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CORE COMPOSITION FOR FIRE DETECTOR ELEMENT

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The present invention relates to fire detector elements, and, more particularly, to a core composition adapted to be utilized in connection with such elements.

The invention is concerned with fire detector elements comprising two or more spaced apart conductors of electricity having therebteween a core composition of such a resistance at normal temperatures that, in effect, it insulates the conductors, and of such a resistance at a predetermined higher temperature that it becomes a conductor of electricity between the conductors and enables sufficient current to pass through the conductors to operate a device for controlling a fire alarm and/or fire extinguishing circuit. For example, as shown in United States Letters Patent No. 2,586,252, the elements may be in the form of a cable-like structure adapted to be placed in a space where a fire is to be detected. This structure comprises a metallic tube through which electrically conductive wires extend which are separated from each other and the tube by a suitable core composition of the foregoing character.

More specifically, the present invention is primarily concerned with improving this core composition in a manner to more accurately predetermine the temperature at which the composition is rendered conductive in response to the heat of a fire whereby current can flow through the conductors to operate an electrical device.

Accordingly, an object of the present invention is to provide an improved core composition of the character indicated herein.

Another object is to provide such a composition which becomes electrically conductive practically instantaneously when heated to a predetermined temperature.

A further object is to provide such a composition which is economical to prepare, is reliable in operation, and is fully adapted for repeated use without change in its responsive characteristic.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the present invention, it has been found that the foregoing objects can be accomplished by utilizing a core composition comprising manganese dioxide, aluminum oxide, talc and anhydrous lead borate.

The manganese dioxide, aluminum oxide and talc may be of a chemically pure or technical grade, while the lead borate preferably is chemically pure.

The talc, when used in sufficient amounts, serves as a body or carrier for the aluminum and manganese oxide in the extrusion thereof and in the final core, while the lead borate serves as a high temperature fluxing agent to provide good adherence of the core composition to the wires.

These materials are admixed together with a suitable binder and/or lubricant, and sufficient water is added to

make the mixture plastic. The plastic mass is then extruded onto the wires and is baked at about 2,000° F. to fuse the same to the wires and provide a ceramic-like core.

The following formula illustrates a specific core composition in accordance with the present invention:

	Parts by weight
Manganese dioxide	50
Aluminum oxide	50
Talc	75
Lead borate	15

A core composition was produced from these materials and applied to two-wire temperature sensing elements in the foregoing described manner. The wires were composed of "Inconel," and had a length of ten feet and a diameter of .010 inch. The core had a diameter of .058 inch, and the wires were disposed therein in parallel relation about .010 inch apart throughout their length. These sensing elements had an infinite resistance at 70° F. which dropped sharply to about 5,000 ohms when the core composition was heated to 770° F. thereby enabling sufficient direct current or alternating current to flow through the wires to effect operation of an electrical device for giving an indication that the aforementioned temperature condition existed.

It further has been found that this formula can be somewhat varied to produce a sharp resistance drop when the core composition is heated to temperatures ranging from about 570° to about 1050° F. which temperatures are in a range quite commonly sought to be detected in practice. This can be accomplished by following substantially the same manufacturing procedure set forth herein to produce an extrudable plastic mass which adheres to the wires and can be fused thereon to provide a durable ceramic-like core.

A core composition which has a sharp resistance drop at 570° F. is illustrated by the following formula.

	Parts by weight
Manganese dioxide	40
Aluminum oxide	40
Talc	15
Lead borate	5

A core composition which has a sharp resistance drop at 1050° F. is illustrated by the following formula.

	Parts by weight
Manganese dioxide	27.5
Aluminum oxide	27.5
Talc	40
Lead borate	5

Thus, on a one hundred part by weight basis the formula may be varied within the following approximate ranges to produce core compositions having sharp resistance drops at temperatures ranging from about 570° to 1050° F.

	Percent by weight
Manganese dioxide	25 to 40
Aluminum oxide	25 to 40
Talc	15 to 40
Lead borate	5 to 8

In the examples given herein, the materials are used in amounts calculated on a chemically pure basis.

From the foregoing description it will be seen that the present invention provides a core composition for temperature sensing elements which has desirable physical and electrical properties, and, in particular, has a sharp resistance drop at a selected temperature to give a rapid and reliable indication that such temperature has been detected.

It will be understood that the details and examples hereinbefore set forth are illustrative only and that the invention as broadly described and claimed is in no way limited thereby.

This application is a continuation-in-part application of application for Letters Patent of the United States, Serial No. 464,915, filed October 26, 1954, now abandoned.

We claim:

1. A core composition consisting essentially of about 25% to about 40% by weight of manganese dioxide, about 25% to about 40% by weight of aluminum oxide, about 15% to about 40% by weight of talc, and about 5% to about 8% by weight of lead borate.

2. A core composition consisting essentially of about 25% to about 40% by weight of manganese dioxide, about 25% to about 40% by weight of aluminum oxide, about 15% to about 40% by weight of talc, and about 5% to about 8% by weight of lead borate, the manganese dioxide and aluminum oxide being present in about equal amounts by weight on a chemically pure basis.

3. A core composition consisting essentially of about 50 parts by weight of manganese dioxide, about 50 parts by weight of aluminum oxide, about 75 parts by weight talc, and about 15 parts by weight lead borate.

4. A core composition consisting essentially of about 40 parts by weight of manganese dioxide, about 40 parts by weight of aluminum oxide, about 15 parts by weight talc, and about 5 parts by weight lead borate.

5. A core composition consisting essentially of about 27.5 parts by weight of manganese dioxide, about 27.5 parts by weight of aluminum oxide, about 40 parts by weight talc, and about 5 parts by weight lead borate.

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