

- (21) Application No. 46152/76 (22) Filed 5 Nov 1976
 (31) Convention Application No. 7512410 (32) Filed 5 Nov 1975
 (33) Sweden (SE) in
 (44) Complete Specification Published 25 Jun 1980
 (51) INT. CL.³ F16L 21/00 9/09 // 21/02 59/00
 (52) Index at Acceptance F2P 1B2 1B5B 1B7
 F26 21A



(54) PIPE FOR THE TRANSPORTATION OF PRESSURIZED FLUIDS

(71) WE, ALFA-ROR AKTIEBOLAG, a Swedish joint stock Company residing in Krumkargatan 40, Box 17 067 Stockholm, Sweden, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to pipes for the transportation of a hot or a cold fluid under pressure comprising a concrete pipe part, which is at the inner surface covered with a layer of fluid sealing material. The invention is useful within various fields, but a pipe according to the invention was originally invented to alleviate the problem of transport water having an overpressure of up to 1,0 - 1,2 MPa (10-12 kg/cm²) and a temperature of 100°C or more. However cold fluid may also be transported by pipes according to the invention. For the transportation of pressurized hot water over long distances like in a distribution net for a remote heating work or similar steel pipes have usually been used. Such pipes are relatively expensive and in order to reduce the heat losses when transporting hot water through such pipes it has been necessary to provide a relatively extensive insulating for the pipes. From several view points concrete pipes should be preferable for the transportation of pressurized fluids and of high temperature, but when in contact with hot water soluble particles of the concrete are lost. It has therefore been proposed to form the concrete pipes with an inner covering of a sealing material. When manufacturing a previously proposed concrete pipe of this kind a sleeve of plastics material is provided, and at one end the said sleeve is formed a radially outwards and rearwards directed collar. In the space between the sleeve and said outer collar is then moulded a concrete material like cement-concrete to form the male end of the concrete pipe. Thereafter concrete is moulded round the plastics sleeve while leaving at least some part of the previ-

ously formed male end free from concrete. By forming the plastics sleeve so as to embrace the male part and widened at the opposite end there is a possibility of obtaining a good joint between the concrete and the plastics sleeve. 50

It is however rather time consuming to make the concrete pipes in two successive step and the separate moulding of material in the space between the plastics sleeve and its collar may cause problems. Further the concrete pipes are sensitive to irregular load and at such irregular loading which may occur depending on uneven bedding the male end portion can crack or break. 55

To alleviate these problems and in accordance with the present invention there is provided a pipe for the transportation of a hot or a cold fluid under pressure comprising a concrete pipe part which along the inner surface thereof is covered with a layer of a fluid sealing material, said pipe having a male end and a female end so that these ends may be joined in successive pipes when in use, characterised in that the male portion is formed with a projecting sleeve of a material having a greater tensile strength than that of concrete, which sleeve is connected to the concrete pipe part and projects axially for a limited distance therefrom and which at least along the inner surface thereof is covered by the layer of fluid sealing material. Preferably the pipe can be manufactured in one step like conventional concrete pipes. 60 65 70 75

Various embodiments of the invention will now be described, by way of example only, with reference to the accompanying illustrative drawings, in which 80

Figure 1 shows a pipe according to the invention partly in an axial cross section, and

Figures 2 and 3 show small parts on an enlarged scale of alternative embodiments of the pipe according to the invention. 85

Referring now to Figure 1 there is shown two pipes 1 and 2 according to the invention, each comprising a concrete pipe part 3 which 90

at the inner surface and at the ends thereof is covered with a layer of a sealing material 4 such as plastics, or rubber material.

The male portion 5 of the pipe 2 as shown is connected to the female portion or bell of the pipe 1. In this case is indicated how pipe 2 can happen to rest on a stone 6 whereas a cavity can be present under the pipe 1 which is loaded from above by the load P. Thereby the male portion 5 is subjected to a large load and to prevent the male portion from breaking this is formed as a sleeve 7 of a material having greater tensile strength than that of concrete.

The sleeve 7 projects with an annular ring part 8 axially outside the concrete pipe part 3, and by means of cross bars 9 the sleeve 7 is connected to the concrete pipe part 3. Preferably the bars are connected to the reinforcement means of the concrete pipe part 3 (not shown in Figure 1 for the clearness). The sleeve 7 can be made of any suitable material such as steel, aluminium, or reinforced plastics material. To provide a sealing of the concrete pipe part 3 against the transported pressurized and/or hot water the pipe at its inner surface is formed with a layer 4 of plastics, or rubber material which covers the female part 10 of the pipe and extends along the entire inner of the pipe and which outwards-rearwards follows the ring part 8 of the sleeve 7. In some cases it can be suitable to provide a layer, e.g. a slide layer between the sealing layer 4 and the concrete part 3 to permit some relative movement between the said two parts. To give the sealing sleeve 7, which is made of plastics or rubber, sufficient strength the sleeve 7 can be made reinforced.

