United States Patent

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[72] Inventor **Robert R. Houle**
432 N. Shore Drive, Forest Lake, Minnesota 55025

[21] Appl. No. **750,815**
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[45] Patented **Nov. 3, 1970**

[54] **CURB BOX AND INSTALLATIONS THEREOF**
3 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **137/370,** 285/302
[51] **Int. Cl.** **F16l 5/00,** F16r 5/00
[50] **Field of Search** ..... 285/302; 287/580(T); 137/365, 369, 370

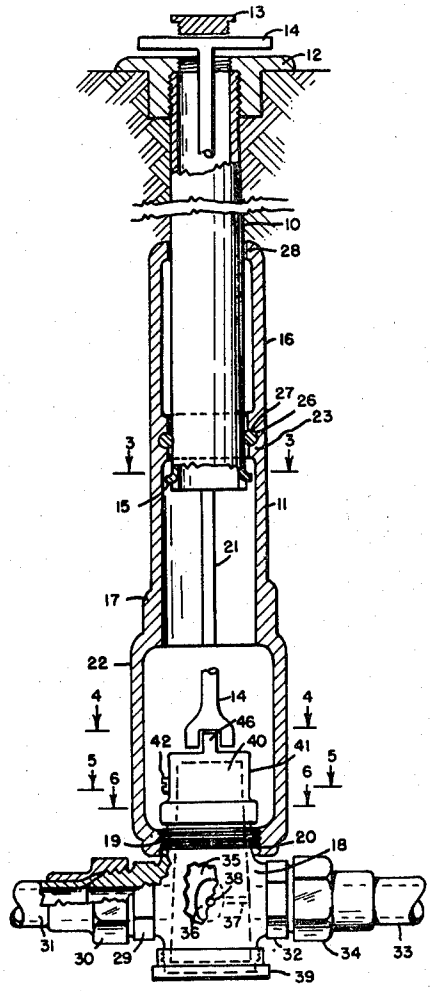
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Primary Examiner—Henry T. Klinksiek
Attorney—Robert C. Baker

ABSTRACT: The invention is directed to a new curb box of economical functional design wherein the telescopingly adjustable standpipe is maintained in essentially drift-free straight alignment with the base housing even under adverse conditions. The standpipe is essentially uniform in outer and inner diameter throughout its length. It is equipped with a collar and removable cap at its uppermost end and a lug at its lowermost end. The base housing is of one-piece unitary cast metal having a lower chamber and upper section. The lower chamber is provided with means, preferably threaded, for secure attachment of it to a buried valve body. It has at least one interiorly directed longitudinally extending rib in it. Its upper terminus is in the nature of an interiorly directed annulus which serves as a stop against which the lug on the standpipe abuts. The upper section of the base housing is equipped with two spaced standpipe alignment means, one at the upper and the other at the lower terminus of that section. One of these alignment means consists essentially of an interiorly directed annular rib having an annular keeper ring recess intermediate the edges of that rib and a keeper ring in that recess. The other alignment means is just sufficient in size to accommodate the outer diameter of the standpipe without constriction or binding.



