June 5, 1934. W. A. KRANER 1,961,974

CONDUIT

Filed May 2, 1932

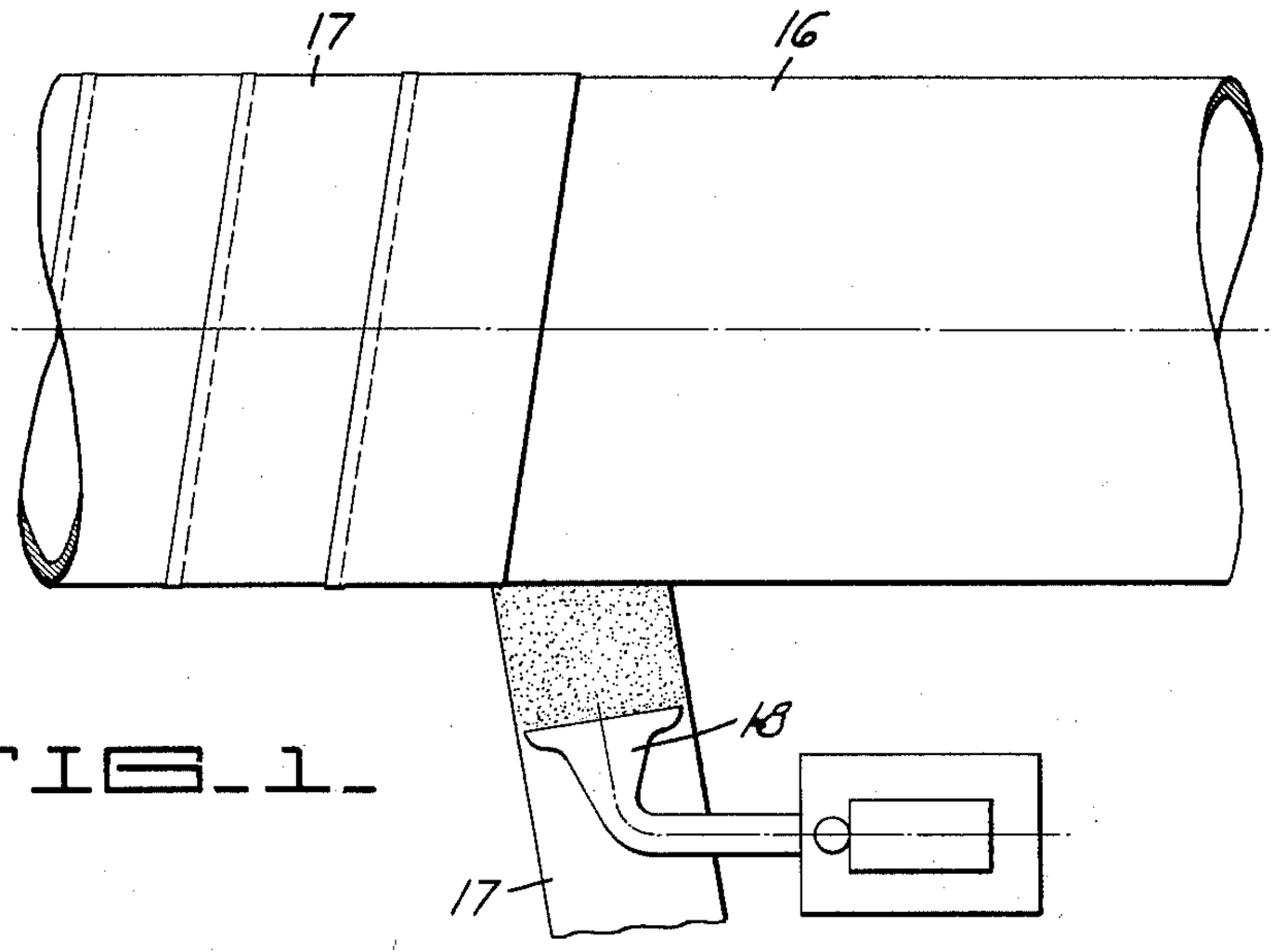

FIG_1_

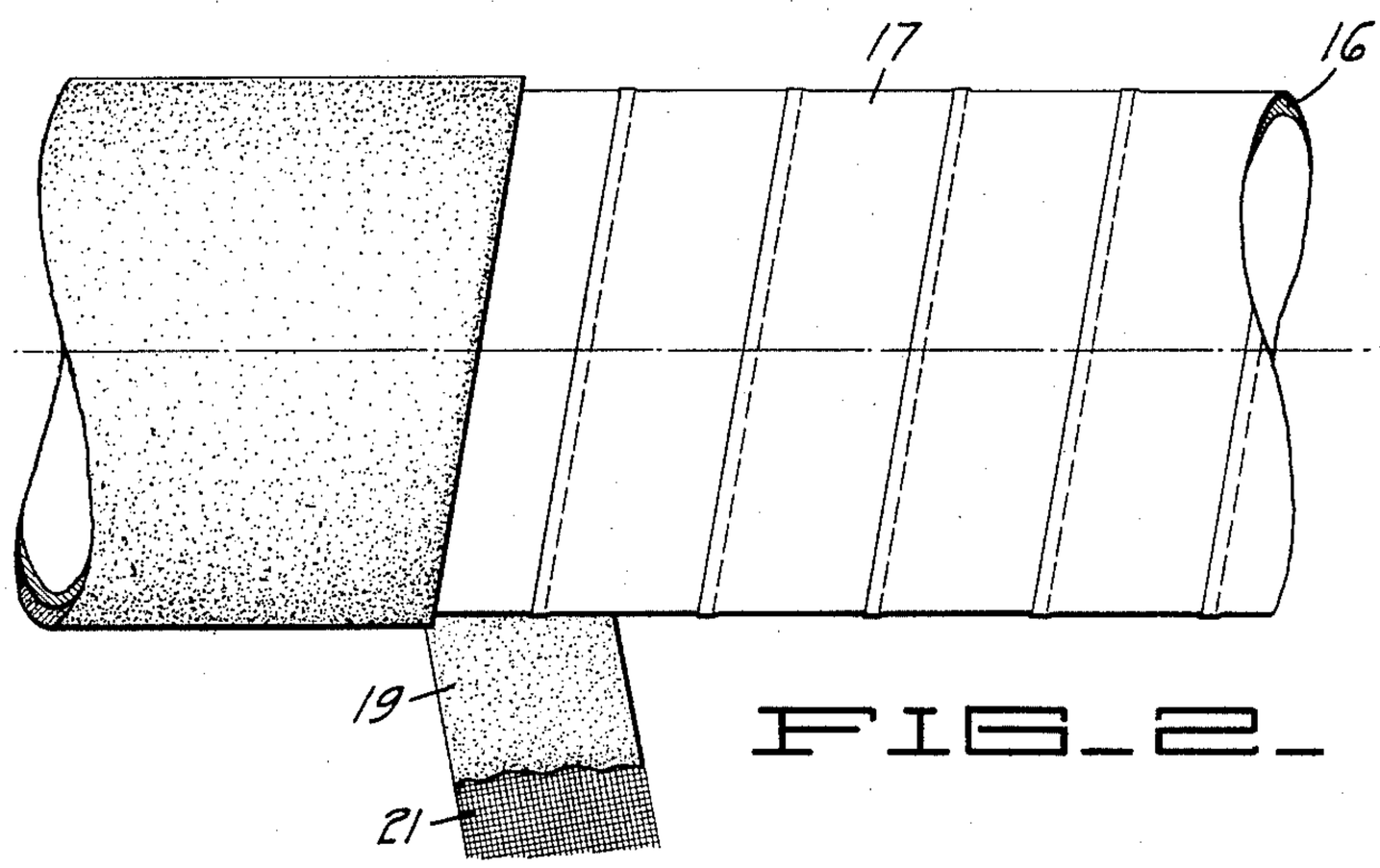

FIG_2_

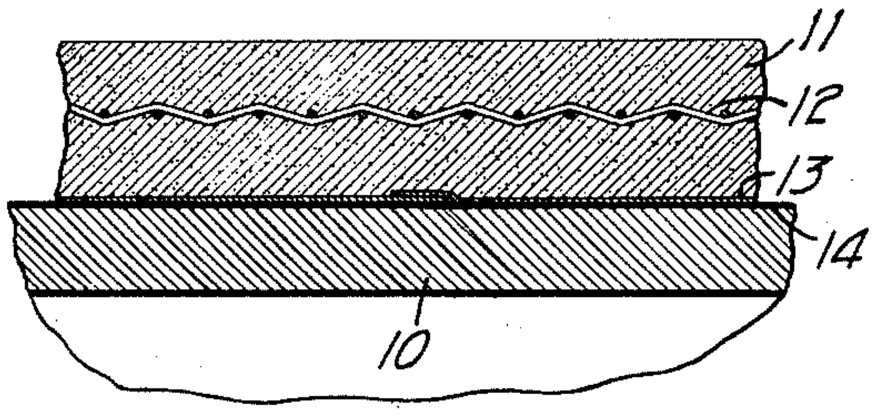

FIG_3_

INVENTOR.
WARREN A. KRANER
BY White, Prost, Flehr & Lothrop
ATTORNEYS.

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CONDUIT

Warren A. Kraner, San Francisco, Calif., assignor to Cement Wrapped Pipe Company, Ltd., San Francisco, Calif., a corporation of Arizona

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5 Claims. (Cl. 72—54)

This invention relates generally to conduits or piping, such as are employed in conjunction with water and gas distribution systems or oil lines.

In the past it has been noted that subterranean metallic conduits or piping employed in conjunction with fluid distribution systems, have frequently been subject to rapid deterioration. This deterioration is partly due to common rusting of the steel pipe, and also to corrosive chemicals which may be in the fluid conveyed or in the