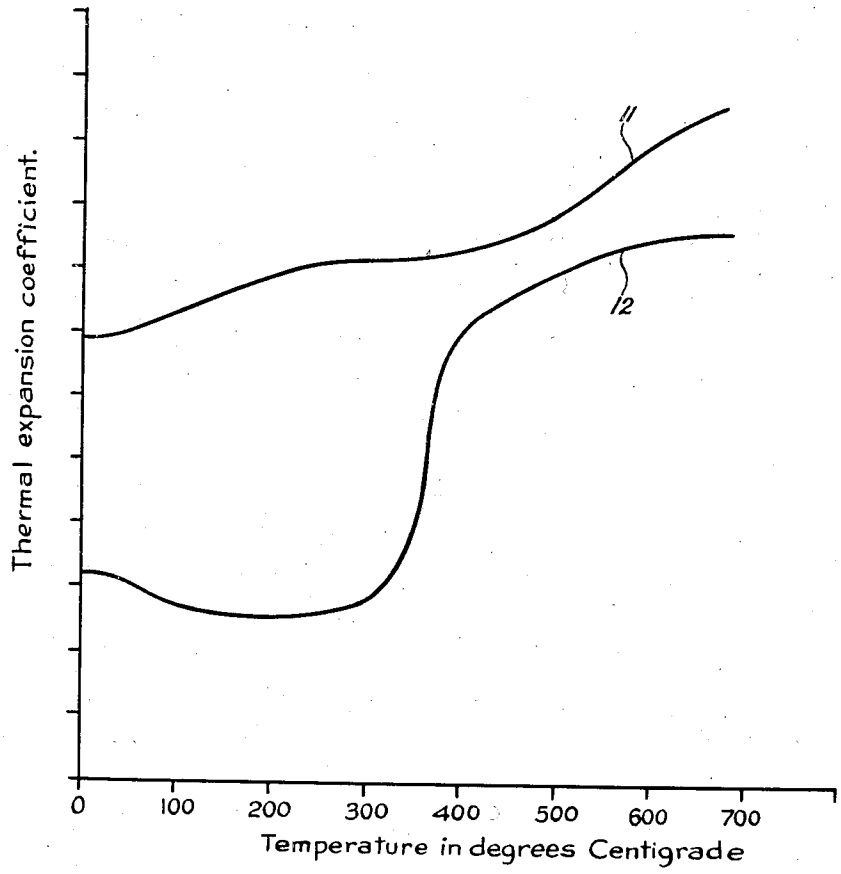
Dec. 13, 1927.

1,652,546

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THERMOSTATIC MATERIAL

Filed Feb. 27, 1925



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UNITED STATES PATENT OFFICE.

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THERMOSTATIC MATERIAL.

Application filed February 27, 1925. Serial No. 12,042.

My invention relates to temperature controlled devices and particularly to thermostats and thermostatic material.

One object of my invention is to provide a bimetallic thermostat, the elements of which shall have a relatively large difference between their respective temperature coefficients of expansion and that shall be composed of material capable of being subjected to relatively high temperatures.

In practicing my invention, I provide a metallic thermostatic element comprising a plurality of metals, one of which is an alloy comprising cobalt and chromium.

The single figure of the drawings illustrates two curves showing the temperature coefficients of expansion of two metallic elements which I prefer to employ in my thermostat.

A number of metals that may be employed in thermostatic members for use with relatively low temperatures are well known, such as iron and brass. However, when such metals are employed for relatively high temperatures they soon lose their original operating characteristics and fail to respond to changes of temperature, and the device therefore becomes useless. I have found that an alloy containing cobalt and chromium in varying proportions, and known as stellite, may be employed as one of the metallic elements in a bimetallic thermostat.

The proportion of chromium and of cobalt employed in the alloy, may vary, as for instance, I may employ 80% of cobalt and 20% of chromium, or I may employ 55% of cobalt and slightly over 40% of chromium, together with smaller percentages of tungsten, and of carbon. While alloys containing different percentages may vary somewhat in their operation, the variations will not be sufficient to prevent their use in thermostatic devices.

A curve designated by the numeral 11 illustrates the temperature coefficients of expansion of a cobalt chromium alloy comprising substantially 55% of cobalt, 40% of chromium, with small percentages of tungsten and of other metals, between the temperature limits of zero and approximately 600° C.

A curve 12 illustrates the temperature coefficients of expansion of a nickel steel alloy containing approximately 42% of nickel. The nickel steel alloy has a very much lower temperature coefficient of expansion at temperatures from substantially zero to 300° C., after which its temperature coefficient of expansion increases and becomes but slightly less than that of the cobalt chromium alloy. Where the temperature range of from substantially zero to 300° C. is to be controlled it will be possible, therefore, to obtain relatively large deflections of a thermostatic element which comprises a cobalt-chromium alloy and a 42% nickel-steel alloy suitably secured together in a manner well known in the art.

While I have shown a curve of expansion coefficients having nickel steel alloy as the low expansion member of a thermostatic element, I do not desire to be limited thereto, as my invention relates more particularly to the use of the cobalt-chromium alloy and it is evident that it may be employed with any other suitable alloy expansion metal with which it can be properly united in order to provide the usual bimetallic member.

Various modifications and changes may be made without departing from the spirit and scope of the invention, and I desire therefore that only such limitations shall be placed thereon as are imposed by the prior art.

I claim as my invention:

1. A heat responsive device consisting of two metallic elements, one of said elements being an alloy containing cobalt and chromium, the percentage of cobalt being in excess of the percentage of chromium and the other element being a nickel steel alloy.

2. A heat responsive device comprising metallic elements, one of said elements being an alloy of cobalt and chromium and the other element being nickel steel.

3. A heat responsive device comprising metallic elements, one of said elements being an alloy of cobalt and chromium and the other element being a reversible nickel steel.

4. A heat-responsive device comprising

two metallic elements, one of said elements being an alloy containing cobalt, and the other element being a nickel steel alloy.

5. A heat-responsive device comprising two metallic elements having relatively different temperature coefficients of expansion, the element having the higher coefficient being an alloy of cobalt and chromium, and the element having the lower coefficient being an alloy of nickel steel.

In testimony whereof, I have hereunto subscribed my name this 14th day of February, 1925.

VICTOR G. VAUGHAN.