Test Plug for Fluid Systems

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3 Claims. (Cl. 138—90)

This invention relates to test apparatus associated with pipe systems, in particular to a plug for sealing off an open end of an incomplete pipe line, as in a sewer system. In connection with such operations, it becomes necessary, from time to time, to seal off the casing temporarily, to test for leaks in the system. The nature of this work requires a closure means which is rapid and certain in operation, with corresponding facility of operation, and it is a principal object of the present invention to attain these ends in a more satisfactory manner than heretofore known. Cost of equipment is also an important factor, and it is therefore a further object to provide a closure plug which is low in cost, easy of manufacture, and adapted for repeated use. A still further object is to provide a closure plug which avoids the need for mechanical mounting means and special tools, yet is operable through readily available equipment. Yet another object is to provide a pneumatic plug which is operable under relatively low pressure.

These and other ends, which will be readily apparent, are attained by the present invention, a preferred form of which is described in the following specification, as illustrated in the drawings, in which:

FIGURE 1 is a perspective view of the plug, mounted in an end opening of a sewer pipe line,

FIGURE 2 is an axial, sectional view, enlarged, taken on the plane of the line 2—2 in FIGURE 1,

FIGURE 3 is an elevation view of the plug, apart from the well casing, uninflated, and broken away, in part,

and

FIGURE 4 is a transverse sectional view through the uninflated plug, taken on the plane of the line 4—4 in FIGURE 5.

Referring to the drawing by characters of reference, there is shown, in FIGURES 1 and 2, a sewer pipe 10, laid in a trench 11, the ground level being indicated at 12. The pipe 10 is belayed at one end, and it receives a vertical pipe section 13.

The end opening of the pipe 10 is sealed off by a pneumatically operable plug, indicated as a whole by the numeral 14, and comprising four parts, namely, a head 16, a bag 18, a clamp 20, and a valve nipple 22. The bag 18, preferably formed from an oil-resistant synthetic rubber, is of cylindrical, tubular form, of substantial wall thickness, and having an open top end, and a closed, rounded, bottom 24. The open upper end of bag 18 is received on a reduced neck 26 of the cylindrical head 16, and is securely clamped in place thereon by means of the metal clamp strap 28, which carries a clip 30 on one end, adapted to be clipped over the other end of the band, after the band has been drawn sufficiently to compress the wall of the bag inwardly, to render the connection pressure-proof.

The head 16 has a through, axial bore 32, for passage of air under pressure into the bag, and the bore is threaded at its upper end, to receive the conventional valve nipple, 22, having a valve core 34, similar to the fittings on pneumatic tires and tubes.

In use, the bag is held in the opening of pipe 10, and the end fixture 36 of an air line 38 placed over the nipple 22, which results in pressurizing of bag 18, and its close and firm engagement with the inner wall of the pipe, even with pressures as low as 3 to 5 p.s.i., resulting not only in an effective seal against fluid pressure in the casing, but also in a frictional engagement over a large area, which resists movement of the bag out of the casing.

With the closure plug in place, the system is tested for leaks by introducing water into the pipe, as shown in FIGURE 1, wherein the water level is indicated at 38, the available test pressure depending upon the head of water, and therefore on the height of vertical pipe section 13. Removal of the closure plug, when such is desired, is easily effected by pressing on the valve core stem, as in the case of deflating a tire, after which the limp bag is easily lifted out of the pipe. The device will fit a variety of pipe bores, and since there are no interengaging parts, wear and breakage are reduced to a minimum, and the device is adapted for repeated use, over a long period.

In lieu of pneumatic pressure, hydraulic pressure may be employed, using a suitable form of valve for the purpose.

While the device has been illustrated as a test apparatus for a sewer pipe system it obviously has utility in other environments, as for instance in sealing off oil well casings.

While a certain, preferred embodiment has been shown, various modifications will be apparent, in the light of this disclosure, and the invention should not, therefore, be deemed as limited, except asofar as shall appear from the spirit and scope of the appended claims.

I claim:

1. A closure plug for the pressure testing of fluid systems, comprising a cylindrical plug with a reduced neck on one end, and having an axial bore, a nipple with a pneumatic valve threaded in said bore on the end of the head opposite said neck, a tubular bag made of rubbery material, of uniform diameter, and having a rounded, closed bottom, and an open end having said uniform diameter received on said neck, a metal strap surrounding said bag in the region of said neck, and means securing said strap in ring form in compressing relation to said bag.

2. A closure plug for the pressure testing of fluid systems, comprising a cylindrical plug with a reduced neck on one end, and having an axial bore, a nipple with a pneumatic valve threaded in said bore on the end of the head opposite said neck, a tubular bag made of rubbery material of substantially uniform diameter, and having a rounded, closed bottom, and an open end having said uniform diameter received on said neck, a metal strap surrounding said bag in the region of said neck, and means securing said bag to said neck in fluid sealing relationship.

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