water with which the outer surface of the pipe comes into contact. However the more rapid deterioration often experienced has been found due largely to electrolysis. Electrolysis results from electrical current flow between the metal conduit and the surrounding moist ground, and such current may be induced artificially in certain installations, or may occur from natural causes.

As far as I am aware there is no commercially practical metal conduit now in the market, capable of withstanding the deleterious effects of electrolysis. A coating of asphaltic material upon the outer surface of the pipe has been found to have very little beneficial effect, even though a sheathing of tar paper is employed. Likewise steel conduit jacketed with reinforced concrete has been found subject to electrolysis.

It is an object of the present invention to provide a protective jacket for metal conduit or piping which will afford an effective protection against deterioration by electrolysis.

It is a further object of the invention to provide a protective jacket of the above character which will not be prohibitive in cost, and which will therefore have general commercial application.

Further objects of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Figure 1 is a plan view, illustrating certain steps in the method of applying a protective jacket in accordance with the present invention.

Fig. 2 is a view similar to Fig. 1, but illustrating further steps in the method.

Fig. 3 is an enlarged cross sectional detail, illustrating my protective coating in its preferred form.

Referring first to Figure 3, the protective jacket shown therein has been applied to the steel wall 10 of an ordinary fluid conduit. This protective jacket consists of an outer layer 11 of concrete, within which a metal reinforcement 12 is embedded. The concrete layer is shown applied to the outer surface of a sheathing 13 of fibrous material, and interposed between sheathing 13 and the outer surface of the metal wall 10, there is a coating 14 of material having relatively high dielectric strength.

