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M. S. BURK
EXPANSION LOOP AND BEND FOR UNDERGROUND
HEATING PIPE SYSTEM
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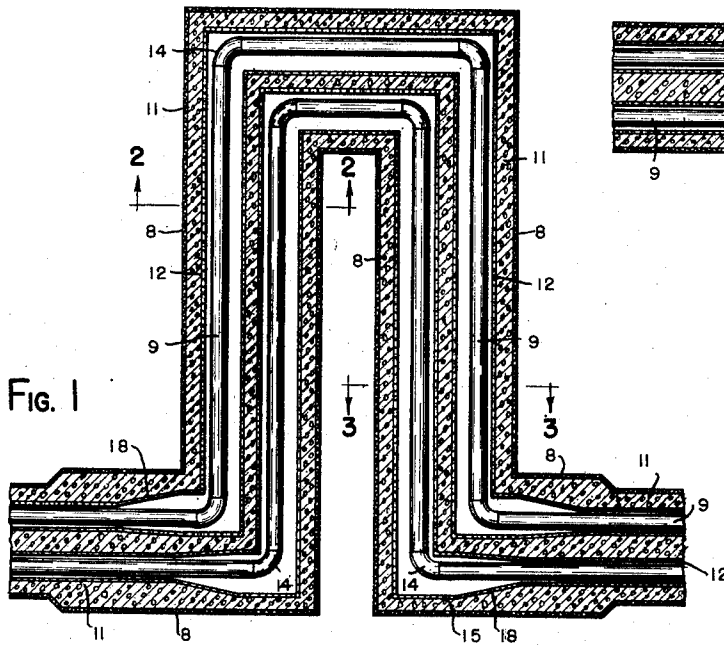


FIG. 1

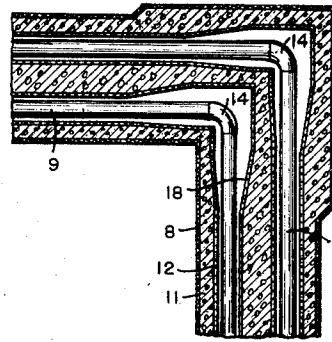


FIG. 6

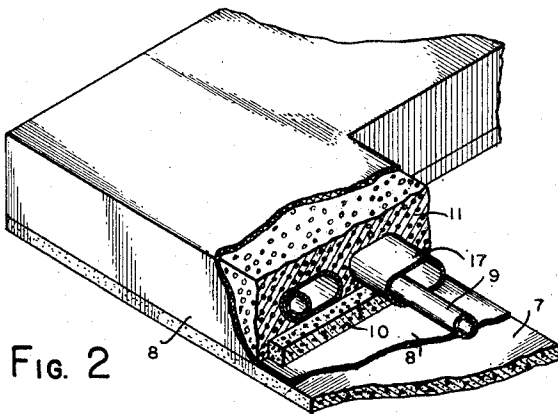


FIG. 2

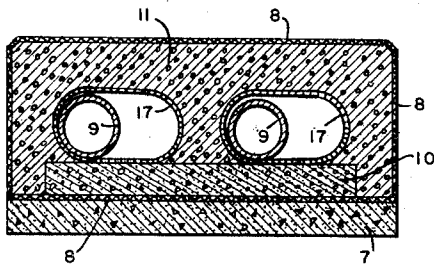


FIG. 3

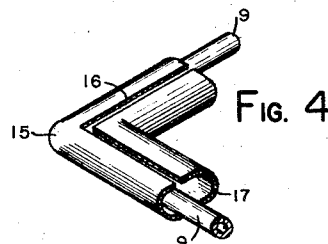


FIG. 4

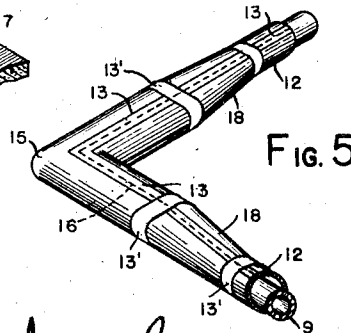


FIG. 5

M. S. Burk INVENTOR.

BY

A. Bishoff
ATTORNEY

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EXPANSION LOOP AND BEND FOR UNDER-GROUND HEATING PIPE SYSTEM

Morris S. Burk, Miami Beach, Fla.

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4 Claims. (Cl. 138—48)

The present invention relates to a method and means for constructing a loop or bend whereby room is provided for the proper expansion and contraction of pipes transmitting fluids or steam at high temperatures.

