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PLUMBER'S TEST PLUG

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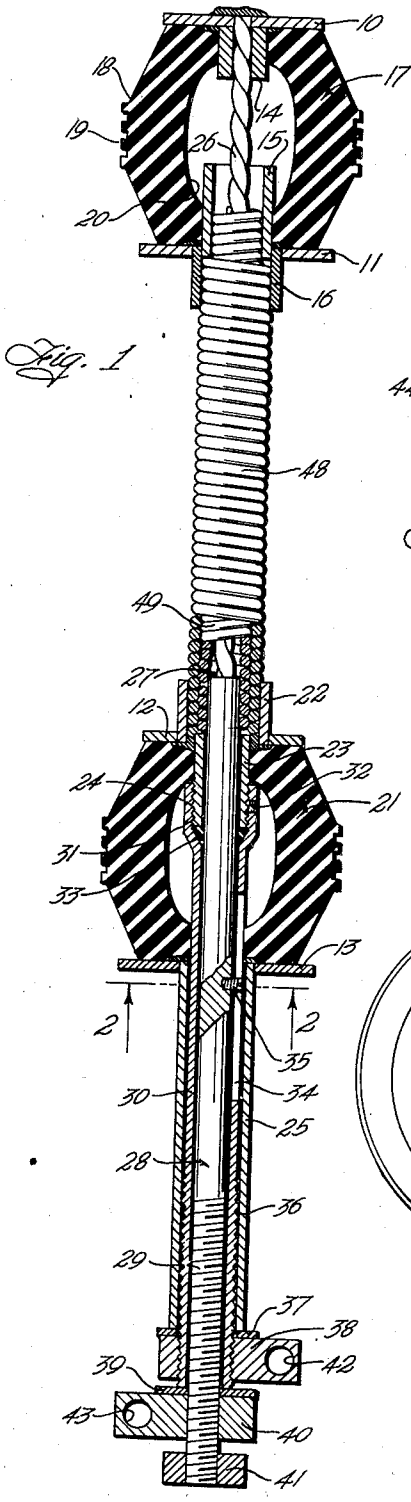


Fig. 1

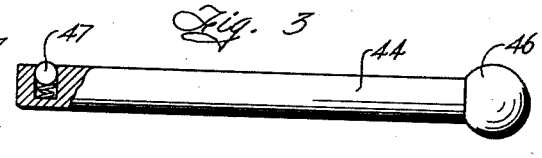


Fig. 3

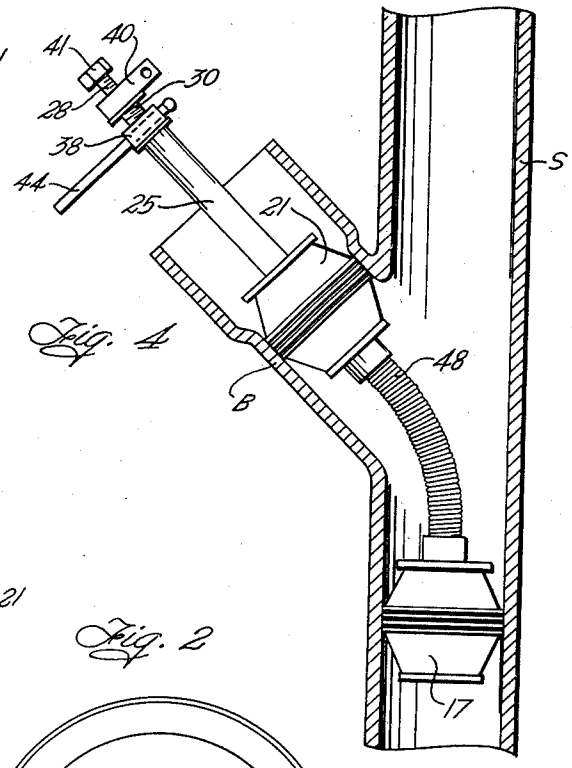


Fig. 4

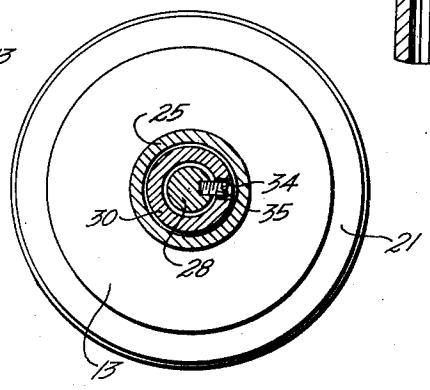


Fig. 2

Inventors
LEON H. THOMAS
PAUL S. ROBINSON
By Hazard and Miller
Attorneys

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PLUMBER'S TEST PLUG

Leon H. Thomas and Paul S. Robinson, Los Angeles, Calif.; said Thomas assignor to said Robinson

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1 Claim. (Cl. 138—90)

This invention relates to improvements in plumbers' test plugs.