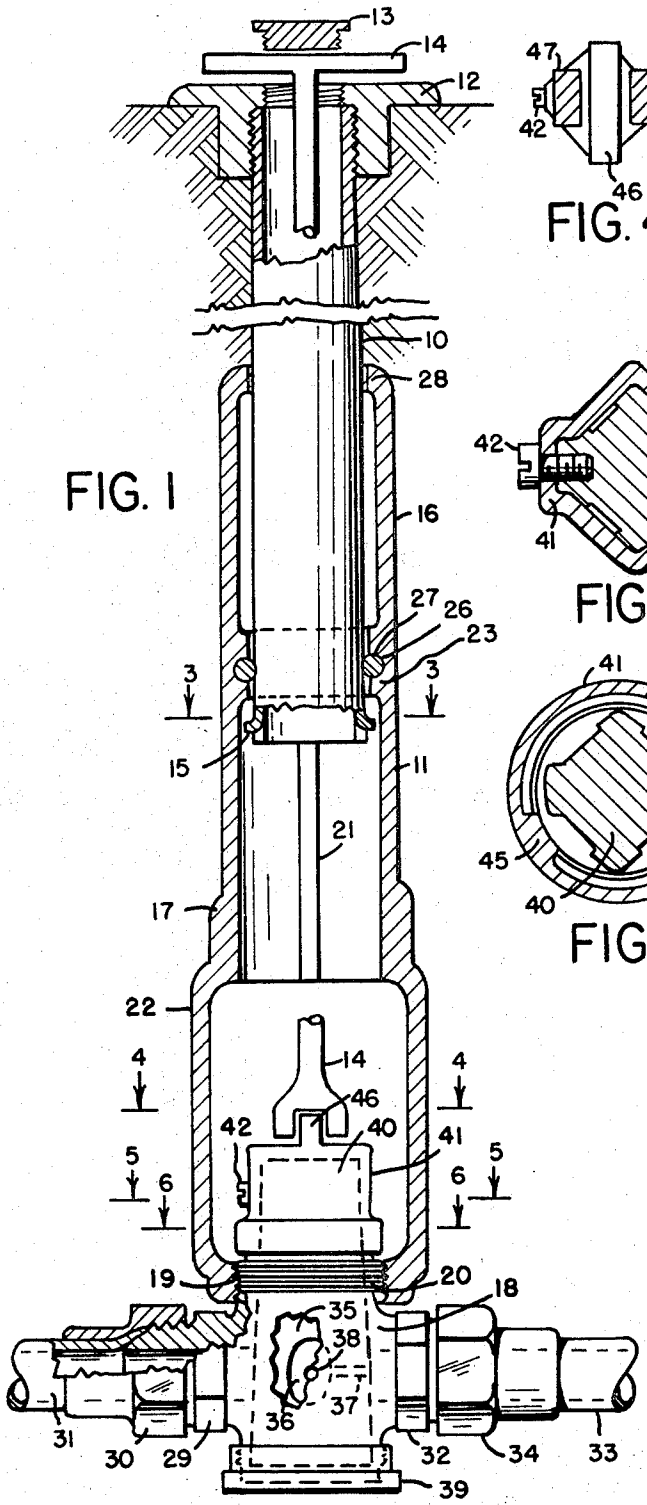


FIG. 1

FIG. 4

FIG. 5

FIG. 6

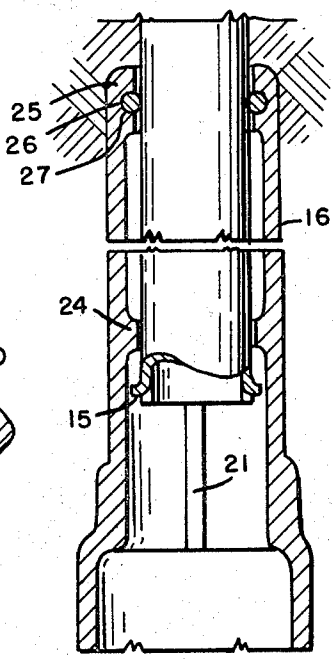


FIG. 2

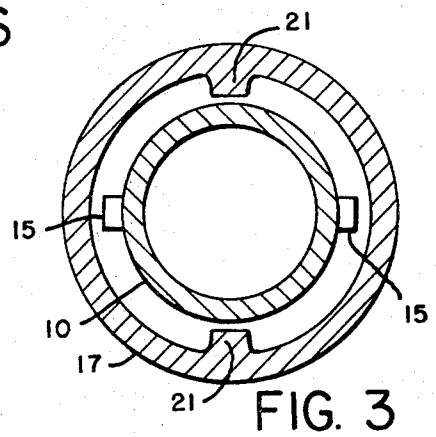


FIG. 3

INVENTOR.
ROBERT R. HOULE

BY

ROBERT C. BAKER
ATTORNEY

FIG. 7

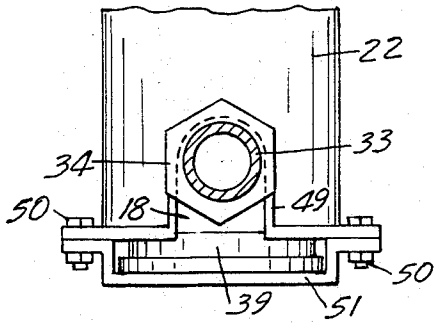
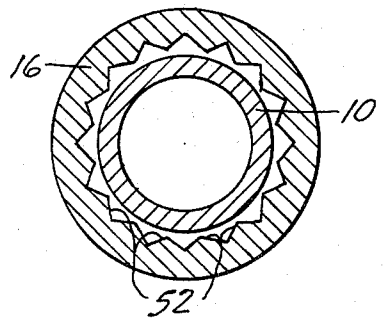


