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PIPE COVERING

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Fig. 2.

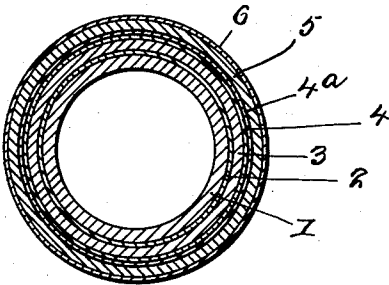
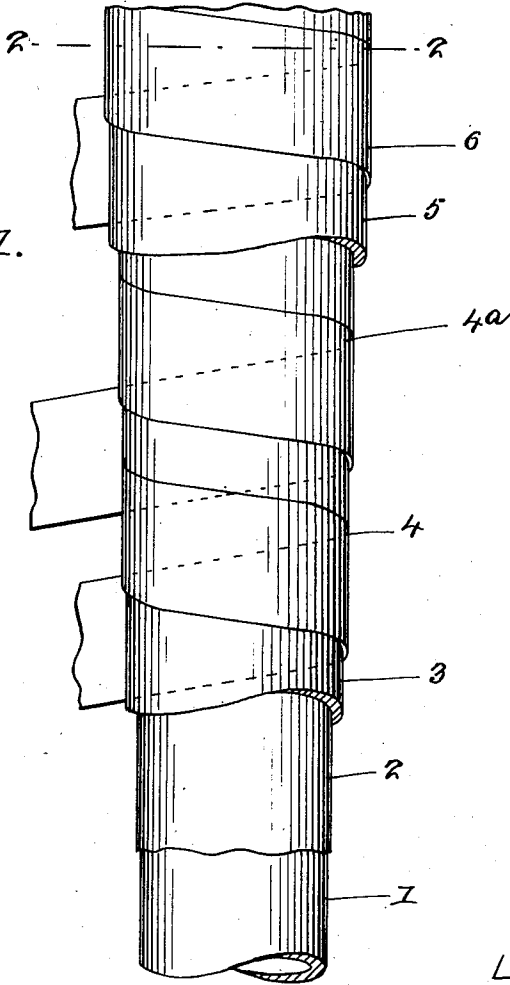


Fig. 1.



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PIPE COVERING

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The present invention relates to improvements in pipe covering. More particularly the invention relates to that type of pipe covering which may be applied to water, gas, air, ammonia, oil and steam conduit lines which are embedded beneath the surface of the earth and which therefore entails considerable expense when it is necessary to excavate for and replace sections of the said lines which have become corroded to the extent that fluid escapes, or which have become otherwise defective. For example, water, oil and gas conduits are usually of steel construction. The steel when embedded in the earth undergoes corrosion due to chemical reaction which takes place between the metal of the pipe and water or moisture which come into contact with the pipe, from the surrounding soil. In other words, the well known corrosion reaction for iron takes place, caused by oxygen contained in the water and greatly accelerated by dissolved salts which the soil water usually contains. Another cause of metallic conduit failure is due to stray electric currents in the earth with which the said conduits may come into contact.

It is appreciated that many others have covered steel pipes embedded in the earth prior to this invention. So far as it has been possible to ascertain, it appears that efficient protection has not been achieved heretofore due to the fact that the bond or seal between the pipe and the covering had been severed or destroyed. Obviously where the sealing bond is severed or destroyed, the efficiency of the protection afforded by the covering becomes virtually nil, regardless of the thickness of the coating, because subterranean water and moisture are permitted access to the said pipe beneath the said covering.

It has been discovered by the present inventor that the most common cause of destruction of the bond or seal between pipe and its covering is due to non-uniform contraction and expansion of the pipe and its covering, whereupon since pipe usually has a higher coefficient of expansion than the covering, stresses and strains are set up within the structure consisting of the pipe and its covering, which result eventually in disruption and failure of the joint sealing them. The soil itself also undergoes certain movements further causing greater strain and stress on the said bond or joint between pipe and covering. Therefore, the present invention resides in means for successfully counteracting and overcoming the disadvantages referred to by covering pipes, particularly metallic pipes with a covering which prevents the ingress of

substances causing corrosion by reacting chemically with the substance of the said metallic pipe, but provision is also made for permitting the said pipe to contract and expand naturally as it will under varying temperature conditions, without however setting up stresses and strains within the structure consisting of the pipe and its coverings, and the means afforded by the present invention is also adapted to permit free movement of the pipe proper, even though the outer surface of the covering be firmly gripped by the soil.

