

[54] **EXPANSIBLE PLUGS FOR SEWER PIPES**
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 [58] Field of Search 138/90, 93, 97; 166/187

3,431,945 3/1969 Robillard 138/90
FOREIGN PATENTS OR APPLICATIONS
 16,437 7/1896 Great Britain 138/93
 14,942 6/1896 Great Britain 138/93

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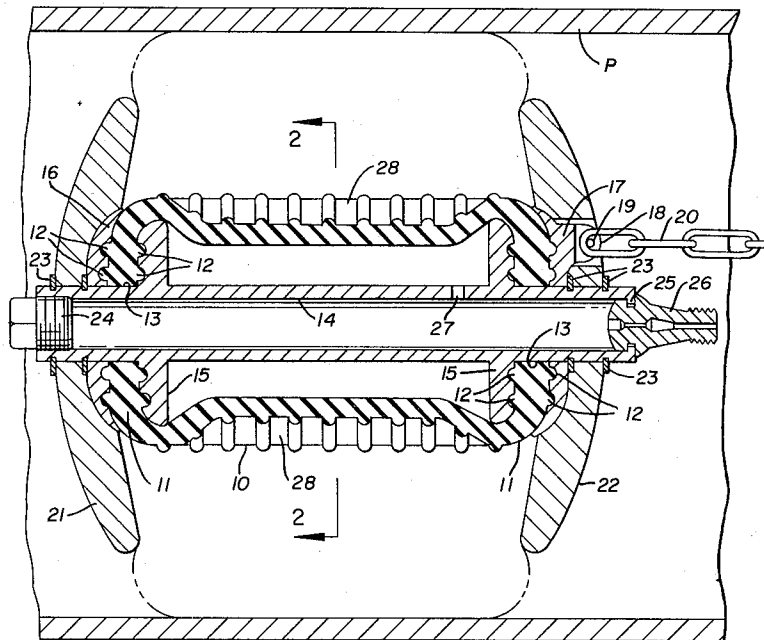
[57] **ABSTRACT**

An expansible plug for a sewer pipe includes a cylindrical expansible member, the ends of which are secured between discs which are arranged to permit the introduction of air or gas into and through the expansible plugs to hold the same in position and create pressure therebeyond.

4 Claims, 4 Drawing Figures

[56] **References Cited**

UNITED STATES PATENTS			
1,506,418	8/1924	Evenst et al.	138/93
2,231,282	2/1941	Norris	166/187
2,773,554	12/1956	Lindorf	138/90



