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Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

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(54) **CAPACITANCE ELECTRODE STRUCTURE FOR MEASURING MOISTURE**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,992,665 A *	11/1976	Preikschat	324/666
4,736,156 A	4/1988	Benson et al.	
5,933,015 A *	8/1999	Siddiqui et al.	324/643
6,014,029 A *	1/2000	Soto et al.	324/664
8,047,056 B2 *	11/2011	Kanare	G01N 1/2273 73/29.01

FOREIGN PATENT DOCUMENTS

GB	717127	10/1954
WO	WO 89/03527	4/1989

OTHER PUBLICATIONS

PCT Search Report and Written Opinion of the International Searching Authority for International Application No. PCT/IB2010/001654—Date of Completion of Search: Mar. 18, 2011; Date of Mailing: Apr. 1, 2011, 8 pages.

* cited by examiner

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(57) **ABSTRACT**

Device (1) for measuring moisture of materials flowing in the shape of dried, liquid or gaseous granulates, or in the shape of powders in at least one duct disposed at least partially along an axis (X-X) through which the material of which the moisture has to be measured flows, comprising: at least one capacitor (Cx) wherein the material of which the moisture has to be measured flows, characterized in that the capacitor (Cx) comprises: at least two metallic rings (3) coaxially mounted to said axis X-X and adjacent to an inner wall of the duct through which the material of which the moisture has to be measured flows; at least one dielectric element (5) having: dielectric constant substantially linear with the temperature changing, and thermal expansion lower than $\alpha=27 \times 10^{-6}/^{\circ}\text{C}$.

14 Claims, 2 Drawing Sheets