In carrying my invention into effect, I propose to apply a protective covering in the following manner.

Reference is here made to the accompanying drawing in which:

Fig. 1 represents a perspective view of a fragment of pipe line covered in the manner of the present invention, the showing being such as to reveal the several laminations comprising the covering and to reveal free ends of several of the sheeted laminations.

Fig. 2 is a vertical section through the pipe taken along the line 2—2 of Fig. 1.

One or more coats of a priming paint (thin coatings usually being suitable) are applied to pipe 1. After the primer has dried thoroughly one or two or more coats of asphalt represented by 3 on the drawing, are then applied at a temperature of about 300° F. The coating of asphalt is preferably of substantial thickness. The temperature at which the asphalt is applied will depend obviously on the softening point of the asphalt used, since the asphalt is preferably applied in molten form. However it may be applied in the form of solution in a solvent, or as an emulsion.

Following the coat or coats of asphalt, a wrapping of a sheeted cellulosic material 4 such as "Cellophane" (which is regenerated cellulose in sheet form), or "Kodapak" (which is cellulose acetate in sheet form), or other thin wrapping material is then wrapped about the coated pipe. The cellulose sheet preferably should be moisture proof or waterproof. The cellulose sheet is wound helically about the pipe so that the windings or turns overlap one-half to three-quarters of an inch, or overlap any sufficient amount to prevent extrusion of the asphalt through and between the winds of sheeted cellulose material.

A second wrapping 4a of cellulose sheet material is wound about the first wrapping in the same manner as the first wrapping, except that the windings or turns need not overlap as much

as the windings or turns of the first wrapping, an overlap of one-fourth to one-half an inch being sufficient.

- The two sheeted cellulosic material wrappings are separate with respect to each other and non-continuous, so that independent lengthwise motion of each of the said wrappings is permitted. In other words, the sheeted cellulosic material wrapping represented on the drawing by 4a (i.e. the second wrapping), is adapted to be moved lengthwise, while pipe coated with the asphalt and covered with the first wrapping of cellulosic sheet material remains at rest or moves in the opposite direction. The wrapping 4 is therefore telescoped within the wrapping 4a, and a slip contact is provided between the two wrappings.

It will be noted by reference to the modification of the invention shown in the drawing that the edges of the turns of wrapping 4 are offset with respect to the edges of the turns of wrapping 4a, thus permitting free slippage of the two wrappings without hinderance due to contacting or abutting edges of the turns checking or opposing the general longitudinal motion of one or the other of the respective wrappings.

A second coating 5 of asphalt is then applied to the wrapping 4a at a temperature which depends on the melting or softening point of the asphalt. This also is preferably a thick heavy coating.

An outside wrapping of kraft paper (not shown in the drawing) for mechanical protection completes the pipe covering. This latter wrapping may be omitted but its use is preferred. This particular feature, of itself, as well as the idea of a coating of asphalt on paper, is not new.

As a modification of the present invention, merely one wrapping of "Cellophane" or the like may be employed. That is to say, the wrapping 4a in the drawing may be omitted, and the covering otherwise constructed as shown, to give a pipe covering which will provide efficient protection for an extended period of time. The use of a plurality of such wrappings is preferred.

With regard to the primer coating 2, it is permissible to use any primer such as a "cut back" of asphalt in a volatile solvent such as mineral spirits. A satisfactory primer is composed of:

	Percent
Pigment { Iron 80% to 85% } { Silica 20% to 15% }	15 to 20
Asphalt	20 to 25
Solvent (mineral spirits)	55 to 65

The asphalt used in the coatings 3 and 5 may be one melting from 160° to 230° F. by the ball and ring method.

Instead of using asphalt as the coating designated 2 on the drawing, other compositions may be used. For example, the following composition consisting of a phenol formaldehyde resin and stearin pitch may be used:

	Parts
Resin	50
Stearin pitch	30
Amyl acetate	200

Another composition is one containing ozocerite, castor oil, mineral oil and asphalt in the following proportions:

Low grade ozocerite	pounds	158
Commercially pure ozocerite	pounds	16.5
Castor oil	gallons	11.5
Mineral oil having a specific gravity of 0.860	gallons	36.5
Asphalt dissolved in benzine	gallons	19.5

The mixture is heated to 150° C., glue is then added and to check frothing, turpentine is added from time to time. Sufficient turpentine is added to bring the volume up to 40 gallons, and then 42 gallons of kerosene are added. After cooling and filtering 6.6 gallons of carbon tetrachloride are added and the solution is aged for 3 days. This type of coating is a baking enamel type.