Heretofore it has been the practice to provide underground heating installations with a pocket or chamber, at intervals of about 300 feet, which chamber would contain U-shaped or elbow-shaped pipe sections of a size depending on the required expansion of the heating pipes and upon the distances between these chambers. Such chambers were constructed of concrete and required both waterproofing and insulating of the heating pipes within the chamber so as to permit free movement of the pipes within the chamber. This method required a chamber of considerable length, and hence the expense and the time consumed in constructing the chamber made each expansion joint many times more costly than the regular and typical length of insulated heating pipe.

Another method heretofore used was to wrap the pipe with glass wool or with some other compressible material and then encase the pipe and wrapping in insulating concrete of a lesser strength or density than the concrete used for typical pipe sections. Such method also has not proven very satisfactory for the following reasons: (1) The compressible material would get saturated with cement and water from the insulating concrete poured around it and would lose its compressibility. The expansion of the heating pipe was then resisted by the insulating concrete, and cracking or other damage to the insulation would result, thereby reducing the value of the insulation in these loops and bends. (2) Since the waterproofing is done on the inside of the concrete chamber, where heat from the pipes and steam formed from possible leaks can attack the asphaltic material normally used, there is usually more trouble with the loops than there is in standard sections of pipes where the waterproofing is outside the insulation. (3) The concrete exterior of the loops has to be built as a separate operation, thus consuming additional time resulting in a delay in laying the heating pipes. (4) The concrete type chamber is very expensive in comparison to the standard sections of conduit.

It is therefore an object of my invention to provide the necessary area for expansion of the heating pipes by the use of a paper tube of elliptical cross section which is properly positioned around the pipe and which is then surrounded with insulated concrete.

A further object of the invention is to provide proper room for changes in direction of heating pipes contained in insulating concrete so as to both prevent binding of the pipe in the concrete and to provide the necessary area for expansion and contraction of the pipe.

It is a further object of the invention to provide an easy and rapid means of installing expansion loops and bends in insulating concrete conduits.

Another object of my invention is to provide a split elbow-shaped fitting made of heavy paper or cardboard having an elliptical cross section, which fitting could be

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easily slipped over a bend in a heating pipe and then seal the split and the joints between sections of the tubes with tape or mastic to provide a waterproof expansion void in the insulation or insulating concrete for the heating pipe. These elbows can be pre-formed in one piece or put together in mitered sections, and can be of any length and size required.

It is also an object of my invention to employ the usual insulation or insulating concrete used in the regular section for the heating pipes for the construction of my novel loops and bends wherein I employ encasements of elliptical cross section in place of round paper encasement commonly used in this art. The balance of the materials and work is exactly the same for the expansion loops and bends as it is for the straight runs of heating pipe. Thus, no special forms nor concrete chamber constructions are needed. Also, the waterproofing continues in exactly the same manner for both the straight runs of conduit and for the loops and bends.

It is a further object of the invention to provide a positive and accurately positioned void in the insulating concrete conduit so as to obviate the necessity of building an expansion chamber, resulting in a saving in excavation and in the cost of concrete encasement; furthermore, changes in direction and length of the heating pipes, bends, and loops can be made to meet site conditions and overcome obstructions with little or no loss of time and with little additional expense.

With these and other objects and features in view, the invention consists in the method of making expansion joints for installation of underground conduits and in the construction and arrangement of the parts hereinafter more fully described. The novel features that are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, wherein like reference numerals indicate like parts throughout the several figures and in which:

Figure 1 is a central cross sectional view of the expansion loop constructed in accordance with my invention with the heating pipe shown in elevation.

Figure 2 is an isometric view of a portion of the loop taken on line 2—2 of Fig. 1.

Figure 3 is a cross section of a portion of the loop taken on line 3—3 of Fig. 1.

Figure 4 is an isometric view of a bend in a heating pipe installation showing the split elbow in position.

Figure 5 is an isometric view of a bend in a heating pipe installation showing the elliptical elbow in position and sealed with tape, and also showing conical transition tubes connecting the elliptically-sectioned elbow with typical round cardboard tubes, and

Figure 6 is a central cross-sectional view of a bend in the heating pipe installation with the pipe shown in elevation.

Referring now to the drawing in detail and more specifically to Figures 2 to 5 inclusive, 7 represents the structural concrete base slab on which all parts and elements of the heating system rest. A waterproofing media 8 is poured on the slab, which media later embraces or envelops all the elements of the loop structure. Heating pipes 9, 9 are positioned on insulating blocks 10 which rest on the base slab 7.