FIG. 8



INVENTOR.
ROBERT R. HOULE
BY
Robert C. Baker
ATTORNEY

CURB BOX AND INSTALLATIONS THEREOF

This invention relates to new curb boxes of the telescopic type, and more particularly, to new curb boxes of economical functional design effective to maintain the telescopingly adjustable standpipe in essentially drift-free straight alignment with the base housing of the curb box even under adverse conditions. The invention also is directed to curb box valve installations characterized by having the improved features as taught herein.

The flow of water from a buried water main into buried service pipes for buildings is conventionally controlled by a buried valve or stop-cock in the service pipe near its connection to the water main. Access to this buried valve is required to turn it on and off; and curb boxes of various types have been used or suggested for the purpose of gaining access to the buried valve from the surface of the ground.

From the standpoint of economy, curb boxes of simple design are desired. In this connection, curb boxes known as "Minneapolis Pattern" curb boxes have become widely accepted. However, curb boxes of the Minneapolis Pattern have a major defect which for years has caused annoyance and unpredictable increases in maintenance expense for cities and municipalities using the same. This defect is known as a valve key guidepipe drift or misalignment between the upper standpipe part of the curb box and the lower base housing part thereof, the latter being fixed to the buried valve or stop-cock. The upper standpipe or valve key guide pipe must be telescopingly adjustable with respect to the base housing of the curb box so that the top of the curb box can be installed flush with the surrounded level of earth. But during the time of installing curb boxes of the Minneapolis Pattern, or as a result of repeated frost heaving of the ground or earth in northern areas, or simply as a result of earth settling or shifting within a few days after installation, the upper telescopingly adjustable standpipe shifts or drifts out of alignment with the lower base housing. When this occurs, it is impossible, after removing the plug on the curb box at the surface, to insert successfully the valve key through the standpipe into sound operable contact with the key receptor valve stem in the base housing part of the curb box. The curb box must first be dug up and reinstalled with its parts in proper alignment, which is expensive from a labor standpoint and is time consuming. Furthermore, emergency shutoff of a buried valve is impossible where the upper standpipe section has drifted as described.

This invention provides a new curb box which is economical to manufacture and which at the same time effectively maintains essentially straight drift-free alignment between the standpipe and base housing. Use of this new curb box in combination with buried valves reduces maintenance expense and permits emergency access for the shutoff of buried valves. Other benefits and advantages of the teaching hereof will become evident as this description proceeds.

The new curb box consists essentially of a standpipe and a base housing part. The standpipe is telescopingly adjustable with respect to the base housing. It is essentially uniform in outer and inner diameter throughout its length, and is equipped with a collar and removable cap at its uppermost end and at least one peripherally projecting lug at its lowermost end.

The base housing is of one-piece unitary cast metal having a lower chamber and an upper section. It has means at the lower terminus of the lower chamber for secure attachment of it to a buried valve body. An interiorly directed longitudinally extending rib in the lower chamber of the base housing is present for the peripherally projecting lug of the standpipe to abut against so as to prevent rotation of the standpipe beyond 360° with respect to the base housing. Means at the upper terminus of the lower chamber is cooperative with the peripherally projecting lug at the lower terminus of the standpipe to maintain the lower terminus of the standpipe in the lower chamber.

The upper section of the base housing is in the nature of a chamber separating two spaced standpipe alignment means, one at the upper and the other at the lower terminus of that

section or portion of the base housing. These alignment means maintain the standpipe in essentially straight alignment with the base housing section, even under conditions such as where backfill of earth is accomplished without special precautions or where repeated frost heaving occurs. One of the alignment means consists essentially of an interiorly directed annular rib having an annular keeper ring recess intermediate the edges of that rib and a keeper ring in the recess. The interiorly directed annular rib itself is of just sufficient inner diameter (with respect to the outer diameter of the standpipe) to allow free longitudinal movement of the standpipe through it without constriction or binding. However, the combination of keeper ring recess and keeper ring is such as to force the keeper ring snugly against the outer diameter of the standpipe to hold it against longitudinal shifting with respect to the base housing, but yet permit the standpipe to be longitudinally shifted by rotary back and forth movements of less than 360°. **The other of the alignment means is just sufficient in size to accommodate the outer diameter of the standpipe without constriction or binding.**

