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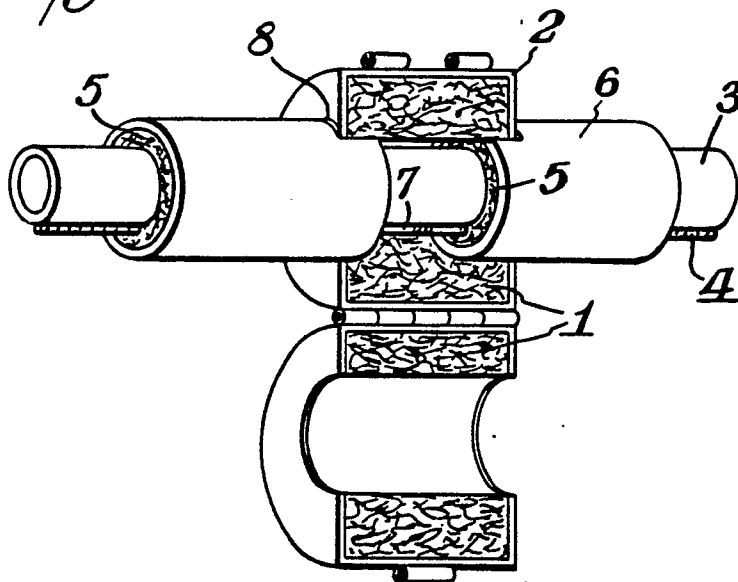
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54 **A liquid transporting pipeline having a liquid leakage sensor.**

57 A liquid transporting pipeline, has a liquid leakage sensor (9) contained with a tube (4) and installed therealong and a heat insulating covering installed around the pipeline and the sensor, the covering having a gap between adjacent lengths thereof, and a bridging member of heat-insulating material bridging the gap between said adjacent lengths.

Fig.1.



EP 0 326 259 A1

A LIQUID TRANSPORTING PIPELINE HAVING A LIQUID LEAKAGE SENSOR

The present invention relates to a liquid transporting pipeline, for example for transporting crude oil, having a liquid leakage sensor installed therealong.

Liquid-transporting pipelines installed in cold regions have an adiabatic or heat-insulating material installed around the outer circumference of the pipeline in order to prevent freezing of the liquid being transported, as described, for example, in Japanese Laid-Open Patent Application (Kokai) No. 58-129232. Conventionally, however, only the outer circumference of the pipeline is covered by such a heat insulating material. The liquid leakage sensor, in the form of a cable contained within a metal mesh container together with any communications lines, is not usually covered by the heat insulating material. Accordingly, when the air humidity reaches a state of supersaturation as a result of a drop in the ambient temperature, the moisture in the air may condense as water droplets on the outer circumference of the pipeline. These water droplets may penetrate areas between the electrodes of the liquid leakage sensor, causing a drop in impedance which results in the generation of a false leakage alarm.

The present invention was designed in order to solve the above-mentioned problem.

According to the present invention there is provided a liquid transporting pipeline, having a liquid leakage sensor installed therealong and a heat insulating covering installed around the pipeline and the sensor, the covering having a gap between adjacent lengths thereof, and a bridging member of heat-insulating material bridging the gap between said adjacent lengths.

One embodiment of the invention will now be particularly described by way of example with reference to the accompanying drawings in which:-

Figure 1 is a schematic view of part of a pipeline according to the invention, and

Figure 2 is a schematic view of one embodiment of liquid leakage sensor which can be installed along a liquid transporting pipeline.

As shown in Figure 1 a perforated plastic tube 4 which contains a liquid leakage sensor 9 is installed along the length of an oil transporting steel pipeline 3. A heating insulating material 5 consisting of glass wool and an outer covering 6 consisting of sheet steel are formed into suitable lengths which are installed around the pipeline 3 and tube 4 so that an insulated heavy-oil transporting pipeline is formed. Gaps exist between adjacent lengths of insulation. Usually there is no heat insulating material 5 or outer covering 6 installed

around the intermediate length 7 of the liquid leakage sensor 9 installed along the bottom of the oil transporting pipeline 3. An intermediate heat insulating part 1 consisting of glass wool which surrounds the intermediate length 7 of the sensor 9 and bridges the gap between adjacent sections of the heat insulating material 5 is supported by an outer covering 2 of sheet steel, and is tightly sealed by a silicone sealing material 8. As shown in Figure 2, the liquid leakage sensor 9 contained in the perforated tube 4 is formed by installing around the circumference of a stranded conductor 10 of electrical soft copper successively (a) a dielectric 11 consisting of braided, expanded polytetrafluoroethylene (EPTFE) fibres, (b) an outer conductor 12 consisting of braided electrical soft copper wires, and (c) a protective covering 13 consisting of braided EPTFE fibres.

