

# UNITED STATES PATENT OFFICE.

JOHN E. CARNAHAN, OF CANTON, OHIO.

METHOD OF OXIDIZING STEEL OR IRON SHEETS.

1,105,251.

Specification of Letters Patent.

Patented July 28, 1914.

No Drawing.

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*To all whom it may concern:*

Be it known that I, JOHN E. CARNAHAN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a certain new and useful Method of Oxidizing Steel or Iron Sheets, of which the following is a specification.

The invention relates to the oxidation of the surface of steel or iron sheets for the purpose of giving them a deeply oxidized hard and uniform dark blue finish. Ordinary oxidation by air gives such sheets a deeply oxidized hard light blue finish, which is not always uniform throughout the surface, while ordinary oxidation by steam gives a superficially oxidized soft and dark blue finish.

The object of the present invention is attained by first oxidizing the surface of the sheets by an air oxidizing process and then uniformly darkening the color thereof by a steam oxidizing process.

The improved process may be performed by first heating the sheets in an annealing box to an annealing heat and then separately exposing the heated sheets to the air, which deeply oxidizes the surfaces and gives them a hard finish with a light blue color, which hardness and color are, however, not always uniform throughout the surface of the sheets. The sheets are then again heated in

an annealing box to a dark red temperature, that is to say, to a degree which will not decompose the air-formed oxidation thereon, after which the sheets are permitted to cool while in the annealing box. Steam is introduced into the annealing box while the sheets are thus heated, and also while they are cooling; and it has been found that the further oxidation caused by the steam not only darkens the blue color of the air oxidation, but renders uniform the varying color which has been produced by the previous processes. The action of the steam, furthermore, serves to soften any excessive hardness of the oxidation, which may have been caused by the previous processes, especially along and near the edges of the sheets; thus producing a sheet which will not crack or scale in the ordinary stamping, bending and drawing processes used in the various arts.

I claim:

The process of oxidizing steel or iron sheets consisting in first bluing the sheets by an oxidizing process, then heating the sheets in an annealing box to a dark red and introducing steam into the annealing box and cooling the sheets therein in the presence of the steam.

JOHN E. CARNAHAN.

Witnesses:

ELFRIEDE SCHMIDT,  
E. S. HALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."