In various forms of plumbing installations particularly with respect to soil lines or drains, it is desirable to subject the soil line or drain to a water pressure test following completion of the installation to determine the presence or absence of leaks. To this end, it is desirable to insert into the soil line or drain an expansible plug that will form a closure therein so that the soil line or drain may be filled thereabove with water to determine the presence or absence of leaks.

If the soil line or drain is branched, that is if it is equipped with a Y, T, or similar construction, it is desirable to be able to plug both the main soil line of the drain and also the branch so that the water used for testing purposes may be confined in the soil line above the plug thereabove the branch.

It is an object of the present invention to provide an improved plumbers' test plug having a novel construction of rubber ball capable of being compressed and thus expanded into engagement with the interior of a soil line or its branch to effect a perfect seal therewith and thus form a closure capable of supporting a column of water thereabove.

Another object of the invention is to provide a plumbers' test plug having a pair of expansible balls, each of which may be expanded independently of the other from the same end of the device with the connection between the balls flexible so that the plumbers' test plug may be inserted through a branch and one ball expanded into engagement with the soil line or drain and the other ball expanded into engagement with the branch.

With the flexible connection between the balls it is possible to use the improved plumbers' test plug under a variety of different conditions.

Another object of the invention is to provide an improved plumbers' test plug which is of relatively simple but sturdy construction and which is of such design as to be capable of being quickly and efficiently operated to effect desired seals or closures.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claim, reference is had to the accompanying drawing for an illustrative embodiment of the invention wherein:

Figure 1 is a vertical section through the improved plumbers' test plug;

Fig. 2 is a horizontal section taken upon the line 2—2 upon Fig. 1;

Fig. 3 is a view of the handle employed for operating the test plug, parts being broken away and shown in vertical section; and

Fig. 4 is a vertical section through a soil line and a branch thereof illustrating one manner of use of the improved test plug.

Referring to the accompanying drawing, wherein similar reference characters designate similar parts throughout, the improved test plug comprises two pairs of flanges. The flanges of the forward pair are indicated at 10 and 11, respectively. The flanges of the rear pair are indicated at 12 and 13, respectively. The forward flange 10 is equipped with a rearwardly extending hub 14 which is brazed, welded, or otherwise secured thereto. The rear flange 11 of the forward pair is equipped with a forwardly extending hub 15 and a rearwardly extending hub 16, the latter being brazed, welded, or otherwise secured thereto.

Between these two flanges there is disposed a forward ball 17 formed of a compressible material. While the material may vary, the preferred material employed is a good grade of Para rubber. This ball presents a peripheral surface 18 which is annularly grooved forming a series of annular ribs 19. These ribs are designed to engage the interior of a soil line S and on the ball being expanded therein, the ribs will compress and conform to any irregular surface that may be encountered in the soil line.

The interior of the ball is enlarged as indicated at 20 so that the walls of the ball are of substantially uniform thickness. It will be noted that the diameter of flanges 10 and 11 is less than the diameter of the peripheral surface 18 so that the flanges normally do not engage the interior of the soil line.

In a similar manner, the rear pair of flanges 12 and 13 have a similar ball 21 disposed therebetween. The forward flange 12 has a forwardly extending hub 22 and a rearwardly extending hub 23 which is threaded as at 24. The rear flange 13 has an outer sleeve 25 welded or otherwise secured thereto which extends rearwardly.

A tension member extends through the entire test plug. This tension member is formed of a section of cable 26 having its forward end brazed or otherwise attached to the center of flange 10. The rear end of the cable is brazed or otherwise attached as at 27 to a pull rod 28 which is threaded as at 29. The pull rod 28 slidably extends through the hub 23. A sleeve 30 surrounds