Other compositions suitable for the priming coat will occur to those expert in the art.

A third composition may contain the following ingredients:

Gray iron filings	avoirdupois ounce	1/8
88% phosphoric acid	ounce	1/4
Burgundy pitch	ounces	1 1/4
Boiled China-wood oil		
	liquid measure ounces	2
Turpentine	ounces	8

Various modifications of the general inventive idea herein disclosed may be made by those skilled in the art without departing from the spirit of the invention.

As used in the claims, the word "separated" used in connection with the wrappings of sheet wrapping material means that the said wrappings are non-continuous with respect to each other, that is to say, the ends of the wrappings are free and not joined to each other.

Having described my invention, I claim:

1. In a pipe covering, the improvement comprising separate contiguous wrappings of a regenerated cellulose material helically wound with overlapping turns, said wrappings being capable of independent lengthwise motion.

2. The process of protecting metallic pipes which comprises applying a priming coat consisting of a non-aqueous bituminous solution, applying a coating of asphalt, helically winding with overlapping turns a first wrapping of a sheet wrapping material, in like manner applying a second separated wrapping of a sheet wrapping material contiguous to but in slip contact with the first wrapping, applying a coating of asphalt and finally applying a wrapping of kraft paper.

3. In combination with a metallic pipe a protective covering comprising a plurality of coats of asphaltic material and between two of said coats, two separate and non-continuous wrappings of sheet wrapping material in slip contact with respect to each other.

4. A process of protecting metallic pipe which comprises applying a coating of bituminous material to said pipe, helically winding a wrapping of sheet wrapping material about the coated pipe so that the several turns overlap the next adjacent turn, from a separated portion of the said sheet wrapping material applying a second wrapping about the first wrapping in the same manner as the first wrapping, whereby the said wrappings are contiguous but non-continuous and in slip contact with respect to each other, and applying a coating of bituminous material.

5. In combination with a metallic pipe a protective covering comprising an inner coating of bituminous material, two contiguous but separated layers of sheet wrapping material in slip contact with each other and an outer coating of bituminous material, which protective covering is adapted to relieve strains and stresses by virtue of the adaptability of said layers to move independently of each other in a lengthwise direction.

6. In combination with a metallic pipe a protective covering comprising an inner coating of bi-

tuminous material, two contiguous but separated wrappings of regenerated cellulose sheet material in slip contact with each other and an outer coating of bituminous material, which protective covering is adapted to relieve strains and stresses by virtue of the adaptability of said wrappings to move independently of each other in a lengthwise direction.

7. In combination with a metallic pipe a covering, comprising coatings of bituminous material, the improvement consisting of two contiguous but non-continuous and separated wrappings of sheet wrapping material, whereby portions of the covering may move independently longitudinally of each other.

8. In combination with a metallic pipe a pipe covering which comprises a plurality of wrappings of sheet-form regenerated cellulose, each of said wrappings being complete in itself, and said wrappings being of sheets which are separate from each other, each of said wrappings being contiguous to its neighbor.

9. In combination with a metallic pipe a pipe covering which comprises a plurality of wrappings of sheet-form cellulosic material, each of said wrappings being complete in itself, and said wrappings being of sheets which are separate from each other, each of said wrappings being contiguous to its neighbor.

10. The process as set forth in claim 4 in which the sheet wrapping material is a sheeted regenerated cellulose.

11. A process of protecting metallic pipe which comprises applying a coating of bituminous material to said pipe, helically winding a first portion of sheet wrapping material about the coated pipe so that the several turns overlap the next previous turn, applying a second portion of said wrapping material helically about the first wrapping in the same manner as the first wrapping except that the edges of turns of the second wrapping are offset with respect to those of the first wrapping, whereby the said wrappings are contiguous and in slip contact with respect to each other, and applying a coating of bituminous material.

12. In combination with a metallic pipe a protective covering comprising an inner coating of bituminous material, two contiguous but independent wrappings of cellulosic sheet material in slip contact with each other, the said wrappings being each formed by helically winding the said sheet material about the pipe, and the edges of the turns of the first wrapping being offset with respect to the edges of the turns of the second wrapping, and an outer coating of bituminous material, which protective covering is adapted to remove strains and stresses within the coating by virtue of the adaptability of said wrappings to move independently of each other in a lengthwise direction.

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