Dec. 22, 1953 L. E. THOMAS 2,663,323

INSTALLATION OF UNDERGROUND TRANSMISSION PIPE

Filed Feb. 5, 1952

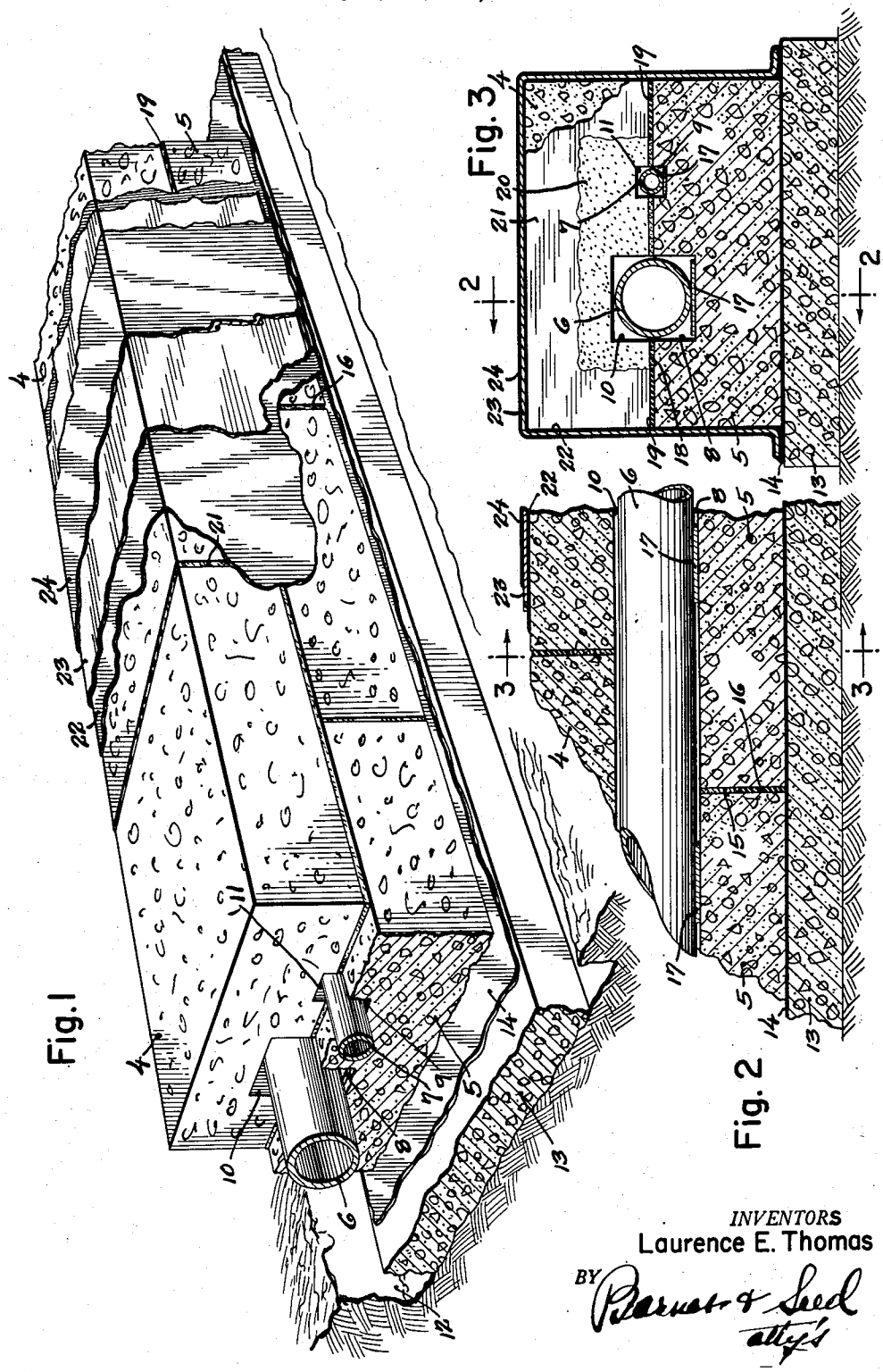


Fig. 1

Fig. 2

Fig. 3

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Patented Dec. 22, 1953 2,663,323