Conventionally a sealing ring 11 of rubber or other suitable material is provided in the barrel and bell joint between the female portion of one pipe 1 and the male portion 5 of the adjacent pipe 2. The smooth outer surface of the male portion 5 and the inner surface of the female portion provide a very good sealing against leakage of the flowing fluid.

The embodiment of the invention shown in Figure 2 in its essential outline corresponds to the above described embodiment; the sealing sleeve 4 is at the male end formed with an outer collar embracing the projecting annular ring 8, and the said outer collar is formed with a groove in which the sealing ring 11 can be mounted.

In the embodiment according to Figure 3 the sleeve 7 is intended to be made of reinforced plastics, e.g. glass fibre reinforced polyester plastics, and the sealing sleeve 4 is glued or welded to the male sleeve 7. Therefore it is not necessary to pull the sealing layer 4 in the direction towards the round end of the ring 8 of the sleeve 7. To secure the sleeve 7 in a concrete pipe part 3 a number of bolts 15 are connected to the sleeve 7 and said bolts 15

are preferably also connected to the reinforcement 14 of the concrete pipe part 3. To prevent a penetration of material into the space between the two pipes 1 and 2 said space is preferably covered by a sealing ring 16 which bridges and seals the joint between the pipe ends.

As previously mentioned the sealing layer can be made of a plastics or rubber material, and for certain purposes it can also be considered suitable to provide said layer as a plastics-rubber laminate. Which one of the rubber or plastics layer that should face the concrete part 3 depends on the circumstances, but it can be assumed that for the transportation of water the most suitable embodiment is the one in which the rubber is faced radially inwards to contact the water.

WHAT WE CLAIM IS:—

1. A pipe for the transportation of a hot or cold fluid under pressure comprising a concrete pipe part, which along the inner surface thereof is covered with a layer of a fluid sealing material, said pipe having a male end and a female end so that these ends may be joined in successive pipes when in use, characterised in that the male portion is formed with a projecting sleeve of a material having a greater tensile strength than that of concrete, which sleeve is connected to the concrete pipe part and projects axially for a limited distance therefrom and which at least along the inner surface thereof is covered by the layer of fluid sealing material.

2. A pipe as claimed in Claim 1, characterised in that the sleeve of the male portion of the pipe is made of metal.

3. A pipe as claimed in Claim 1, characterised in that the sleeve of the male portion of the pipe is made of a plastics or reinforced plastics material.

4. A pipe as claimed in any one of Claims 1 to 3 characterised in that the sealing layer is made of a plastics or reinforced plastics material.

5. A pipe as claimed in any one of Claims 1 to 3, characterised in that the sealing layer is made of rubber.

6. A pipe as claimed in any one of Claims 1 to 3 characterised in that the sealing layer is made of a plastics-rubber laminate.

7. A pipe as claimed in any of the preceding claims, characterised in that the sealing layer also covers the outer surface of the axially projecting part of the sleeve at the male portion of the pipe.

8. A pipe substantially as herein described with reference to any one of the accompanying illustrative drawings.

URQUHART-DYKES & LORD

11th Floor,
140 Tottenham Court Road,
London W1P 0JN

COMPLETE SPECIFICATION

This drawing is a reproduction of
the Original on a reduced scale
Sheet 1



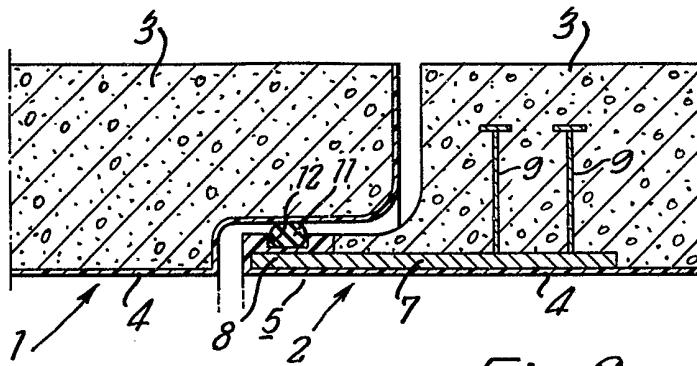


Fig. 2

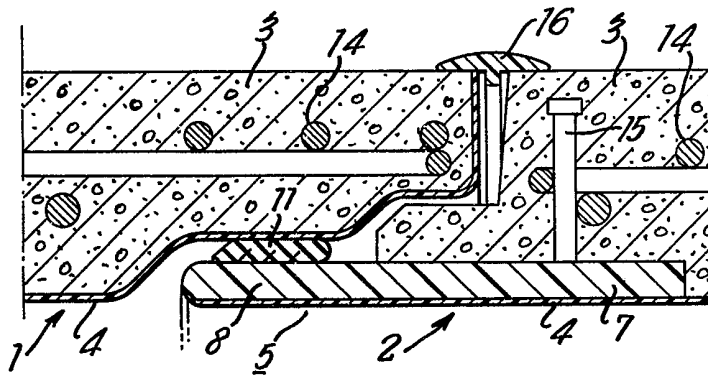


Fig. 3