

# UNITED STATES PATENT OFFICE.

HIRAM TUCKER, OF NEWTON, MASSACHUSETTS.

## IMPROVED PROCESS OF BRONZING OR COLORING IRON.

Specification forming part of Letters Patent No. 40,964, dated December 15, 1863.

*To all whom it may concern:*

Be it known that I, HIRAM TUCKER, of Newton, in the county of Middlesex, in the State of Massachusetts, have invented a new and Improved Process or Method for Superficially Bronzing or Coloring Iron; and I do hereby declare that the following is a description of my invention, sufficient to enable those skilled in the art to practice it.

My invention consists in a novel mode or process by which I produce on the surface of iron a change of color, which I term "bronzing," not by the application of pigments in the forms of solutions, paints, or lacquers, whether dried or hardened by heat or by simple atmospheric exposure, but by chemical changes of and upon the surface of the iron.

In the practice of my invention I produce the bronze effect or color by the combined action of heat and linseed-oil, or its equivalent, upon the surface of the metal. Heat alone produces that change of color on the brightened surface of iron which ranges from light straw-color to deep blue, which I understand to be the result of oxidation, (though this color may be the result of some other chemical superficial change of the iron the chemistry of which may not be understood by me,) and the oil acting upon or with the resultant of heat or in conjunction with heat on the iron changes the color thereby produced to a bronze tint, the darkness of which depends upon the intensity of the heat to which the iron is submitted, and also upon the number of times the operation is repeated.

In practice I proceed as follows: The surface of the iron is cleaned from sand, scale, or other foreign matter, and where fine effects are desired the surface is best made smooth or polished. Under given conditions of heating and oiling the finer the polish the lighter is the bronze tint produced. In cases where ornamentation is obtained by relief the salient parts should be the most highly polished or most smoothly surfaced in order that the color produced upon them shall not be so deep as it is on those parts which are in the rear, so as to imitate thereby more nearly the effect of genuine bronze, in which its natural oxidation is apt to be somewhat worn away from its

salient parts, and therefore lighter in color. When the iron is thus prepared I cover it with a very thin coating of linseed-oil or its equivalent, (such a coating as I find best attained by rubbing off the oiled surface thoroughly with a rag or sponge, or otherwise,) and then submit it to a degree of heat which will change a brightened surface of clean, unoiled iron, to a color varying from a light straw-color to a deep blue, the lowest degree of heat producing the lightest-colored changes and the lightest bronze, and the highest degree of heat producing the darkest-colored changes and the darkest bronze; but, as the oil is present, the metal does not change its color under the influence of heat, as it would if free from the oil. As the iron becomes heated the color obtained will be bronze of an intensity corresponding to the degree of heat employed; but it should be observed that the heat may be made so intense and so long continued as to destroy the effects of the oil, in which case the iron will lose the bronze tint acquired and will assume the dark-blue shade. The perfection of the results obtained under these instructions will of course depend, in a considerable degree, upon the dexterity and watchfulness of the operator.

In practice I prefer to use boiled linseed-oil. When the desired shade of bronzing is obtained the iron is removed from the oven or furnace, and, if desired, may again be treated with oil, as before, even if not cool, and then again submitted to the action of heat, as described, and the operation of oiling and heating may be repeated indefinitely, each repetition deepening the shade of the bronzing. I recommend that at each repetition the degree of heat should be less than the degree immediately before employed. The process may be carried to such an extent by repetition of oiling and heating as to produce a very dark color—black even may be thus produced.

The particular process above described is the best known to me; but it may be modified somewhat in practice without departure from my invention—as, for instance, the iron may first be heated and afterward oiled, the oiling with the heat contained in the iron changing the color obtained by heat alone into a bronze.

The bronzing may be protected by a coat of varnish, (that which is colorless being preferred,) and the varnish may be dried over the bronzing by exposure to the atmosphere; or it may be baked or dried by heat, and, if desired, the bronze color may be darkened by submitting the varnish to a degree of heat sufficient to deepen and change its hue.

I claim—  
The process of bronzing iron, substantially as described.

HIRAM TUCKER.

Witnesses:

J. B. CROSBY,  
FRANCIS GOULD.