

# UNITED STATES PATENT OFFICE.

JOHN T. H. DEMRSTER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRICAL-RESISTANCE ALLOY.

963,123.

No Drawing.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed February 1, 1910. Serial No. 541,335.

To all whom it may concern:

Be it known that I, JOHN T. H. DEMPSTER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electrical-Resistance Alloys, of which the following is a specification.

This invention relates to alloys for electrical purposes and has for its object the production of a material having a relatively high specific resistance, which may be easily rolled, drawn, or otherwise formed into desired shape.

One of the objects of my invention is to produce a resistance material suitable for use in rheostats and the like.

In my previous Patent No. 901,428, I have disclosed a resistance conductor having a resistivity of about seventy times that of copper. This material will withstand a red heat continuously, and under this condition will oxidize very slowly. This material is extremely satisfactory for certain purposes, such as electric heaters, where a very high resistance is desired and where it is desired that a high temperature be employed for considerable intervals. This wire is, however, rendered relatively expensive by the fact that it is extremely hard and, therefore, difficult to draw and roll. For certain purposes, as for instance in rheostat work, a resistance conductor is desirable which does not have quite such a high specific resistance and which may oxidize more readily than that described in the patent above referred to. I have found that by greatly increasing the amount of iron and reducing both the nickel and the chromium, I can produce a resistance material suitable for this purpose. The iron content should be more than 50%, while the iron and nickel together should constitute more than 80% of the alloy. The following composition, however, has given very good results: iron 70 to 75 per cent., nickel 20 per cent., chromium 6 to 3 per cent., manganese 4 to 2 per

cent. In this composition, the main body of the alloy is iron and nickel, since they constitute from 90 to 95 per cent. of the whole content, while the chromium and manganese constitute from 5 to 10 per cent. of the content. Wire made from this alloy is found to have approximately twice the resistance of German silver, and may be produced at a cost which is considerably less than that of German silver. The metal may be drawn and rolled as easily as soft iron, and a uniform product may be produced at a very low cost.

I have described my alloy as being composed of specific materials combined in definite proportions in accordance with the patent statutes, but it is obvious that the materials and proportions may be modified without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. An electrical resistance conductor comprising iron, nickel, chromium and manganese, the iron constituting more than 50 per cent. of the alloy.
2. An electrical resistance conductor comprising iron, nickel, chromium and manganese, the iron and nickel constituting more than 80 per cent. of the alloy.
3. An electrical resistance conductor containing at least 90 per cent. of iron and 80 nickel.
4. An electrical resistance conductor containing approximately 75 per cent. of iron and 20 per cent. of nickel.
5. An electrical resistance conductor containing approximately 75 per cent. of iron and 20 per cent. of nickel, the remainder being chromium and manganese.
6. An electrical resistance conductor containing at least 80 per cent. of iron and 90 nickel, the remainder being chromium and manganese.
7. An electrical resistance conductor containing at least 70 per cent. iron and 20 per

cent. nickel, the remainder being chromium and manganese in the proportion of three parts chromium to two parts manganese.

5 8. An electrical resistance conductor containing at least 80 per cent. of iron and nickel, the iron content being at least three times that of the nickel.

9. An electrical resistance conductor containing chromium, manganese, and a com-

bined iron and nickel content of at least 80 10 per cent., the iron content being at least three times that of the nickel.

In witness whereof, I have hereunto set my hand this 31st day of January, 1910.

JOHN T. H. DEMPSTER.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.