The invention will be described by reference to a drawing made a part hereof wherein:

FIG. **1** is a broken longitudinal view of the curb box of this invention, partially in section, shown affixed to a buried valve or stop-cock;

FIG. **2** is a broken fragmentary longitudinal view partially in section, illustrating an alternate embodiment for the curb box of this invention;

FIG. **3** is a sectional view taken at line **3–3** of FIG. **1**;

FIG. **4—6** inclusive are sectional views of interior elements taken at **4–4**, **5–5**, and **6–6**, respectively, of FIG. **1**;

FIG. **7** is a fragmentary side plan view showing a valve and an alternate lower terminus for the lower chamber of a base housing for the curb box; and

FIG. **8** is a cross-sectional view through a second alignment means (*e.g.*, such as identified at **28** in FIG. **1** and at **24** in FIG. **2**), illustrating an alternate embodiment thereof consisting of an annular series of inwardly directed lugs or points.

Referring to the drawing, the new curb box consists essentially of a standpipe **10**, which is a pipe of essentially uniform outer and inner diameter throughout its length, and a base housing of one piece unitary cast metal **11**. The standpipe **10** is telescopingly adjustable with respect to the base housing **11**, suitably by employing small back and forth rotary movements of less than 360° during telescopic push or pull of the standpipe with respect to the base housing part.

The upper or ground terminus of the standpipe **10** is preferably equipped with threads which receive a thread-on collar **12** having a removable cap **13** for the purpose of providing surface access into the curb box and insertion of valve key **14**. The lower terminus of the standpipe is equipped with one or more abutment lugs **15**, suitably consisting of simple outward or peripherally projecting ears formed by bending a short annular section of the pipe **10** outwardly. No special contour for these ears is necessary. They are solely a small arc (*e.g.* ¼ inch arc) of the pipe end bent or flanged outwardly.

Base housing **11** consists essentially of two sections integrally united together as one piece. It is elongated, open ended, and cylindrical. It has an upper section or housing portion **16** and a lower chamber or housing portion **17**. The lower chamber may be looked upon as essentially a key-receiving valve-stem access chamber. At its lower terminus it is equipped with means for secure attachment of it to a valve body; and preferably, this means consists of interior annular threads **19** at the lower open terminus of housing section **17** cooperating with exterior threads **20** on the valve body **18**. Alternately, a saddle-type **49** or western-type lower terminus may be employed, and bolted **50** to the valve body or a band **51** about the lower portion of the valve body.

The lower chamber **17** of the base housing **11** is equipped with longitudinal means in the nature of a longitudinal inwardly directed rib or ribs **21** (see FIGS. **1**, **2**, and **3**), which cooperate with the peripherally projecting lug or lugs of the

standpipe in preventing rotation of the standpipe beyond 360° with respect to the base housing section **11**. Complete revolution of the standpipe with respect to the base must be prevented in order to secure the threaded collar **12** and secure and remove the threaded cap **13**. By employing two oppositely disposed longitudinal ribs, as illustrated in FIG. **3**, the maximum rotary movement is limited to that just short of **180°**. Lug **15** of the standpipe abuts against longitudinal ribs **21** to prevent additional rotary movement. Ribs **21** need not extend the full length of the lower chamber of the base housing. However, ribs **21** should extend for at least about 6 or 8 inches into the lower chamber **17** from the upper terminus of that chamber. The lower chamber may be equipped with an enlarged or bulbular section **22**, which is optional; and when it is so equipped, the longitudinal rib **21** of the lower chamber will terminate at about the start of the lower bulbular or enlarged portion of the lower chamber **17**. Generally at least the upper one-half of the length of the lower chamber is equipped with a rib or ribs **21**. Normally, this lower chamber is at least 8 inches or even 1 foot in length, up to about 1 ½ feet in length. The bulbular lower portion is not over about 4 or 6 inches in length.

Means at the upper terminus of the lower chamber, such as an inwardly directed annular rib (shown at numeral **23** of FIG. **1** and numeral **24** of FIG. **2**) serve as a stop member cooperative with means on the lower terminus (lug **15**) of the standpipe to prevent upward removal and separation of the standpipe **10** from the lower chamber **17** of the base housing section **11**.