To prevent the pipes 9 from sticking to the insulating concrete 11, which is poured around them, it is customary to wrap each pipe with cardboard or heavy paper. I employ tubular members 12 which are split longitudinally

and hence are easily applied on the heating pipes. The splits are then sealed with tape or mastic 13.

To provide for the expansion and contraction of the heating pipes of the underground installation pipes, loops or bends 14 are used, as the case may be, at distances of about 300 feet apart. Each loop or bend 14 is provided with an elbow fitting 15 made of paper or cardboard. This fitting is split at 16 to provide for its easy positioning around the bend 14 of pipe 9, as clearly shown in Fig. 4. Elbow 15 is elliptical in cross-section as shown at 17 in Figs. 2, 3 and 4. This is done to provide a proper space for the expansion and contraction of the heating pipe 9 in two directions, shown at right angles to each other in Figs. 4 and 5. A conical transition split tube 18 connects one section of the elbow fitting 15 with the round tube 12, as shown in Figs. 1, 5, and 6. The joints between said sections are sealed with tape or mastic 13'.

After the pipes 9 are fully encased in the cardboard or paper tubular sections 12, 15, and 18, the insulation means or lightweight concrete 11 is placed or poured around the enclosed heating pipes. The waterproofing media 8 is then applied to cover or envelop the insulation to complete the section of the heating system.

The following result from my invention: (1) A better void to provide for expansion and contraction of the heating pipe is obtained; (2) a greater flexibility in the construction of the underground heating system is obtained, since changes in the length and direction of bends in the heating pipe can be easily, quickly, and inexpensively made in the field; (3) it is not necessary to use insulation of a different quality or type in the areas of loops and bends than that used in the rest of the installation; (4) the waterproofing method and final results are more satisfactory outside the conduit in my present system than the waterproofing done inside the expansion chamber in the existing systems; (5) the overall time of construction is greatly reduced by the use of my method; (6) it is easier to install the heating pipes in the bends and loops in my system and hence the quality of the work is better; and (7) the overall cost of installing heat lines is greatly reduced by my system.

Thus, by the simple and practical method described, any number of conduits and expansion joints may be efficaciously and economically laid. Moreover, complete, sure, and perfect expansion joints and waterproofing means are provided for enclosing the underground high-temperature, under pressure pipe distribution system.

Although a certain specific embodiment of the invention has been shown and described, it is obvious that many modifications thereof are possible. The invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

What I claim is:

1. In an underground heating system, a pipe for conducting fluid or steam under high temperature, a bend in said pipe, means to provide an expansion chamber for said pipe comprising tubular members surrounding the straight portions of said pipe, an elbow-shaped fitting surrounding the bend of said pipe and having an elliptical cross-section to provide space for the proper expansion of said pipe in two directions, and transition members connecting the ends of the fitting with the tubular members, and insulating media encasing said pipe and the means which provide the expansion chamber; said tubular members, elbow-shaped fitting, and transition members being of flexible heat insulating material of a strength to withstand the pressure of the insulating media placed or poured over said pipe and the means which provide the expansion chamber and being split longitudinally for easy application over the pipe and bend, and means for sealing the split of said members and fitting.

2. The device as set forth in claim 1, said members and fitting being of spirally-wound heavy paper.

3. Means for providing space for the expansion and contraction of a fluid carrying pipe in an underground heating system encased in heat insulating concrete, said pipe having straight portions joined by a bend or loop, tubular members closely embracing the straight portions of said heating pipe, an elbow-shaped fitting surrounding the bend of said pipe and being elliptical in cross-section to provide space for expansion of said pipe at the bend in two directions, and transition members connecting the ends of the fitting with the tubular members; said tubular members, elbow-shaped fitting, and transition members being of flexible heat insulating material of a strength to withstand the pressure of the concrete poured over said pipe encased in said flexible heat insulating material.

4. The means as set forth in claim 3, wherein the tubular members, elbow-shaped fitting, and transition members are provided with a longitudinal split for easy application over the pipe and bend, and means for sealing said split.

References Cited in the file of this patent

UNITED STATES PATENTS

340,073	Ainsworth	Apr. 20, 1886
727,786	Grace	May 12, 1903
891,855	Pearce	June 30, 1908
2,081,867	Gysling	May 25, 1937
2,355,966	Goff	Aug. 15, 1944

FOREIGN PATENTS

165,185	Germany	Nov. 29, 1905
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