UNITED STATES PATENT OFFICE

2,663,323

INSTALLATION OF UNDERGROUND TRANSMISSION PIPE

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Application February 5, 1952, Serial No. 269,957

10 Claims. (Cl. 138—48)

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This invention relates to systems calling for underground transmission of fluids and such, for example, as a steam heating system where steam is piped underground from a central heating plant and liquid products of condensation returned to the boiler.

There has been considerable effort heretofore made toward developing a satisfactory method of installing underground transmission pipe, and possibly the best of these prior methods is illustrated and described in United States Patent No. 2,355,966, issued to David C. Goff August 15, 1944. This particular method is one in which a trench, within which the pipes are to be laid, is provided along its floor with a bedding strip of poured concrete. The pipes are spirally wrapped with tape and suspended within the trench so as to be spaced above the bedding strip, and a body of concrete is then poured into the trench so as to encase the wrapped pipes. As a final step both the concrete bedding strip and the surmounting body of concrete are waterproofed by mopping several plies of asphaltic felt over the exposed top and sides. One objection to an installation made in accordance with the Goff teachings is that the substantially unitary casting extending monolithically for quite extended distances, 200 and more feet, tends to develop cracks, and the surface coating of asphaltic felt then becomes the sole protection against penetration of moisture. A further objection is the close investing of the pipe by the poured concrete. A yet additional objection to the Goff system of installing underground piping is that weather conditions are an important factor, and this is to say that pouring of fresh concrete is necessarily prohibited either when the temperature is extremely high or at a freezing point.

The present invention aims to provide a perfected system of installing underground piping which will overcome each of the above objections. The invention consists in the new method of installing the underground pipe and in the product of said method.

In the accompanying drawing:

Figure 1 is a fragmentary perspective view portraying an installation of underground piping made in accordance with the preferred teachings of the present invention.

Fig. 2 is a fragmentary vertical sectional view taken on line 2—2 of Fig. 3; and

Fig. 3 is a transverse vertical sectional view on line 3—3 of Fig. 2.

The present invention essentially resides in

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the use of pre-cast upper and lower half-blocks. The lower said blocks, denoted by the numeral 5, serve as a base to support the pipe which is being laid, for example a steam-pipe 6 and a companion return-pipe 7, and for the reception of such pipe there is provided in the top face of the half-block a respective groove, as 8 and 9. These grooves extend longitudinally of the blocks, are somewhat wider, say 1", than the diameter of pipe for which they are intended, and in the preferred embodiment of the invention each groove has a depth approximating one-half of the width. Designated by 4, the upper said block functions as a capping complement of the base-block and there is formed in these upper or cap-blocks a registering counterpart of the grooves 8 and 9, denoted in this instance by 10 and 11. The number and location of the grooves will, of course, be determined by the job for which the blocks are intended, but it is recommended that there be at least a 4" waist section of concrete between adjacent grooves and that there be at least a 6" flank section of concrete isolating the grooves from the outer surfaces of the block.

In making an installation, and assuming that there has been provided a trench 12 therefor, there is first provided a bed 13 on which to lay the lower or base-blocks 5. While a concrete pour might be employed to produce the bed I prefer that the bed be constructed from fine gravel compacted between 2" x 4" side forms (not shown) and with enough coarse sand applied to the surface to fill the voids. After being levelled and rolled the bed is saturated with hot asphalt and in addition to this saturating asphalt there is provided a flood coat 14 of hot asphalt.

