lower end thereof in communication with the valve and the upper end is normally coincident with, or slightly below, the ground level. The upper end of the box is provided with a cover which is removed when access to the valve is desired.

It is an object of the invention to provide curb box structure and a cover therefor which permits the cover to be positively locked to the box without the necessity of high torque or pressure forces.

A further object of the invention is to provide a curb box cover having a radially extending projection or lip for positive locking engagement with a recess formed in the curb box and means for radially translating the lip into the recess.

Yet another object of the invention is to provide a nonmagnetic curb box cover which is highly resistant to corrosion and wherein magnet means may be employed to aid in the location of the curb box.

Yet another object of the invention is to provide a curb box structure employing cam surface or wedge means for affixing the cover to the box wherein the cam surfaces are uniquely arranged and permit a more readily manufacturable and dependable construction than heretofore known cam actuated covers.

These and other objects of the invention arising from the details and relationships of the components of an embodiment thereof will become apparent from the following description and accompanying drawing wherein:

FIG. 1 is an elevational sectional view of the upper end of a curb box and cover, in accord with the invention taken along a section similar to section II-II of FIG. 3, after placing the cover in position and prior to actuation of the locking means,

FIG. 2 is an elevational sectional view similar to FIG. 1 taken along section II-II of FIG. 3 after actuation of the locking means illustrating the cover in the locked position,

FIG. 3 is a plane sectional view taken along section III-III of FIG. 2, and

FIG. 4 is a perspective enlarged upper view of the nut member employed in conjunction with the invention.

As shown in FIGS. 1 and 2, the upper region of the curb box 10 consists of a cylindrical member having a plurality of cylindrical portions of varying diameter. The particular configuration of the curb box is not critical to the practice of the invention, except for the fact that the curb box be provided with an internal shoulder 12 which may be defined by an annular groove 14 formed on the inside of the box. In the illustrated embodiment both the curb box and the major cover components are formed of a synthetic, plastic material which is relatively inert and highly resistant to corrosion such as cellulose acetate, butyrate, acrylonitrile, or the like. This material is also preferably nonmagnetic for reasons which later will be apparent.

The primary cover components include a cap element 16, a nut member 18, and a bolt or screw element 20, rotatably associated with the cap and engaging a threaded

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hole in the nut. The cap member is of a configuration similar to that of the upper end of the curb box and includes a downward extending flange 22 to minimize the opportunity of foreign matter finding its way adjacent the upper end of the box. The cap is provided with a centrally recessed portion 24 and is formed with a hole 26 through which the bolt 20 extends. The bolt 20 includes a head 28 which will be located within the depression 24 and washer means are interposed between the head and cap. It will be noted that the diameter of the hole 26 is substantially greater than that of the threaded bolt portion.

The cap 16 also includes a downwardly extending projection portion 30, which extends in an axial direction into the curb box and exteriorly conforms to the inner configuration thereof. The projection 30 outer surface is cylindrical and the projection extends in its upper regions through an arc of approximately 200° and at the lower end through an arc of approximately 160°. The lateral edges of the projection 30 will therefore be of an inclined configuration and define cam or wedge surfaces 32. The surfaces 32 are preferably planar.

The configuration of the nut member 18 is best shown in FIG. 4 and includes a hub portion 34 having a threaded bore 36 therein for receiving the threaded bolt 20. The lower end of the threaded bolt 20 is deformed at 38 to prevent the nut from being completely unscrewed from the bolt. The nut 18 is formed of a configuration requiring a minimum amount of material, yet having sufficient strength characteristics, and includes the reinforcing web portions 40 which radially extend from the hub. The exterior portion 42 of the nut is of a cylindrical configuration defined at the edges thereof by planar cam surfaces 44. The cam surfaces 44 are such that the upper cylindrical portion extends through an arc of substantially 160° and the lower portion of the nut extends through approximately 200°. The configuration of the cylindrical portion 42 substantially conforms to that of the inner curb box surface. The lower end of the cylindrical portion 42 is provided with a lip or ridge 46 which radially extends from the cylindrical configuration thereof, having a maximum extension at the point furthest from the plane of cam surfaces 44. The lip 46 is of an axial length less than that of the groove 14, as will be apparent from FIG. 2.

In operation, the cap and nut members 16 and 18 are assembled by means of the bolt 20 wherein the nut 18 is loosely related to the cover and the cam surfaces 44 are in loosely associated opposed and adjacent relation to the wedge surfaces 32. The cover is then inserted upon the end of the curb box 10 and as the nut will be located on the lower regions of the bolt member 20, the bolt may be moved to the extreme left position in the hole 26 as shown in FIG. 1. This relationship reduces the dimension from the maximum extension of the lip 46 to the diametrically opposed portion of the outer surface of the projection 30 to less than the diameter of the curb box 10, and permits the nut and projection to be easily inserted into the curb box to assume the relation shown in FIG. 1. Thereupon, the bolt 20 is rotated to draw the nut 18 upwardly wherein the surfaces 44 will engage with the surfaces 32, and move the nut to the right as the nut is moved upwardly toward the bolt head 28. The resultant radial movement of the nut to the right inserts the lip 46 into the groove 14 and continued rotation of the bolt will wedge the portions 30 and 42 against the curb box walls.

Merely tightening the bolt 18 with the fingers permits a cover connection which prevents the cover being lifted from the curb box due to the engagement of lip 46 with shoulder 12, and by the use of a wrench to tighten the

bolt 20, a very firm connection between the curb box and cover may be achieved.