The upper section **16** of the base housing **11** is in the nature of a chamber also. This section is equipped at its upper and lower termini with means to maintain the standpipe **10** in alignment with the base housing. The length of this upper section is at least about two times the outer diameter of the standpipe. The chamber itself in this upper section is usually at least about 2 or even 3 inches in length, and may be as much as 1 foot or so in length, although approximately 3 or 4 inches in length is most preferred since the standpipe employed will usually have an outer diameter of 1 or 1 ½ or possibly 2 inches.

One of the alignment means in the upper section (**23** as illustrated in FIG. **1**, and **25** as illustrated in FIG. **2**) consists essentially of an interiorly directed or inwardly directed annular rib having an annular keeper ring recess **26** intermediate the annular edges thereof, and a keeper ring **27** in that recess. Annular rib **23** and annular rib **25** have inner diameters just sufficiently large to accommodate the outer diameter of the standpipe for free longitudinal movement of it without constriction or binding. The combination of the keeper ring recess **26** and the keeper ring **27** is such that the keeper-ring is pressed snugly against the outer diameter of the metal standpipe **10**, and holds that standpipe against longitudinal shifting with respect to the base housing section **11** as the curb box is installed. However, the snugness of fit for keeper ring **27** against the outer diameter of standpipe **10** is such that standpipe **10** may be adjusted or telescoped longitudinally with respect to the base housing section **11** by employing back and forth rotary movements of less than 360° (or less than 180° when oppositely directed longitudinal **21** are employed as illustrated in FIG. **3**). This adjustability is necessary in order to place the top of the standpipe level with surrounding earth or ground level at the time of installation.

The other (or second) alignment means at the opposite terminus of the upper section **16** is just sufficient to accommodate the outer diameter of the standpipe without constriction or binding. This other alignment means (numeral **28** in FIG. **1** and **24** in FIG. **2**) may consist of an inwardly directed annular rib comparable to the inwardly directed annular rib illustrated at numeral **23** of FIG. **1** and numeral **25** of FIG. **2**. However, the keeper ring recess is not present since no keeper ring is employed for the annular ribs **24** and **28**. In general, it is preferred to employ the embodiment as specifically illustrated in FIG. **2**; however, where some slight penetration of dirt within the chamber of section **16** may be tolerated, it is suitable to employ the embodiment illustrated in FIG. **1**. If desired, the other or second alignment member or means may consist of an annular series of inwardly directed lugs or points **52** (see FIG. **8**) instead of a complete or continuous annular rib as illustrated at numeral **28**. But the continuous annular rib principle is preferred. The chamber of section **16** desirably serves as a catch basin or trap for dirt which accidentally may penetrate through the upper alignment means; and it also is essential from the standpoint of practical telescoping without binding.

The inner diameter of annular ribs **23** and **24** is sufficient to accommodate the outer diameter of standpipe **10**, but insufficient to allow passage of the projecting lug **15** of the standpipe. Thus, ribs **23** and **24** serve also as the means at the upper terminus of the lower chamber **17** to maintain the lower terminus of the standpipe in the lower chamber **17**.

The upper standpipe is simply made out of a metal pipe of conventional manufacture readily available from a variety of sources. One end is threaded, which is convenient to accomplish; and the other end is provided with ears or lugs which are conveniently formed simply by bending a small section of the end outwardly. The base housing section likewise is formed to consist of a minimum of essential features. Its inner diameter in the lower chamber **17** as well as at the threaded lower terminus **19** is such that the standpipe **10** may be inserted at the lower end of the base housing and the lugs accommodated or passed through the threaded terminus **19** into the lower chamber **17**. Thus, the device is extraordinarily simple to manufacture. Additionally, it is easily handled in the installation procedure, without requiring specialized steps or skills to accomplish installation in a manner to prevent undesirable drift or shifting of the standpipe with respect to the base housing.