The base-blocks are now laid end-to-end upon the bed while the flood coat is still hot, and as each successive block is laid there is trowelled over its exposed end face, so as to extend out approximately 2" to 3" beyond the grooves, a layer of refractory cement 15 and beyond this layer of cement, to the bottom and side edge extremities of the block, there is applied a corresponding thickness of rubber-base mastic 16. While this cement and mastic are in a plastic condition the next block is pressed into place.

When all the base blocks have been set in place upon the bed, with their meeting faces bonded and sealed, asbestos cement slide pads 17 are placed upon the floor of the grooves. These slide pads, which are or may be about

6'' long and a ¼'' thick, are placed at separated intervals of, say 2'.

The pipe fitters are now called in to set the pipe in place and while not illustrated in the drawing it will be understood that at spaced intervals along the length of the installation there are provided relatively large pockets within which looped sections of pipe may be accommodated. These looped sections, joining straight sections of pipe, permit the latter to expand and contract with changing temperatures.

After the pipe has been tested and laid in the grooves the procedure is to duplicate, upon the upper faces of the base-blocks, the surface treatment given to the end faces, and this is to say that there is first applied a layer **18** of refractory cement over the waist strip and to the outside of the grooves, and then laterally beyond the refractory cement there is applied a coating **19** of rubberbase mastic approximately corresponding in thickness to the thickness of the refractory cement.

The operation is now in condition to receive the cap-blocks **4**, placing the same so as to stagger the joints relative to the joints of the base-blocks. Here again refractory cement and rubber-base mastic, designated in this instance by **20** and **21**, respectively, is used to bond the blocks and seal the vertical joints.

The final steps in the process are to give all exposed surfaces a heavy mop coating **22** of hot asphalt, whereupon a suitable protective membrane **23** such as 15# asphalt felt is applied, and this felt is itself covered with a finish mopping of hot asphalt **24**, both the asphalt moppings and the felt paper being turned outwardly from the side edge limits of the blocks so as to bond with the flood coat of asphalt applied to the bed and insure a completely water-proof jacket about the blocks.

The aggregate from which I cast my blocks is or may comprise expanded mica (vermiculite), pearlite, cork, pumice, cinders, sawdust, diatomaceous earth or other like or suitable lightweight material and used therewith is air-entrained cement and a water-proofing admix, such for example as the chemical composition available under the trade-mark "Oronite D–40." After the cast blocks are thoroughly dry they are additionally water-proofed by spraying the surface, and I preferably use for this purpose the product known to the trade as NS Clear Sealer.

The advantages of the invention will, it is thought, have been clearly understood from the foregoing detailed description of the illustrated preferred embodiment. Minor changes will suggest themselves and may be resorted to without departing from the spirit of the invention, wherefor it is my intention that no limitations be implied and that the hereto annexed claims be given a scope fully commensurate with the broadest interpretation to which the employed language admits.

What I claim is:

1. An underground pipe installation comprising a level bed surfaced with a coating of asphalt, a concrete body resting upon said bed and composed of two courses of concrete blocks bonded together and having the joints of the one course staggered relative to the joints of the other course, the meeting horizontal faces of said two courses of blocks being formed with registering grooves acting in complement to produce a longitudinally extending tunnel so spaced from all exposed surfaces of the double-coursed concrete body as to provide a major thickness of surrounding concrete on all sides of the tunnel, a fluid-carrying pipe received in said tunnel, and a waterproofing jacket completely covering the top and sides of said concrete body.

2. The pipe installation of claim 1 in which the bond between the blocks is comprised in part of refractory cement and in part of rubber-base mastic and with the mastic being toward the outside of the joints and separated from the grooves by the refractory cement.

3. The pipe installation of claim 1 in which the pipe rests upon cement asbestos slip plates placed at spaced intervals throughout the length of the tunnel.

4. An underground pipe installation comprising a level bed composed of compacted fine gravel and coarse sand saturated with asphalt, a concrete body resting upon said bed and composed of two courses of pre-cast concrete blocks bonded together and having the joints of the one course staggered relative to the joints of the other course, the meeting horizontal faces of said two courses of blocks being formed with registering grooves acting in complement to produce a longitudinally extending tunnel so spaced from all exposed surfaces of the double-coursed concrete body as to provide a major thickness of surrounding concrete on all sides of the tunnel, a fluid-carrying pipe received in said tunnel, and a waterproofing jacket completely covering the top and sides of said concrete body.