Coating 14 is preferably of such material that it will form a continuous unbroken water-tight membrane, and one which has sufficient resilience to stretch and flex a certain amount without cracking. Certain coating materials of this character are now available on the market, which are formed of an asphaltic base. The sheathing 13 is preferably of such material that it will not deteriorate when subjected to moisture, as for example a paper made largely of asbestos fibre impregnated with asphaltic material. Coating 14 is adhered to the outer surface of the metal walls 10, while sheathing 13 is in turn bonded to the coating 14. The concrete layer 11 is in intimate or close contact with the outer surface of sheathing 13.

A jacket such as has been described with reference to Fig. 3 can be formed as follows:—The coating 14 is first applied to the outer metal surface of the pipe, as by dipping the pipe into the coating material, while the material is in liquid condition. After this coating has solidified, the coated pipe, indicated generally at 16 in Fig. 1, is rotated between suitable centers, and the sheathing 13 is then applied in the form of a strip 17 wrapped spirally about the pipe. As the strip is being wrapped upon the pipe, its inner surface is covered with additional coating material, as by way of the nozzle 18. The edges of adjacent convolutions of strip 17 are preferably overlapped as shown in Fig. 1.

After the pipe has been completely wrapped with strip 17 to form the sheathing 13, the next step is to apply the concrete jacket 11. In applying such a layer of concrete, I preferably utilize the apparatus and method disclosed in my co-pending application, Ser. No. 537,009 filed May 13, 1931. Thus as indicated in Fig. 2, while the pipe is being rotated between suitable centers, a strip 19 of plastic concrete is wrapped spirally upon the pipe, and embedded in this strip of concrete there is a suitable metallic reinforcement 21, as for example a strip of metallic screening. Screening 21 is maintained under tension while the concrete strip 19 is applied, so that after application the concrete layer 11 is held in tight engagement with the outer surface of the sheathing 13.

A protective jacket such as described above forms an effective electrical insulator for the exterior of the metal conduit. This has been demonstrated by tests in which the exterior of the pipe was entirely immersed in brine solution. The concrete layer 11 affords mechanical protection, and at the same time prevents free flow of chemical containing liquid into contact with the sheathing 13. Sheathing 13, while it affords some dielectric strength of itself, affords a protection for the inner coating 14. If the concrete layer were applied directly to coating 14 without the intervening sheathing 13, the membrane afforded by coating 14 might be disrupted by particles of the concrete, and might be disrupted to form fine cracks upon deflecting the metal wall of the pipe. When sheathing 13 is employed, coating 14 remains intact as a continuous membrane, even though the pipe may be bent slightly in a direction lateral of its axis, or even though the walls of the pipe may be slightly deflected. Likewise the presence of sheathing 13 largely prevents penetration of liquids into contact with coating 14.

I claim:

1. In conjunction with a metallic conduit, a protective jacket consisting of a coating of dielectric material applied upon the outer surface of the conduit, a sheathing of fibrous material applied and bonded to said coating, and a layer of concrete covering said sheathing.

2. In conjunction with a metallic conduit, a protective jacket consisting of a coating of asphaltic material applied upon the outer surface of the conduit to form a moisture proof dielectric medium, a sheathing of fibrous material applied and bonded to said coating, and a layer of concrete applied upon said fibrous material.

3. In conjunction with a metallic conduit, a protective jacket consisting of a coating of asphaltic material applied upon the outer surface of the conduit to form a moisture proof electrical insulating medium, a sheathing consisting of asbestos fibre impregnated with asphaltic material, applied and bonded to said coating, and a layer of concrete applied upon said sheathing.

4. In conjunction with a metallic conduit, a protective jacket consisting of a water impermeable and elastic coating of dielectric material applied upon the outer surface of the conduit, a sheathing consisting of asbestos fibre impregnated with asphaltic material, applied and bonded to said coating, and a layer of concrete applied upon said fibrous material.

5. In conjunction with a metallic conduit, a protective jacket consisting of a coating of dielectric material applied upon the outer surface of the conduit, said coating being impermeable to water and relatively flexible, a sheathing of fibrous material applied and bonded to said coating, and a relatively rigid layer of reinforced concrete applied upon said sheathing.

WARREN A. KRANER.