A preferred type of water valve for use in combination with the curb box of the invention to gain desired benefits of simplicity and reliability of operation is illustrated in the drawing. This valve consists of a valve body or housing **18** having an inlet port formed by fitting **29** to which inlet pipe **31** from the water main is connected by nut **30** and an outlet port formed by fitting **32** to which the branch pipe **33** is fixed by nut **34**. A tapered valve core or plug **35**, preferably copper, is within valve housing **18** and is shown in FIG. **1** with its flow-through port **36** transverse to the water flow, which is the shutoff condition. If desired, a bleeder port or weep hole **37** may be present in tapered plug **35** to allow water in branch **33** to pass backward into flow-through port **36** of plug **35**; and an optional weep hole **38** in valve body **18** may be used to permit that water to pass from flow-through port **36** out of valve body **18** into the ground. By turning the tapered plug in a counterclockwise direction, as viewed from the top or surface of the ground, the valve is opened to permit water flow from the water main into the branch line **33**; and simultaneously, the weep ports are both closed or blocked. Tapered plug **35** is firmly seated within valve body **18** by tightening bottom closure cap **39**, which is equipped with a low friction gasket member pressing against the bottom of tapered plug **35**.

Shank **40** extends upwardly from valve plug **35** out of an annular opening in valve body **18**; and to this shank is firmly fixed stem member **41**, as for example by bolt **42**. The contour of stem member **41**, as illustrated in FIGS. **5** and **6**, is essentially square in its upper part but is circular or cylindrical in its lower portion adjacent the valve body **18**. In the circular portion of the stem **41**, adjacent valve body **18**, is an inwardly directed rib **43** which abuts against an upwardly projecting flange **44** off the valve body **18** inwardly of the threads **20** of the valve body **18**. Rib **43** abuts against flange **44** when the valve is in a closed position, and prevents full rotation of the plug **35**. Similarly, inwardly directed rib **45** in the circular portion of stem **41** abuts against flange **44** when the plug **35** is rotated a quarter turn counterclockwise to open the valve.

Stem member **41** is equipped with an elongated upwardly projecting flange **46**, which is adapted to receive key **14**. Key **14** is provided with a bifurcated end so arranged that one leg

47 and the other leg 48 of the bifurcation mates on each side of the flange 46 for turning of the valve plug 35 from the surface by using key 14.

I claim:

1. A curb box valve installation comprising a valve buried in the earth and a curb box attached thereto and extending to the earth's surface for surface access to said valve, said curb box consisting essentially of a standpipe and a base housing, (*i*) said standpipe being of essentially uniform outer and inner diameter throughout its length and being telescopingly adjustable with respect to said base housing by back and forth rotary movements of less than 360° with respect to said base housing, said standpipe further having a collar and removable cap at its uppermost end and at least one peripherally projecting lug at its lowermost end, said collar and removable cap being exposed on the earth's surface and said lug being within said base housing, and (*ii*) said base housing being of one-piece unitary cast metal having a lower chamber and an upper section, means at the lower terminus of said lower chamber securely attaching it to said buried valve body, an interiorly directed longitudinally extending rib in said lower chamber against which said peripherally projecting lug of said standpipe abuts to prevent rotation of said standpipe beyond 360° without obstructing said back and forth rotary movements of less than 360° with respect to said base housing, and means at the upper terminus of said lower chamber cooperative with said peripherally projecting lug at the lower terminus of said standpipe to maintain the lower terminus of said standpipe in said lower chamber, said upper section being characterized by having a chamber separating two standpipe alignment means spaced apart a distance at least as great as about two times the outer diameter of said standpipe, one at the upper and the other at the lower terminus of said upper section, one of said alignment means consisting essentially of an interiorly directed annular rib having an annular keeper ring in said recess, said annular rib being of just sufficient inner diameter to allow free longitudinal movement of said standpipe therewithin, and the combination of said keeper ring recess and keeper ring and said standpipe being such as to act cooperatively together to maintain said keeper ring in its recess and snugly against the outer diameter of said standpipe, whereby said standpipe is held against longitudinal shifting with respect to said base housing but longitudinally shiftable by said rotary back and forth movements of less than 360°, the other of said alignment means having no keeper ring and being just sufficient in size to accommodate the outer diameter of said standpipe without constriction or binding, whereby said standpipe is held in essentially straight alignment with said base housing and remains essentially free of drift even after repeated shifting of the earth surrounding said curb box.

2. The curb box valve installation of claim 1 wherein said alignment means with said keeper ring is at the upper terminus of said upper section of said base housing.

3. The curb box valve installation of claim 1 wherein said alignment means with said keeper ring is at the lower terminus of said upper section of said base housing.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,537,471 November 3, 1970

Robert R. Houle

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 6, after "keeper ring" insert -- recess intermediate the edges thereof and a keeper ring --.

Signed and sealed this 30th day of March 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR
Commissioner of Patents