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(56) Documents cited

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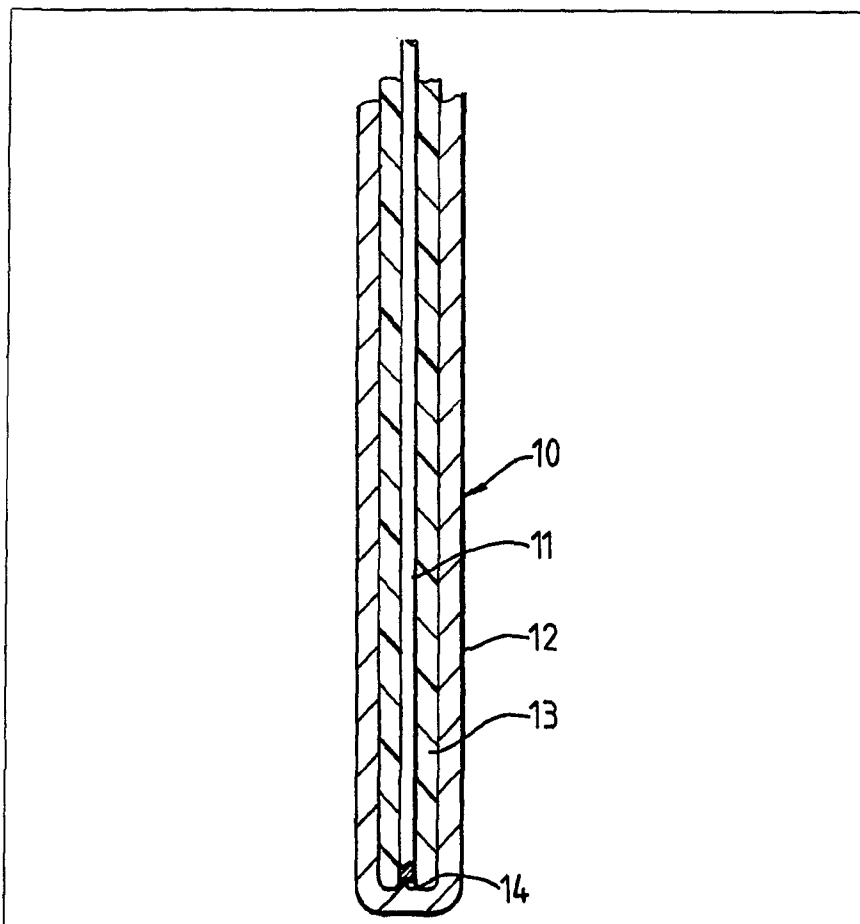
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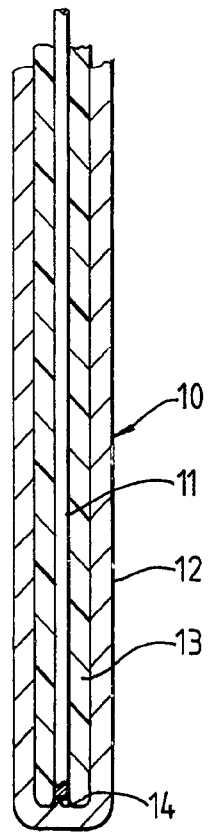
London SW1Y 4QP

(54) **Thermocouple**

(57) A thermocouple is provided by a cable (10) of coaxial form with inner (11) and outer (12) conductors of thermocouple forming materials and with the conductors electrically joined together at one end of the cable to form the thermocouple junction (14). The inner and outer conductors are preferably of chromel and stainless steel respectively.



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SPECIFICATION

Thermocouple

5 This invention relates to thermocouples.

It is an object of the present invention to provide a thermocouple of improved construction.

A thermocouple according to the present invention is provided by a cable of coaxial form with inner and outer conductors of respective thermocouple forming materials and with the conductors joined together at one end of the cable. The conductors are preferably chosen to be of non-oxidising material such as stainless steel and "Chromel" and separated by oxide insulant in the manner well known in mineral insulated cables.

To form a thermocouple in accordance with the invention a desired length of cable is cut from a stock cable and the end prepared to expose the inner conductor ("Chromel") and to bring it into contact with the outer conductor (stainless steel). The two conductors are then welded together such as by capacitor discharge or by electron beam.

With thermocouples according to the present invention a number of advantages arise. For example:

- 30 a. The basic cable is less costly.
- b. The manufacturing steps are simpler and less costly.
- c. The thermocouple junction can have a low thermal capacity and be located very close to the exterior of the cable end, and thereby giving a fast response to temperature changes in the vicinity of the junction.
- 35 d. The basic cable can have smaller dimensions than presently used thermocouple cable.
- 40 This not only has physical advantages like reduction of space but also thermal advantages like low heat loss.
- e. There is no requirement for the cable to be terminated at a bead which is in turn secured to the cable sheath and hence reliability is increased.
- f. If the junction fails then it will be a complete failure and identifiable as such.
- 50 g. As the cable has only a single conductor in a sheath, heat loss along the cable is further reduced and hence less measurement error is likely to occur.
- h. The option to avoid the use of oxidisable material is available as the customary use of Alumel (RTM) is no longer required. This factor also enhances reliability as failures or misleading measurements can arise with Alumel oxidation.

One form of the invention will now be described with reference to the accompanying drawing which is a diagrammatical sectional elevation.

The drawing shows a cable 10 of coaxial form with an inner conductor 11 and an outer conductor-cum-sheath 12. The two conduc-

tors are separated by oxide insulant 13 except at their ends where they are welded together by a capacitative discharge weld to form a thermocouple junction 14.

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CLAIMS

1. A thermocouple provided by a cable of coaxial form with inner and outer conductors of respective thermocouple forming materials and with the conductors electrically joined together at one end of the cable.

75 2. A thermocouple as claimed in claim 1 in which the outer conductor is a stainless steel sheath and the inner conductor is "Chromel" separated from the outer conductor by oxide insulant.

80 3. A thermocouple substantially as hereinbefore described with reference to the drawing.

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