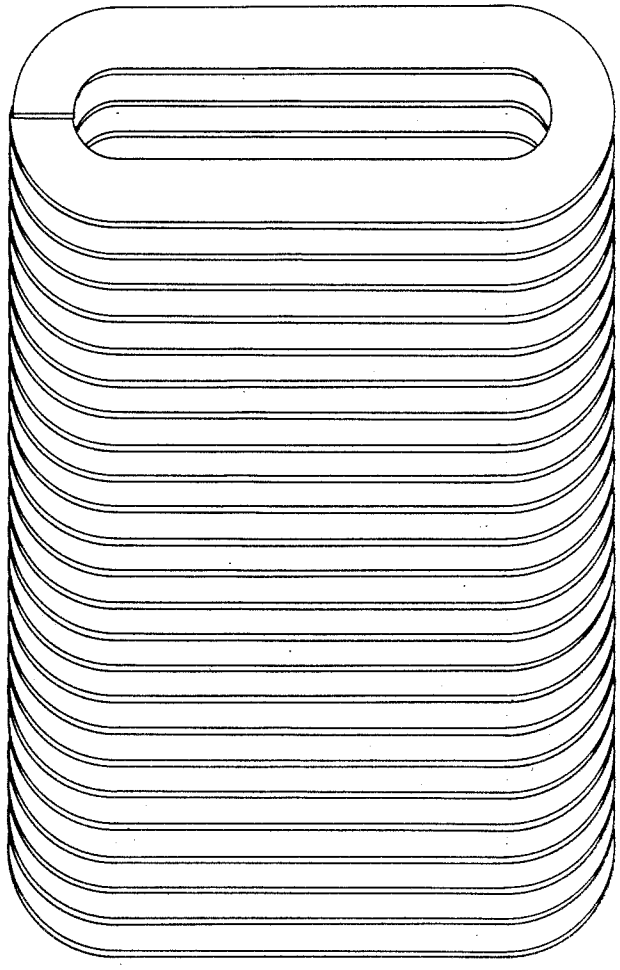
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METHOD OF MAKING RESISTOR GRIDS

Filed Dec. 19, 1927



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UNITED STATES PATENT OFFICE

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METHOD OF MAKING RESISTOR GRIDS.

Application filed December 19, 1927. Serial No. 241,209.

This invention relates to resistance elements, particularly to resistor grids made from an iron chromium aluminum alloy and more particularly to resistor grids formed from strips of such alloy and which strips are bent and coiled edgewise into the form of a grid having the cross section and length necessary to obtain the resistance desired.

In an application filed by me on December 19, 1927, serially numbered 241,208, I have disclosed a method of making ductile articles such as sheets, strips and the like from iron chromium alloys in which the chromium content ranges from 5% to 20% and the aluminum content from 3% to 10% with the principal part of the remainder iron, but I find that even this ductile material when sheared into strips and subjected to edgewise bending when cold has a tendency to break at the outer margin at the bend.

The manufacturers of resistor grids such as herein contemplated generally obtain the material (the alloy referred to) in strip form in multiple widths and shear the multiple width strips into strips that are suitable for the grids to be produced.

This shearing, which is done cold, sets up strains in the sheared edges and also in some instances starts incipient cracks along such edges so that when an attempt is made to bend the strips edgewise, a large percentage is lost through breakage, for in bending edgewise maximum strains are placed on the already distorted or incipiently cracked edges.

I have found that strips of these alloys even if their edges are strained or incipiently cracked, can be successfully bent edgewise and coiled, if the strips are warmed up so to speak, that is heated to 120° F. Some results can be obtained by heating the strips to a temperature as low as 100 F. But I find that entirely satisfactory results can be obtained when the strips are heated to from 120° to 200° F. and I prefer to heat them to at least 200° F. so as to be on the safe side. I find that heating to any temperature above 120° F. and with what is known as the cold range will do. The cold range includes temperatures below hot working temperatures.

The bending operation must be carried on while the strips are maintained at substantially this temperature.

I am of the opinion that this heating, though relatively slight, renders these alloys more mobile and increases their ability to flow during the bending operation. Actual tests show that the elongation of these sheared strips is increased 100% by heating the same to 200° F.

In the drawings accompanying and forming part of this application, I have shown in perspective a grid such as herein contemplated.

The strip of alloy may be bent and coiled in any way, but I prefer to use a machine designed for the purpose. The strip may be heated to the desired temperature in any satisfactory way but I prefer to pass it on its way to the bending and coiling machine through a resistance furnace so controlled as to heat the strip to about the desired temperature. I also prefer to have this furnace located immediately adjacent the bending and coiling machine so as to reduce to a minimum the time between the heating operation and the bending and coiling machine so as to reduce to a minimum the time between the heating operation and the bending and coiling operation.

The material must not be raised to a temperature which will detrimentally affect the bending die of the machine and therefore must of course be kept well below hot working temperature.

Having thus described my invention, what I claim is:—

1. The method of making resistor grids from strip material composed of an iron chromium aluminum alloy, which consists in heating such strip material to above 100° F. and below hot working temperature and then while the material is at substantially this temperature, in bending and coiling the same into the form of a grid.

2. The method of making resistor grids from strip material composed of an iron chromium aluminum alloy in which the chromium content ranges from 5% to 20%, the aluminum content from 3% to 8%, with the principal part of the remainder iron, which consists in heating such strip material to above 100° F. and below hot working temperature, and then while the material is at substantially this temperature, in bending and coiling the same into the form of a grid.

3. The method of making resistor grids from strip material composed of an iron

chromium aluminum alloy in which the chromium content is about 12% and the aluminum content about 5% with the principal part of the remainder iron, which consists in heating such strip material to above 100° F. and below hot working temperature and then while the material is at substantially this temperature, in bending and coiling the same into the form of a grid.

4. The method of making resistor grids from strip material composed of an iron chromium aluminum alloy in which the chromium content is about 12% and the aluminum content about 5% with the principal part of the remainder iron, which consists in heating such strip material to about 200° F., and then while the material is at substantially this temperature, in bending and coiling the same into the form of a grid.

5. The method of making resistor grids from strip material composed of an iron chromium aluminum alloy in which the chromium content is about 12% and the aluminum content about 5% with the principal part of the remainder iron, which consists in heating such strip material to between 100° F. and below the hot working temperature, and then while the material is at substantially this temperature in bending and coiling the same into the form of a grid.

In testimony whereof, I have hereunto subscribed my name this 15th day of December, 1927.

VERE B. BROWNE.