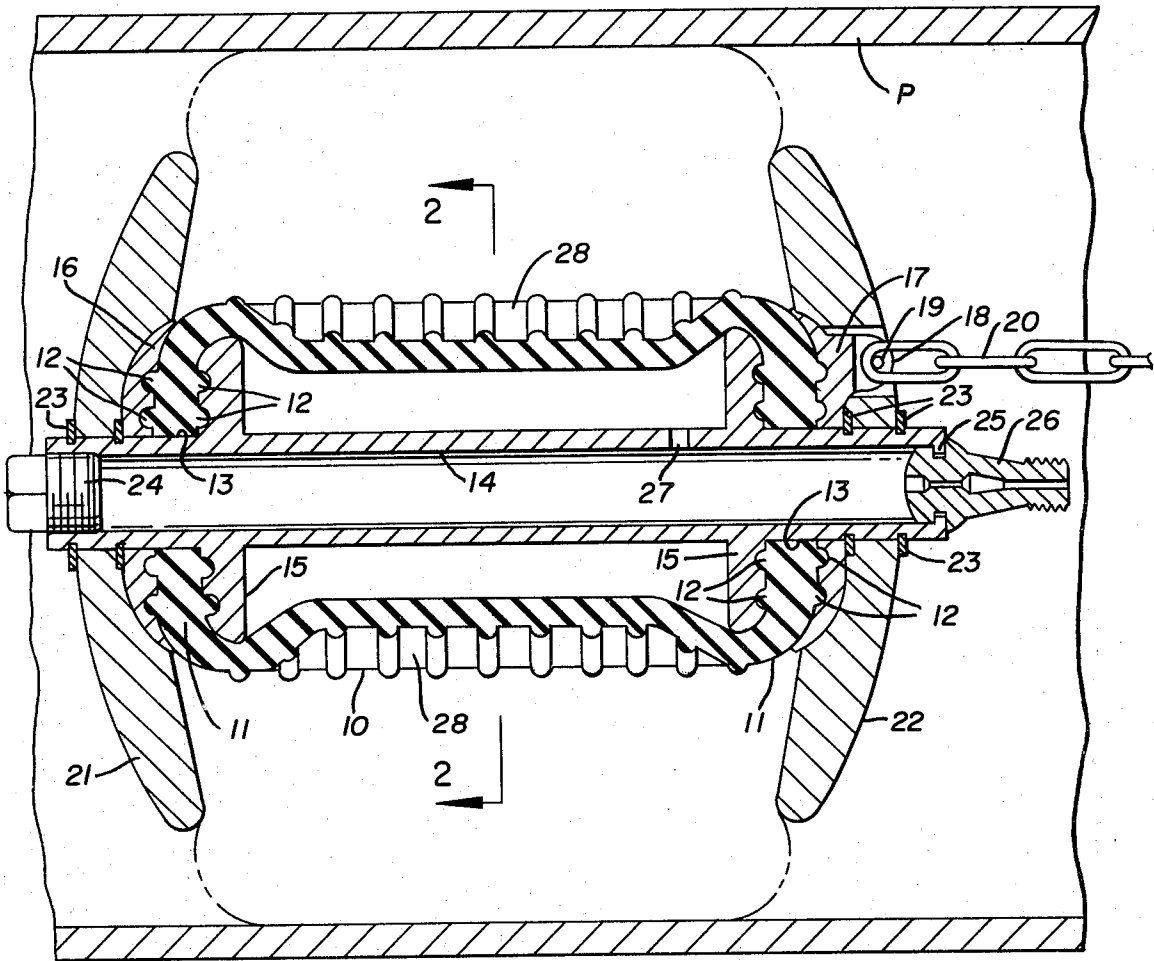


FIG. 1

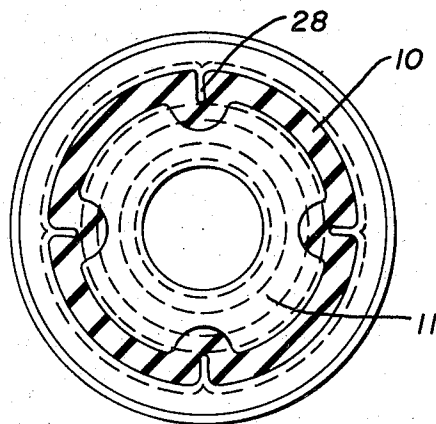


FIG. 2

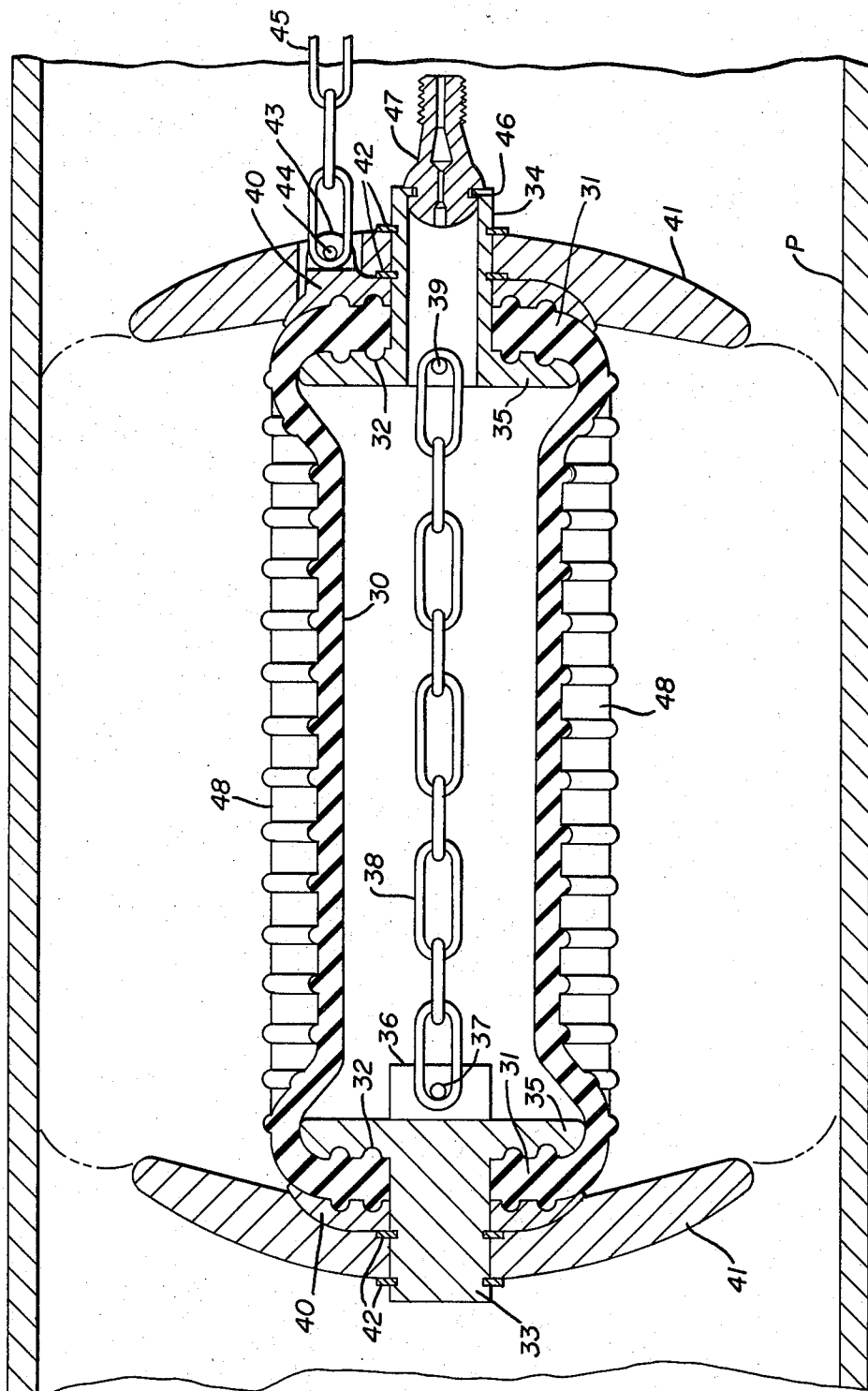


FIG. 3

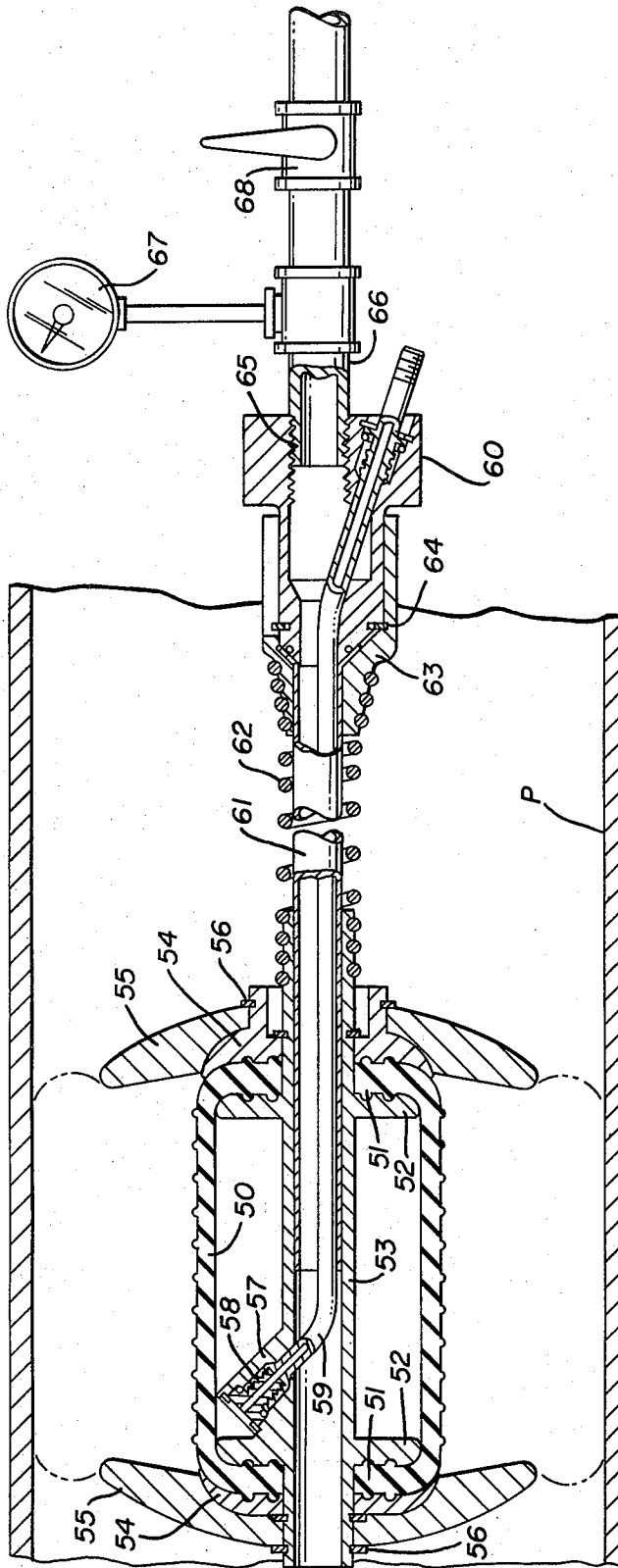


FIG. 4

EXPANSIBLE PLUGS FOR SEWER PIPES**BACKGROUND OF THE INVENTION****1. Field of the Invention**

This invention relates to expansible plugs for sewer pipes of the type normally employed to temporarily block a pipe to permit testing in a section thereof or to introduce air or gas pressure therein for clearing a stoppage therein.

2. Description of the Prior Art

Prior structures of this type have included expansible members and means for introducing air or gas pressure therein. See for example U.S. Pat. Nos. 1,506,418, 2,299,116, 3,034,522, and 3,431,945.

This invention eliminates some of the problems of the prior art structures and provides an expansible plug wherein the expansible portion is protected by the mounting discs which also provide for the ready placement and retrieval of the plug from the sewer line.

SUMMARY OF THE INVENTION

Expansible plugs for sewer pipes are disclosed, one of which is a relatively small size and having a rigid tubular core with enlarged end discs while the other is relatively larger and has a flexible connection between the relatively large end discs thereon. The expansible members are cylindrical with thickened closed ends which are apertured and provided with annular ribs so that they will be retained between the end discs and thus secured against accidental blowout. Means is provided for introducing air into the expansible members for inflating the same into engagement with a sewer pipe and means is provided for introducing air through the expansible plugs for creating air or gas pressure in the pipe beyond the plug so as to blow an obstruction therefrom.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation with parts broken away and parts in cross section illustrating the expansible plug of the invention.

FIG. 2 is a vertical section on line 2—2 of FIG. 1.

FIG. 3 is a side elevation with parts broken away and parts in cross section illustrating a modified form of the expansible plug wherein the same is longitudinally flexible.

