

(12) **UK Patent Application** (19) **GB** (11) **2 182 413** (13) **A**

(43) Application published 13 May 1987

(21) Application No **8527134**

(22) Date of filing **4 Nov 1985**

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(51) INT CL⁴

F16L 59/00 59/02 59/05 59/10 59/14

(52) Domestic classification (Edition I):

F2P 1A12 1A35 1A8 1A9 1B3 1B7D C12 F14

F2X 7B 7D2 7D4

U1S 1402 1405 1807 1952 1958 1969 F2P F2X

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(58) Field of search

F2P

H5H

E1T

Selected US specifications from IPC sub-class F16L

(54) **Protecting pipelines and tanks**

(57) Metal pipelines and tanks are externally protected for example for insulation and anti-corrosion purposes, by wrapping at least a portion of the pipeline or tank with non-woven glass fibre through which is distributed granules of carbon black. Electrical current may be applied to the wrapping for heating purposes. The fibre may be enclosed in a film of polythene. Copper mesh or wire may also be incorporated in the wrapping.

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SPECIFICATION

Improvements relating to protection of pipelines and fluid containers.

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This invention relates to the protection of pipelines and fluid containers, such as fluid storage tanks, and is particularly concerned with the external protection of metal pipelines and

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containers. Metal pipelines and containers are commonly employed in a wide variety of diameters for a large number of purposes ranging from large-scale industrial use to domestic water and heating systems. They may be subject to outside or inside atmospheric conditions, or may be buried, for example underground or in wall cavities. Precautions commonly need to be taken, dependent on the external conditions to which the pipeline is to be subjected, to prevent corrosion and/or to insulate the pipeline or container, for example in cold environments where a pipeline is carrying fluids of high viscosity at low temperatures, or when carrying water which will freeze at ambient temperatures below 0°C. Such precautions commonly involve applying a protective wrapping such as fabric or paper impregnated with bitumen. Between the wrapping and the pipe it may be necessary to incorporate electrical heating wires or mesh or steam traces, for example to prevent gas condensation in the pipeline. All these measures add considerably to the complexity and cost of pipeline installations.

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The present invention seeks to provide a comparatively cheap and effective method of protecting metal pipelines and containers enabling both protection against corrosion and/or control of temperature within the pipeline or container.

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According to this invention we provide a method of protecting metal pipelines and fluid containers comprising applying to a length of metal pipeline or a metal container an external wrapping comprising non-woven glass fibre through which is distributed granules of carbon black.

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The invention also includes pipelines and container which have been protected by this method.

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The wrapping is suitably applied in an overlapping strip.

The granules of carbon black are preferably finely divided and for example have a granule size of 17 to 23 nanometres. They are preferably uniformly distributed in the glass fibre, the preferred proportion of carbon black being from 80 to 200 g/sq.m. of the wrapping. The glass fibre may be in the form of matting of any convenient width and thickness so that it can be wound onto the pipeline or container before or after the pipeline is put into use. A suitable matt thickness is 0.2 to 5.0 mm. The glass fibre matt may be of any suitable den-

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sity to give a firm wrapping to the pipeline. In a preferred construction the matt is enclosed on all sides in a film of standard polyolefin, for example approximately 0.25 mm thick.

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In use, the wrapping of glass fibre not only protects the metal pipeline or container from corrosion and provides a strong outer casing but, if it is necessary to keep the pipeline or container contents at a temperature above

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that of the surroundings, it is a simple matter to attach terminals to each end of the wrapping and apply an electric current, which, by virtue of the presence of the conductive particles of carbon black, will provide low-voltage, safe heating of the wrapping, uniformly and without over-heating. Conveniently the matt wrapping carries a strip of thin copper or other conductor to provide a continuous electricity carrier within the wrapping. Such a strip may conveniently be of the order of 0.1 to 0.5 mm thickness with a width of 10 to 20 mm, preferably a thickness of about 0.2 mm with a width of about 15 mm. One or more strips may be employed dependent on the thickness of the matt wrapping, for example one strip for a matt width up to 50 cm.

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Alternatively the wrapping may have embedded therein a mesh of fibreglass-coated copper, or other conducting wire, exposed at regular intervals, so as to conduct current to the carbon granules.

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Such conducting wires may, for example be of 12 to 20 micrometers diameter with a glass thickness (bound by melting onto the wire) of between 3 to 7 micrometers. The mesh may vary dependent on the dimensions of the wrapping but a typical suitable mesh size is of 4 sq.cm with the conducting wire exposed midway between each junction point. Of course the wires may run in one direction only, e.g. longitudinally of the wrapping.

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While it is only necessary to apply the current at the ends of the wrapping, intermediate connections may be employed, for example, if a pipeline contains valves or junctions which affect the continuity of the wrapping. Thermostatic controls may be incorporated to control the heating temperature dependent on the external temperature. Thus the current need only be applied when necessary to control temperature within the pipe, thus minimizing power consumption.

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In addition to its role for temperature control and as protection against corrosion, the use of such a wrapping obviates the need for cathodic protection against static build-up, especially in the region of fluid flow joints, as the carbon black impregnated glass fibre is antistatic.

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It will be appreciated that the invention can be employed to wrap pipes of comparatively small diameter, for example pipes used in domestic heating systems, to large diameter industrial pipes of, for example, 2 metre diameter. The wrapping can also be used around

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metal containers for fluids such as tanks, e.g. domestic hot water cylinders.

The wrapping can be applied by any suitable means conventionally used to apply external insulation to a pipeline. Further layers of other protective materials such as bitumen impregnated paper may be applied if desired, but should not normally be necessary.

10 CLAIMS

1. A method of protecting metal pipelines and fluid containers comprising applying to a length of metal pipeline or a metal container an external wrapping comprising non-woven glass fibre through which is distributed granules of carbon black.
2. A method according to claim 1, comprising applying said wrapping as an overlapping strip.
3. A method according to claims 1 or 2, further comprising enclosing the wrapping in a polyolefin film.
4. A method according to any one of claims 1 to 3, wherein the carbon black has a granule size of 17 to 23 nanometres.
5. A method according to any one of the preceding claims, wherein the carbon black is present in an amount of 80 to 200 g/sq.m. of the wrapping.
6. A method according to any one of the preceding claims, wherein the wrapping is in the form of matting of thickness 0.2 to 5.0 mm.
7. A method according to any one of the preceding claims, comprising attaching electrical terminals at least to each end of the wrapping for electrical heating thereof.
8. A method according to claim 7, comprising including at least one strip of an electrical conductor along the length of the wrapping.
9. A method according to claim 7, comprising embedding a mesh of conducting wire in the wrapping.
10. A method of protecting metal pipelines and fluid containers substantially as described herein.
11. A metal pipeline or container when protected by the method of any one of the preceding claims.