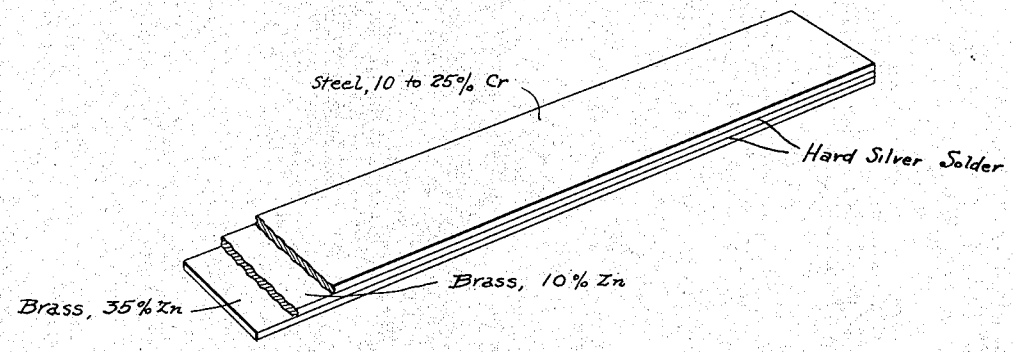
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NONCORRODIBLE THERMOSTATIC ELEMENTS

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NONCORRODIBLE THERMOSTATIC ELEMENTS

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3 Claims. (Cl. 297—15)

My present invention relates to thermostatic elements, and has particular reference to elements which are non-corrodible and have long life when operating in corrosion-promoting atmosphere.

The standard types of thermostatic elements require periodic replacement when used in flue gas passageways, steam radiators, and other installations where corrosion-promoting fluids contact the thermostatic metal. To counteract this corrodible effect the thermostatic metal has been surface treated or plated with a resistant material such as vanadium or chromium, but this arrangement has not been satisfactory, as surface currents are induced which produce pitting and eating away of the metal; moreover, the coating slows up the action of the thermostatic element when subjected to temperature change. It is the principal object of my invention to provide a thermostatic element composed of non-corrodible metals, thus eliminating need for surface or other protection.

To this end, I have combined non-corrodible steel with brass to obtain a thermostatic element. Although steel and brass have been combined heretofore, the steels possessing non-corrodible properties, such as chrome steels, have not hitherto been combined with brass because the degree of heat necessary to produce the joining has been higher than the melting point of the brass. It is a further object of my invention to use a method of joining that does not require a temperature sufficiently high to prevent the necessary uniting.

With the above and other objects and advantageous features in view, my invention consists of a novel thermostatic material and a novel method of producing the same, more fully disclosed in the detailed description following in conjunction with the accompanying drawing, and more specifically defined in the claims appended thereto.

The drawing shows a perspective view of a preferred thermostatic metal.

The non-corrodible steels available for thermostatic use include steels having a high chromium content. A typical steel of this type is stainless steel, which has a composition of low carbon, low silicon, low copper and high chromium, the chromium ranging from 10 to 25%, and practically no coefficient of expansion, and may be directly joined to a low brass by means of hard silver solder, or may be joined to a high brass by the method described hereinafter.

A typical composition for stainless steel is as follows:

Carbon	.12
Chromium	16
Silicon	1
Copper	1
Iron	81.88

Since high brass cannot be welded to steel, and particularly chromium steel, except at a temperature sufficient to melt the high brass, I have found it necessary to first join a low brass to the steel, preferably by means of hard silver solder, and then to join the high brass to the low brass, also preferably by means of hard silver solder. This procedure permits use of low temperatures which do not cause melting of the brass, whereby a thermal responsive device is obtained having three metals soldered together. A suitable composition for the low brass is as follows:

Copper	88
Zinc	10
Tin	2

and a suitable composition for the high brass is as follows:

Copper	65
Zinc	35

the low brass having a coefficient of expansion of .0000191 per degree C. and the high brass having a coefficient of expansion of .0000202 per degree C.

In manufacturing the thermostatic elements, bars of the different materials, after being joined by the solder as described, are rolled down to the desired thickness and are then cut in any desired form. In the arrangement using non-corrodible steel and low brass, it is preferred to use bars of the same thickness; when both high and low brass are used, the thickness of the low brass bar may be 10%, and of the high brass at least 40% of the total width; and in the arrangement of the two steels and the intermediate brass, it is preferred that the width of each of the steels be 45% and of the brass 10%.

It is thus clear that I have joined non-corrosive metals, and particularly high chromium steels and brass, to produce a non-corrodible thermostatic element, and that I have devised a method of uniting these metals which does not require a high temperature for effecting the joining.

While I have described specific compositions of metals which I have found suitable for the desired purpose, changes in the materials used, in the

compositions and amounts thereof, and in the manner of uniting, may be made to meet particular requirements for thermostatic metals, within the spirit and the scope of the invention as defined in the appended claims.

I claim:

1. The method of uniting a high brass strip to a high chromium steel strip, comprising first joining a low brass strip to the steel at a temperature above the melting point of the high brass strip, and then joining the high brass strip to the low brass strip at a temperature below the temperature required for joining the steel and the low brass strip.

2. A thermostatic element comprising a strip of high chromium steel, a strip of high brass, and an intermediate strip of low brass integrally joined to the steel strip and the high brass strip.

3. A thermostatic element comprising a strip of steel having from 10 to 25% chromium, a second strip of brass containing substantially 35% of zinc, and an intermediate strip of brass containing substantially 10% of zinc and joined to said steel strip and said first brass strip.

RALPH F. GIBBS.