the pull rod and has its forward end enlarged and internally threaded as at 31 for attachment to hub 23. It may be locked in position by means of a set screw 32, and in the preferred form of construction, a small packing ring 33 is disposed within the enlargement on the forward end of sleeve 30 at the rear end of hub 23 so as to prevent leakage between the hub 23 and the pull rod. Rearwardly of the packing ring 33 the sleeve 30 is provided with a longitudinally extending slot 34 and a stud or set screw 35 is driven into the pull rod through this slot. This forms a slidable but keyed connection between the pull rod and its surrounding sleeve. Sleeve 30 is disposed within the outer sleeve 25 and is externally threaded as at 36. It projects rearwardly a small distance beyond the end of sleeve 25 so as to be capable of receiving a washer 37 and a nut 38. In a similar manner, pull rod 28 extends rearwardly a small distance beyond the end of sleeve 30 so as to be capable of receiving a washer 39 and a nut 40. Nut 41, which is screwed onto the extreme end of the pull rod, is merely designed to keep the parts assembled and to keeps nuts 38 and 40 from becoming completely unscrewed and lost. Each nut has tangential apertures 42 and 43 formed therein for the reception of a handle 44. This handle is merely in the form of a bar preferably equipped with an integral ball 46 at one end and a spring-urged ball 47 at the other. The handle is receivable in either aperture 42 or 43. When the spring-urged ball 47 engages the wall of either aperture 42 or 43, it frictionally holds the handle in position in the nut to prevent its dropping out.

It will be noted that the cable 26 forms a flexible part of the tension member extending forwardly of flange 12. This cable is disposed within a flexible housing that connects the rear flange 11 of the forward pair of flanges with the forward flange 12 of the rear pair of flanges. In the preferred form of construction this housing is composed of an outer coil 48 of steel wire, the convolutions of which are closely wound together, and an inner coil 49 likewise formed of steel wire, the convolutions of which are closely wound.

In the preferred form of construction the two coils are oppositely wound or oppositely directed. The rear end of the outer coil telescopes within hub 22 and is firmly held therein by a close pressure fit or by brazing. In a similar manner, the forward end of the outer coil is telescoped within the hub 16 and is held in position therein. The inner coil abuts against hub 23 within the outer coil and may extend at its forward end into hub 15. In this manner it will be appreciated that the cable 26 cooperates with the housing formed by the two coils to form a highly flexible connection between the pairs of flanges positioned on opposite sides of the two balls.

When it is desired to test a soil line S having a branch B, the plug may be inserted through the branch so that the forward ball is positioned in the main portion of the soil line and the rear ball disposed within the branch B. The flexible cable 26, together with the flexible housing permits the plumber's test plug to assume the position shown in Fig. 4 or any analogous position that circumstances may require. When in this position the handle 44 may be inserted in aperture 43 in nut 40 and on rotation of the nut the draw bar or pull rod 28 can be drawn rearwardly imposing a tension on the cable and thus drawing flange 10 rearwardly. The reactionary force is transmitted through washer 39 to sleeve 30 which, in turn, transmits it to flange 12 through the flexible housing to flange 11. In this manner, on rotation of nut 40, flanges 10 and 11 are drawn together squeezing the ball 17 outwardly into firm engagement with the interior of the soil line. Thereafter, the handle may be removed and inserted in aperture 42 to rotate nut 38. This rotation causes the outer sleeve 25 to be forced forwardly, thus forcing flange 13 toward flange 12 and compressing the rear ball squeezing it into engagement with the interior of branch B. With the soil line and the branch thus both being plugged and effectively closed, water may be poured into the soil line to test for leaks above the branch. When the test is completed, reverse rotation of the nuts 38 and 40 permits separation of the flanges and the contraction of the balls so that they can be removed from the soil line and branch respectively.

Obviously, the situations wherein it may be desired to perform tests are numerous. In some instances merely one ball may be inserted into a soil line and individually expanded. In other instances, occasion may require the insertion of the plumber's test plug through a T or through an elbow. Due to the flexible connection between the pairs of flanges, the plumber's test plug may accommodate itself to any of these required conditions.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claim.

We claim:

A plumber's test plug comprising two pair of opposed flanges, deformable balls arranged between the flanges adapted to be compressed thereby into sealing engagement with the interior of a conduit, a flexible housing connecting the adjacent flanges of each pair, a flexible tension member extending through the housing and connected to the forward flange of the forward pair, a first sleeve connected to the forward flange of the rear pair and extending rearwardly therefrom, a pull rod slidably keyed in the first sleeve and connected to the flexible tension member, a second sleeve surrounding the first sleeve for forcing the rear flange of the rear pair forwardly, and nuts threaded onto the pull rod and first sleeve respectively adapted to be tightened against the first sleeve and second sleeve respectively for deforming the balls.

LEON H. THOMAS.
PAUL S. ROBINSON.