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Nikolaev et al.

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[54] **METHOD FOR FABRICATING BIMETALLIC MEMBERS OF THERMOELEMENTS BY SINTERING POWDERED COMPACTS IN THE PRESENCE OF GRAPHITE**

[76] Inventors: **Jury Diomidovich Nikolaev,** Nova-Basmannaya ulitsa, 31, kv. 22; **Sergei Nikolaevich Ljuskin,** prospekt Mira, 179, kv. 43; **Vladimir Ivanovich Koletvinov,** Argunovskaya ulitsa, 4, kv. 61; **Alexandra Semenovna Pavlenko,** ulitsa Bakuninskaya, 18, kv. 8, all of Moscow, U.S.S.R.

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[51] **Int. Cl.** **B22f 1/00**

[58] **Field of Search** ..... 75/223, 213, 134 G, 134 H; 29/573

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Primary Examiner—Benjamin R. Padgett
Assistant Examiner—B. Hunt
Attorney, Agent, or Firm—Waters, Roditi, Schwartz & Nissen

[57] **ABSTRACT**

A method for fabricating bimetallic members of thermoelements from ingots of alloys based on solid solutions of $Bi_2Te_3 - Sb_2Te_3$, or $Bi_2Te_3 - Bi_2Se_3$ consisting in crushing the ingots to fines, pressing the fines in briquettes similar in shape to the bimetallic members of thermoelements, and annealing the briquettes in air in a thick-walled metal vessel with a powdered graphite medium.

2 Claims, No Drawings

METHOD FOR FABRICATING BIMETALLIC MEMBERS OF THERMOELEMENTS BY SINTERING POWDERED COMPACTS IN THE PRESENCE OF GRAPHITE

The present invention relates to a method for manufacturing thermoelements, and more particularly to a method for fabricating bimetallic members of thermoelements.

Known in the art is a method for fabricating bimetalic members of thermoelements from ingots of alloys based on solid solutions of $Bi_2Te_3 - Sb_2Te_3$ and $Bi_2Te_3 - Bi_2Se_3$ consisting in crushing the ingots to fines which are then pressed in briquettes similar in shape to the bimetallic members of thermoelements being produced and, finally, in annealing the briquettes in a medium protected against oxidation. Used as said medium are vacuum, an inert gas, or hydrogen.

A disadvantage of the prior-art method resides in the necessity to use, for annealing, vacuum-pumping assemblies or special chambers protecting the working medium against oxidation which substantially complicates the process of manufacturing thermoelements.

It is an object of the present invention to improve the method for fabricating bimetallic members of thermoelements so as to abandon the use of vacuum-pumping assemblies or any other sophisticated protecting chambers in the process of annealing, thus simplifying the manufacture of thermoelement bimetallic members.

This object is achieved by annealing said briquettes in air in a thick-walled metal vessel with a powdered graphite medium therein.

The method for fabricating bimetallic members of thermoelements according to the present invention does not call for the use of sophisticated equipment for the annealing stage thereof.

The invention will now be explained in greater detail with reference to a preferred embodiment thereof.

To fabricate bimetallic members of thermoelements of p-type conductivity, use is made of ingots of alloys containing 76 mol percent of Sb_2Te_3, 24 mol percent of Bi_2Te_3, and 3 wt percent Te of the total weight of all the

starting components. The content of alloys used for the fabrication of bimetallic members of n-type thermoelements is as follows: 80 mol percent of Bi_2Te_3, 20 mol percent of Bi_2Se_3, and 0.15 wt percent $ZnCl_2$ of the total weight of the starting components.

First, the ingots are crushed to fine particles of no more than 0.5 mm in diameter. Then, the fines thus obtained are charged into molds and pressed at room temperature under a pressure of 9 t/cm^2. Briquettes are formed which are annealed. For annealing, the briquettes are placed in a thick-walled metal vessel precharged with fine graphite (a layer 1 to 2 cm thick). The rest of the vessel volume is also filled with graphite which is slightly compressed. The vessel is covered with a lid and placed in an annealing furnace. Temperature is controlled by thermocouple inserted into a hole made in the vessel. Bimetallic members of p-type thermoelements are annealed at a temperature of 375° C for 3 hours, while those of n-type thermoelements are annealed at a temperature of 360° C for 2 hours.

The thermoelectric efficiency of bimetallic members of p- and n-type thermoelements fabricated by the novel method is substantially higher than that of thermoelement bimetallic members treated in vacuum by the prior-art method, as well as in air.

What is claimed is:

1. A method for fabricating bimetallic members of thermoelements from ingots of alloys based on a solid solution of $Bi_2Te_3 - Sb_2Te_3$, comprising crushing said ingots to fines, pressing said fines in briquettes similar in shape to the bimetallic members of the thermoelements, and annealing said briquettes in air in a thick-walled metal vessel with a powdered graphite medium.

2. A method for fabricating bimetallic members of thermoelements from ingots of alloys based on a solid solution of $Bi_2Te_3 - Bi_2Se_3$, comprising crushing said ingots to fines, pressing said fines in briquettes similar in shape to the bimetallic members of the thermoelements, and annealing said briquettes in air in a thick-walled metal vessel with a powdered graphite medium.

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