FIG. 4 is an enlarged cross sectional side elevation showing a modification of the expansible plug of FIG. 1 to include means for inflating the same and means for directing air or gas pressure through the same and into the pipe beyond the plug.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIGS. 1 and 2 of the drawings, the expansible plug for sewer pipes consists of a cylindrical expansible member 10 having thickened end sections 11, the inner and outer surfaces of which are provided with a plurality of annular ribs 12 positioned around apertures 13 through which a tubular core 14 is positioned. Flanges 15 are formed inwardly of the ends of the tubular core 14 and have annular grooves therein in which the annular ribs 12 on the thickened end sections 11 of the cylindrical expansible member 10 may be received. A pair of apertured discs 16 and 17 are positioned over the extending ends of the tubular core 14 and into engagement with the thickened end sections 11 of the cy-

lindrical expansible member 10. Each of the apertured discs 16 and 17 have annular grooves on their inner surfaces for registry with the annular ribs 12 on the thickened end sections 11.

The apertured disc 17 has a bifurcated lug 18 thereon with a transverse pin 19 therethrough so that a chain 20 can be attached thereto.

A pair of end discs 21 and 22 are centrally apertured and positioned over the extending end portions of the tubular core 14 and into close fitting engagement with the apertured discs 16 and 17 heretofore referred to. Both the apertured discs 16 and 17 and the end discs 21 and 22 are held in position as shown in FIG. 1 of the drawings by C clips 23 engaging grooves on the exterior surface of the tubular core 14. One end of the tubular core 14 is provided with an internal thread pattern so as to receive a plug 24 and the other end has an inturnd flange 25 so as to receive and retain a resilient valve stem 26. An opening 27 is formed in the tubular core 14 between the flanges 15 thereof so that air pressure introduced into the tubular core 14 through the valve stem 26 will flow through the opening 27 into the cylindrical expansible member 10 so as to inflate the same to the position shown in broken lines in FIG. 1 of the drawings where it will move into sealing engagement with the inner walls of the sewer pipe P.

Referring now to FIGS. 1 and 2 of the drawings, it will be seen that the cylindrical expansible member 10 has longitudinally extending folded sections 28 therein positioned circumferentially thereof which enables the cylindrical expansible member 10 to expand from the size and shape shown in FIGS. 1 and 2 of the drawings to that shown by the broken line outline in FIG. 1 of the drawings.

It will occur to those skilled in the art that under some conditions it will be desirable to use a longer expansible plug than that hereinbefore described and such a plug may be seen in FIG. 3 of the drawings wherein an elongated expansible member 30 is provided with thickened end sections 31 having annular ribs 32 on their inner and outer surfaces and positioned between a pair of mounting members 33 and 34 respectively. Both the mounting members 33 and 34 have annular flanges 35 on their inner ends, each of which are provided with annular grooves in which the annular ribs 32 hereinbefore referred to will register. The mounting member 33 has a bifurcated boss 36 with a transverse pin 37 on its inner end, a chain 38 being affixed to the pin 37. The mounting member 34 is tubular and has a transverse pin 39 thereacross to which the chain 38 is also affixed. The length of the chain 38 is comparable with the inner length of the cylindrical expansible member 30. A pair of apertured discs 40 are positioned over the mounting members 33 and 34 and into engagement against the thickened inturnd ends 31 of the cylindrical expansible member 30. The apertured discs 40 are provided with annular grooves which register with the annular ribs 12 heretofore referred to. A pair of end discs 41 are apertured and positioned over the mounting members 33 and 34 and held in position against the apertured discs 40 by C clips 42. One of the apertured discs 42 is provided with a bifurcated boss 43 which has a transverse pin 44 to which a section of chain 45 is affixed so that the device when assembled can be positioned in a sewer pipe P and retrieved by pulling the same outwardly by the chain 45.

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The mounting member 34 has an inturned flange 46 on its outer end to receive and retain a valve stem 47 which will permit air or gas to be introduced into the device and specifically the cylindrical expansible member 30 so that it can be inflated thereby to the position shown in broken lines in FIG. 3 of the drawings. The cylindrical expansible member 30 is provided with longitudinally extending folds 48 which in cross section appear the same as the folds 28 in FIG. 2 of the drawings.

