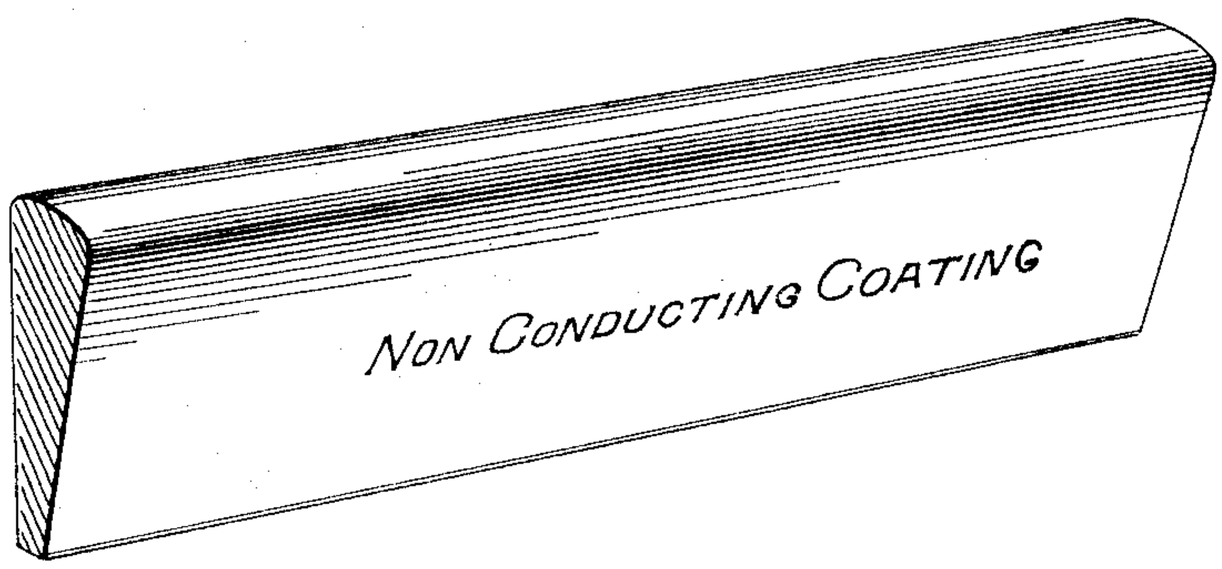
No. 624,167. Patented May 2, 1899.

C. F. BROOKER.

COMMUTATOR BAR.

(Application filed June 2, 1897.)

(No Model.)



WITNESSES:

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CHARLES FREDERICK BROOKER, OF ANSONIA, CONNECTICUT, ASSIGNOR TO THE COE BRASS MANUFACTURING COMPANY, OF CONNECTICUT.

COMMUTATOR-BAR.

SPECIFICATION forming part of Letters Patent No. 624,167, dated May 2, 1899.

Application filed June 2, 1897. Serial No. 639,110. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FREDERICK BROOKER, a citizen of the United States, residing at Ansonia, State of Connecticut, have invented a new and Improved Article of Copper Manufacture, of which the following is a specification.

My invention relates to a new article of manufacture—*i. e.*, a rod, bar, strip, plate, sheet, or other form of copper having a coherent and compacted surface formed integrally with or of the metal itself and of less electrical conductivity than the metal as distinguished from a non-conducting surface formed of an applied insulating material of any description.

The object of my invention is to produce a body of copper having a hard compact surface of less conductivity than the metal of the body.

I will describe my invention as employed in the manufacture of commutator-bars for dynamo-electric machines, motors, and other similar apparatus.

The drawing is a perspective view of a finished commutator-bar. The shaded lines on the face of this view are intended to indicate the dark surface coating of the material.

To carry my invention into effect as applied to a commutator-bar, I proceed as follows: A commercial pig of copper is heated to the required temperature and then passed in the usual manner through suitable roughing and flattening rolls until it has reached the condition of a strip of copper of the required thickness. Such strip is then passed between a pair of disk rolls, which determines the width of the trip, then through a pair of beveled rolls, which determines the shape of the commutator-bar, and simultaneously through guides which keep the strip flat.

In order to produce a hard coherent surface upon the strip of less conductivity than the metal of the strip, water or steam or both are allowed to flow continuously upon the heated strip during its passage through the rolls. By this treatment the water or steam will unite with the highly-heated surface of the strip and chemically transform such portion of the copper as is exposed to their action into a material—*i. e.*, an oxid—the base of which is copper and which is a poor conductor of electricity. In practice I have found that this chemical action attacks the body of the copper over its surface uniformly, so that the layer which is formed—*i. e.*, copper oxid—is entirely coherent—that is, it is not formed as a scale, but is integral with the body of the copper. Further, I have found that such layer as the strip is passed through the rolls is compressed and compacted and forms a hard, highly-polished, coherent, and non-conducting surface.

Having thus described my invention, I claim—

1. As a new article of manufacture, a rod, bar, strip, plate or other body of copper having a superficial and integral layer of copper oxid, the constituent particles of said oxid being coherent and compressed into a compact mass, substantially as described.

2. As a new article of manufacture, a commutator rod, bar, strip, plate or other body of copper having a superficial and integral layer of copper oxid, the constituent particles of said oxid being coherent and pressed into a compact mass, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES FREDERICK BROOKER.

Witnesses:

JAS. A. DOUGHTY,

GEO. E. COLE.