Difficulty is often encountered in locating curb box covers in that they often become obscured from view by weeds, dirt, high grass, etc., and to aid in the use of magnetic curb box locating equipment, a magnet may be associated with the cover in accord with the invention. A small magnet 48 may be located in the nut between the reinforcing ribs 40 and maintained therein by upsetting the rib portions above the magnet as at 50. Such upsetting may be accomplished with a heated tool, if the nut is formed of a thermoplastic material or formed cold, if desired. To aid in locating the curb box and cover when using electronic reflecting type metal locating apparatus, a disc 51 of aluminum or foil may be placed upon the nut 18 to reflect the signals of the apparatus. Also, magnets, not shown, are often mounted on the exterior of the curb box 10 near the upper end for locating purposes if the cover should be lost.

In some instances it may be desirable to form the cap and nut components of cast iron or other metal, or the cover may be formed of cast iron and the nut may be of synthetic material. Usually the bolt is formed of brass to minimize corroding and permit easy actuation of the cover.

It will be appreciated that various modifications to the invention may be apparent to those skilled in the art, and it is intended that the scope of the invention be defined only by the following claims.

I claim:

1. A cover for curb boxes and the like including a tubular member having an open end and an internal wall and a radial shoulder defined on the wall comprising, in combination, a cap adapted to enclose the open end of the tubular member, a projection formed on said cap extending into the tubular member, a cam surface defined on said projection obliquely related to the axis of said tubular member, a nut member, nut support means interconnecting said cap and nut member selectively displacing said nut member toward and away from said cam surface and permitting radial displacement of said nut member relative to the axis of the tubular member upon engagement with said cam surface, means defined on said nut member engageable with said cam surface, and a radial extending shoulder defined on said nut member operatively associating with the tubular member shoulder in abutting relation upon operation of said nut support means to engage said nut with said cam surface and translate said nut member relative to said cam surface.

2. A cover for curb boxes and the like including a tubular member having an open end and an internal wall and a radial shoulder defined on the wall axially spaced from the end comprising, in combination, a cap adapted to enclose the open end of the tubular member, a projection defined on said cap adapted to axially extend into the tubular member, an axial extending cam surface defined on said projection obliquely related to the axis of said tubular member, a nut member having a projection cam surface engaging portion defined thereon, means interconnecting said cap and nut members selectively axially displacing said nut member relative to said cap and permitting radial displacement of said nut member relative to said cap and a radial shoulder defined on said nut member adapted to radially overlap with said tubular member shoulder for abutting engagement therewith upon actuation of said interconnecting means engaging said nut member with said cam surface to prevent axial withdrawal of the cover from the tubular member.

3. In a cover as in claim 2 wherein a recess is defined in the wall of the tubular member forming the tubular member shoulder and a radial extending projection is

defined on said nut member defining said nut member shoulder and receivable within said recess.

4. In a cover as in claim 3 wherein said interconnecting means comprises a threaded bolt rotatably associated with said cap and a threaded bore defined in said nut member receiving said bolt.

5. In a cover as in claim 4 wherein said cap projection is of an axial configuration corresponding to the configuration of the internal tubular member wall and engages said wall, said cap projection having axial extending defining edges, said edges constituting cam surfaces.

6. In a cover as in claim 2 wherein said cap and nut member are formed of a synthetic, inert, nonmagnetic material, and a magnet is affixed to said nut member.

7. A curb box cover comprising, in combination, a cap having an axis, an axial extending projection fixedly defined on said cap defined by a lower edge and axial extending edges, said axial extending edges constituting cam surfaces, an axial hole centrally defined in said cap, a bolt having a head and loosely received within and extending through said hole, said head abuttingly associating with said cap, a nut member operatively associated with said bolt substantially axially aligned with said projection, said nut member including an axial extending portion having an abutment surface transversely disposed to the axial direction of said projection and cam surface engaging members defined on said nut member on the opposite side thereof relative to said abutment surface adapted to engage said cam surfaces upon drawing said nut member toward said cap by rotating said bolt.

8. In a curb box cover as in claim 7 wherein said nut member is of a substantially semi-cylindrical configuration and the axial edges thereof are complementary in configuration to said cam surfaces and constitute said cam engaging members.

9. In a curb box as in claim 7 wherein said cap and nut member are formed of a relatively inert synthetic, moldable material.

10. In a curb box cover as in claim 7 wherein said nut member is formed of a synthetic, inert, nonmagnetic material and a magnet affixed to said nut member.

11. A curb box cover comprising, in combination, a cap portion having an axis, an axial extending projection fixedly defined on said cap portion having a cylindrical outer surface and axially defined by cam surface edges obliquely related to the axis of said cap, said projection defining a cylindrical arcuate segment of about 180°, an axial hole centrally defined in said cap portion, a bolt extending through said hole, said bolt including a threaded shank which extends through said hole and an enlarged head abutting said cap portion, said opening being larger than said threaded shank whereby said bolt is capable of lateral movement relative to said cap portion axis, a nut member threadedly mounted upon said bolt shank, said nut member constituting a cylindrical surfaced arcuate segment of about 180° axially defined by cam surface edges complementary to said first-mentioned cam surface edges whereby upon said nut member being axially aligned with said projection so that the cam surface edges of said projection and nut member engage, said projection and nut member together define a complete cylindrical configuration having an outer cylindrical surface, and a transversely disposed abutment surface defined on said nut member on the outer surface thereof intermediate the cam surface edges of said nut member.

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