By referring now to FIG. 4 of the drawings, a side elevation with parts broken away and parts in cross section may be seen to illustrate the device of the invention and more specifically the device of FIG. 1 modified to provide for directing air or gas under pressure therethrough and at the same time provide for inflating the device so as to sealingly engage a pipe P in which the device may be positioned.

By referring to FIG. 4 of the drawings it will be seen that the device consists of an expansible member 50 having thickened ends 51 which are inturned and sealingly held between annular flanges 52 formed on a tubular core 53 inwardly of the ends thereof. Apertured discs 54 and end discs 55 which are held in place by C clips 56 secure the inturned ends 51 of the expansible member 50 in the assembly. The tubular core 53 is provided with an apertured extension 57 in which an end 58 of a tube 59 is secured, the tube 59 extending axially of the tubular core 53 and communicating through the apertured extension 57 with the expansible member 50. The other end of the tube 59 communicates with an apertured fitting 60 remotely positioned with respect to the expansible member of the invention and connected therewith by the tube 59 and a flexible tube 61 which extends from a position within the tubular core 53 to a position within the fitting 60. A flexible coil spring 62 is positioned about the tube 61 in the area between the device of the invention and the fitting 60 which as will occur to those skilled in the art may be located exteriorly of the sewer pipe P in which the expansible device of the invention is positioned. The fitting 60 includes a tapered member 63 on which the spring 62 is directly engaged, the tapered member 63 being secured to the remainder of the fitting 60 by C clips 64. An axial opening 65 in the end of the fitting 60 permits an air or gas supply line 66 to be connected thereto which may include a gauge 67 and a control valve 68 as will occur to those skilled in the art.

Thus air or gas under pressure may be introduced through the line 66, the pipe 61 and the tubular core 53 of the expansible plug and directly into the sewer pipe on the other side of the expansible plug so that by building up air or gas pressure therein an obstruction in the sewer pipe may be blown out.

The cylindrical expansible member 50 is expanded by air or gas pressure introduced through the tubing 59 as will be understood by those skilled in the art.

Although but two embodiments of the present inven-

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tion have been illustrated and described it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention.

I claim:

1. An expansible plug consisting of a tubular core having spaced flanges inwardly of its ends, a cylindrical expansible member having thickened inturned ends positioned over said flanges so as to extend therebetween, annular ribs on said thickened inturned ends, apertured discs positioned on said tubular core beyond said flanges, annular grooves in said apertured discs and means for securing said apertured discs to said tubular core and in engagement with said thickened inturned ends of said expansible member with said ribs and grooves in registry, a plug in one end of said tubular core and a valve stem positioned in the other and whereby air introduced into said tubular core through said valve stem may communicate with said expansible member through an opening in said tubular core, secondary apertured discs on said tubular core on the opposite outer sides of said first mentioned apertured discs, the diameter of said secondary apertured discs being substantially larger than the diameter of said first mentioned apertured discs, and flexible means on one of said first mentioned apertured discs extending through an opening in one of said secondary apertured discs for retrieving said expansible plug from a sewer pipe.

2. The expansible plug of claim 1 and wherein the expansible member has a plurality of circumferentially spaced folds therein when in uninflated condition acting to expand the diameter of said expansible member during inflation.

3. The expansible plug of claim 1 and wherein the expansible member has a plurality of circumferentially spaced folds therein when in uninflated condition acting to expand the diameter of said expansible member during inflation and wherein a plurality of annular ribs are formed on the exterior of said expansible member.

4. An expansible plug consisting of a cylindrical expansible member having thickened inturned ends, a pair of flanged mounting members one of which is hollow, said thickened inturned ends of said expansible member positioned over said flanges of said mounting members so as to close the ends of said expansible member, fasteners on said mounting members and a flexible member of fixed length secured at its ends to said fasteners, a valve stem in said hollow mounting member whereby air may be introduced into said expansible member, two pairs of apertured discs positioned on said mounting members, one pair being of greater diameter than the other, and means securing said pairs of apertured discs in tensioned relation to said mounting members with the thickened inturned ends of said expansible member between said flanges of said mounting members and said apertured discs.

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