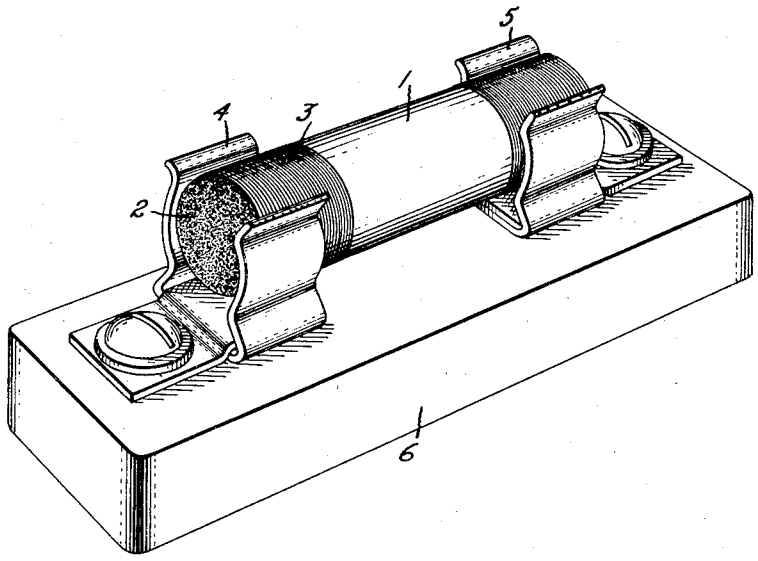
E. E. F. CREIGHTON.

RESISTOR.

APPLICATION FILED MAR. 15, 1920.

1,394,187. Patented Oct. 18, 1921.



Inventor:
Elmer E. F. Creighton,
by Albert G. Davis
His Attorney.

UNITED STATES PATENT OFFICE.

ELMER E. F. CREIGHTON, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

RESISTOR.

1,394,187. Specification of Letters Patent. Patented Oct. 18, 1921.

Application filed March 15, 1920. Serial No. 365,738.

To all whom it may concern:

Be it known that I, ELMER E. F. CREIGHTON, 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 Resistors, of which the following is a specification.

The present invention relates to resistance material and comprises particulary a shaped body of high resistance which is of especial utility in radio systems and devices because of its stability.

In accordance with my present invention I have provided a resistor of unusual stability from a solid solution of a conductive oxid, such as red oxid of iron in a refractory material, such as porcelain. A resistor embodying my invention is illustrated in perspective in the accompanying drawing.

It has been suggested heretofore to construct resistances from various metallic oxids and a binder, but in all cases of which I am aware the metallic oxid predominated, resulting in a material of unstable characteristics.

These prior resistances were in other respects unfitted for use where a constant high resistance is required, for example, because of the unstable nature of the metallic oxid forming part of the composition or because of the presence of decomposable binders or other ingredients.

A preferred embodiment of my invention comprises about 60 to 70 parts by weight of porcelain mixture and about 40 to 30 parts by weight of red oxid of iron, Fe_2O_3. The porcelain mixture consists of about 50 parts clay, about 30 parts feldspar and about 20 parts flint. The porcelain and iron oxid are thoroughly mixed with sufficient water to produce a uniformly blended plastic mass. The mixture is squirted into stick form, dried and fired in a porcelain kiln under the usual oxidizing kiln conditions at a temperature of about 1340 to 1370° C., that is, at a bright white heat.

The resulting sintered resistance stick has a uniform red color and a stable resistance. The indications are that the iron oxid is in solid solution in the porcelain. All high resistance bodies known to me consisting of a mixture of non-conducting and conducting substances or, in fact, consisting of particles of high resistance material such as carborundum, vary in resistance when subjected to different voltages at a given constant temperature. As the impressed voltage increases the resistance falls even though the temperature is kept constant. The resistances made in accordance with my invention remain substantially constant when the impressed voltage is varied and the temperature does not vary appreciably. In other words, my improved resistance behaves like a homogeneous body although the melting point of iron oxid is materially higher than the temperature used in producing the resistance.

Resistance units may be produced in accordance with my invention by varying the relative proportion of conductive oxid and vitreous material having any desired resistance over a wide range, say, from 4000 ohms to a million megohms.

A suitable mounting and contact connections for resistance sticks embodying my invention is shown in the accompanying drawing. The novel details of this contact construction is not a part of my invention, but is described and claimed in a copending application filed on March 15, 1920, by W. C. White, Serial No. 365,830.

As shown on the drawing, a resistance stick 1 of suitable length made in accordance with my invention is provided at its ends with a coating 2 of conducting material such as graphite about which is closely wound a wire 3 of suitable non-oxidizable metal such as nickel, iron, copper or other suitable metal. The graphite is preferably applied by dipping the ends of the stick in the graphite paste, such, for example, as "aquadag" and then drying the film of graphite thus applied. The resistance stick thus made may be inserted in the usual way in contact with the clips 4, 5, mounted upon an insulating base 6.

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

1. A resistor comprising a conductive metal oxid and a sintered non-conductive vitreous material, said resistor having when subjected to variable voltages at constant temperature a substantially stable resistance.

2. A resistor comprising a shaped mass

of a uniform mixture of porcelain and red oxid of iron in a state of stable solution, said resistor having a resistance of at least about 4000 ohms.

3. A resistor comprising porcelain and red oxid of iron in a sintered state, the porcelain predominating over the iron oxid by weight.

4. A resistor comprising about 60 parts of porcelain and about 40 parts of red oxid of iron.

5. A resistor comprising a uniform composition containing clay, feldspar, flint, and iron oxid, the latter predominating by weight.

In witness whereof, I have hereunto set my hand this 12th day of March, 1920.

ELMER E. F. CREIGHTON.