By reason of the heat insulating part 1 installed around the oil transporting pipeline 3 and liquid leakage sensor 9, and which bridges the gap between adjacent sections of the heat insulating material, no temperature differential is generated in the area of connection of the oil transporting pipeline 3 and liquid leakage sensor 9. Consequently, the ambient humidity around the intermediate length 7 of the liquid leakage sensor 9 does not reach a state of supersaturation, and there is no problem of reduction in impedance caused by the penetration of condensed water into areas between the electrodes of the liquid leakage sensor 9.

Claims

1. A liquid transporting pipeline having a liquid leakage sensor installed therealong and a heat insulating covering installed around the pipeline and the sensor, the covering having a gap between adjacent lengths thereof, and a bridging member of heat-insulating material bridging the gap between said adjacent lengths.

Fig. 1.

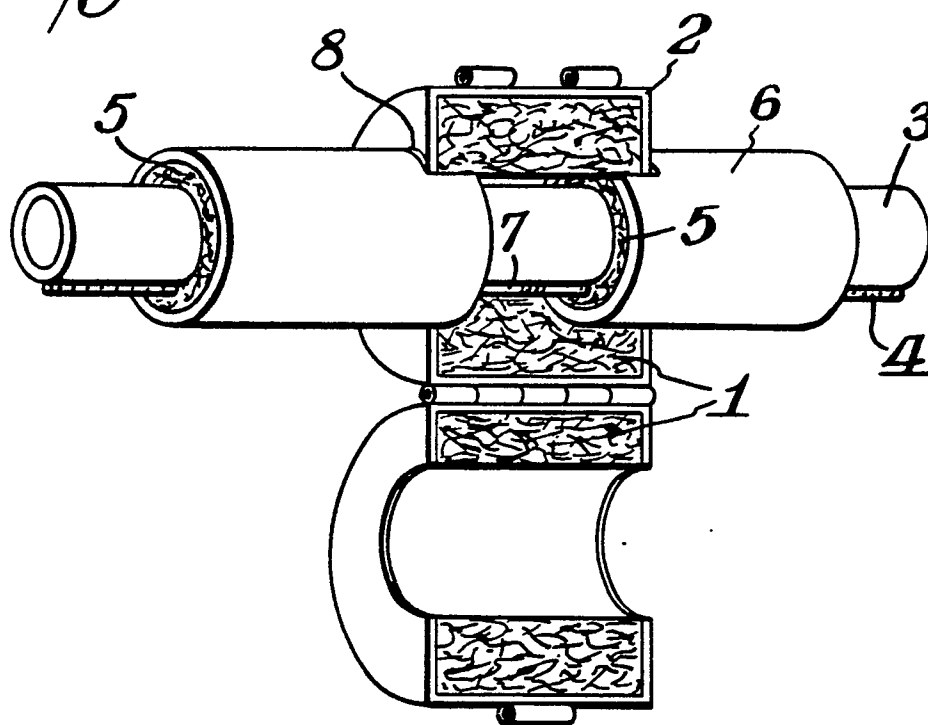
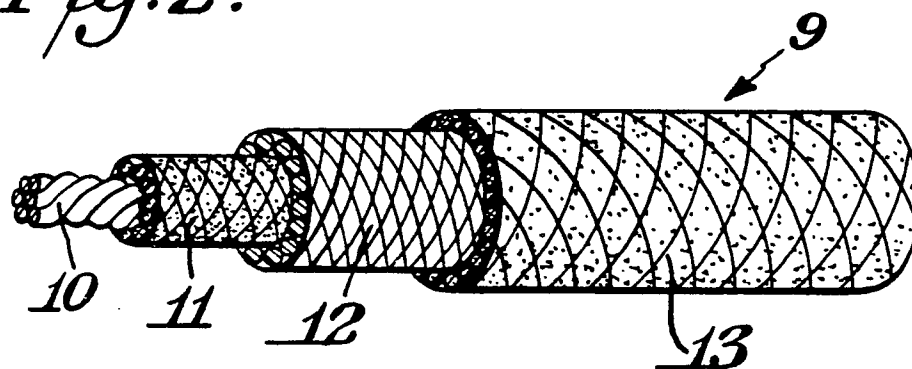


Fig. 2.





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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	US-A-4 013 924 (CHRISTENSEN et al.) * column 1, lines 6-30; figures 1,2 * -----	1	F 16 L 59/14
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 16 L
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 12-04-1989	Examiner SCHAEFFLER C.A.A.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			