5. An underground pipe installation comprising a level bed surfaced with a coating of asphalt, a concrete body resting upon said bed and composed of two courses of concrete blocks bonded together and having the joints of the one course staggered relative to the joints of the other course, the meeting horizontal faces of said two courses of blocks being formed with registering grooves acting in complement to produce plural longitudinally extending tunnels and spaced one from another and from all exposed surfaces of the double-coursed concrete body as to provide a major thickness of surrounding concrete between and on all sides of the tunnels, fluid-carrying pipes received in said tunnels, and a waterproofing jacket completely covering the top and sides of said concrete body.

6. An underground pipe installation comprising a level bed surfaced with a flood coating of asphalt, a concrete body resting upon said bed and composed of two courses of concrete blocks bonded together and having the joints of the one course staggered relative to the joints of the other course, the meeting horizontal faces of said two courses of blocks being formed with registering grooves acting in complement to produce a longitudinally extending tunnel so spaced from all exposed surfaces of the double-coursed concrete body as to provide a major thickness of surrounding concrete on all sides of the tunnel, a fluid-carrying pipe received in said tunnel, and a waterproofing jacket completely covering the top and sides of said concrete body, said jacket comprising a fairly heavy weight of felt paper applied between two mop coats of asphalt.

7. An underground pipe installation comprising a level bed surfaced with a coating of asphalt, a concrete body resting upon said bed and composed of two courses of waterproofed concrete blocks with the joints of the one course staggered relative to the joints of the other course and having contained in the joints both bonding cement and sealing mastic, the meeting horizon-

tal faces of said two courses of blocks being formed with registering grooves acting in complement to produce a longitudinally extending tunnel so spaced from all exposed surfaces of the double-coursed concrete body as to provide a major thickness of surrounding concrete on all sides of the tunnel, a fluid-carrying pipe received in said tunnel, and a waterproofing jacket completely covering the top and sides of said concrete body.

8. An underground pipe installation comprising a level bed composed of fine gravel with coarse sand added to fill the surface voids and having the top saturated with a flood coating of asphalt, a concrete body resting upon said bed and composed of two courses of waterproofed light-weight concrete blocks with the joints of the one course staggered relative to the joints of the other course and having both bonding cement and sealing mastic contained in all joints, the meeting horizontal faces of said two courses of blocks being formed with registering grooves acting in complement to produce plural longitudinally extending transversely spaced tunnels, cement asbestos slip plates placed along the floors of said tunnels at spaced intervals of the length, a respective fluid-carrying pipe resting upon said slip plates in each of the tunnels, and a waterproofing jacket completely covering the top and sides of said concrete body.

9. A method of installing fluid-carrying pipe, said method employing light-weight waterproofed concrete blocks pre-cast in complementing pairs

with the two blocks in each pair providing longitudinally extending surface grooves disposed in matching correspondence, the method consisting in producing on compact earth and from fine gravel and coarse cement a supporting level bed, giving said bed a flood coat of hot asphalt and while such asphalt is still hot laying a lower course of the pre-cast blocks thereon with the grooved surface uppermost, the joints between said blocks being cemented, laying the pipe which is to be installed in the open grooves, laying and coincidently cementing an upper course of the pre-cast blocks upon the lower course so that the grooves of the one course register with the grooves of the other and with the joints staggered, and finally covering the top and sides of the double-coursed concrete body with a waterproofing jacket by applying felt paper between two mop coats of hot asphalt.

10. The method of claim 9 including the step of augmenting the joint cement, for purposes of sealing said joints, with rubber-base mastic and so applying the cement and sealer that the cement is at the inside and the sealer is at the outside of the joints.

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