UNITED STATES PATENT OFFICE.

STANLEY GREACEN, OF RYE, NEW YORK.

ART OF ATTACHING RUBBER TO METALS.

SPECIFICATION forming part of Letters Patent No. 260,020, dated June 27, 1882.

Application filed December 6, 1881. (No specimens.)

To all whom it may concern:

Be it known that I, STANLEY GREACEN, of Rye, county of Westchester, in the State of New York, have invented a new and useful Improvement in the Art of Attaching Rubber to Metals, of which the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide an easy, cheap, and certain way of attaching rubber to iron, steel, or other metals or alloys to which it is applicable.

I know that many attempts have heretofore been made to accomplish this result, and none of them, so far as I am aware, will accomplish the desired end under all conditions; and I have discovered that by the use of my improvement I can attach rubber to iron where all other processes to me known have failed.

My improved process consists in first cleaning the surface of the iron, steel, or other suitable metal. The metal so cleaned is then coated with brass, copper, or other suitable metal or alloy, and this can be done in the case of iron or steel by electroplating or other suitable means. The iron or steel thus coated is then heated, preferably in a furnace. I do not confine myself to any particular way of heating sufficiently to drive the deposit into the surface of the metal. The iron or steel is then allowed to cool, when it is ready for the application of the rubber to be attached. If desired, the surface of the article thus treated may be coated with vulcanizable rubber cement before applying the rubber. The whole should then be inclosed in a mold, when practicable, and vulcanized under pressure.

In using my process I have found that a bath composed of equal parts of sulphate of zinc and sulphate of copper dissolved in water which has been acidulated with sulphuric acid will produce a suitable deposit, and in this case the iron or steel articles to be covered with rubber are placed in this bath, where they may remain until they have received a heavy deposit. I have found that the time they may remain in the bath need be limited only by the action of the deposit upon the surface, as if left too long the coating appears to become uneven, and the acid also will injure the surface by eating the iron, and thus disfigure the article to be coated. Otherwise I believe that the thicker the deposit the better, so long as the iron or steel will take it up. When the iron or steel article has received a good thick deposit, which can be produced in, say, fifteen minutes to one-half hour by the bath, the articles are removed from the bath, and may then be allowed to dry before being placed in the heating-furnace; but this is not necessary, as equally good results can be obtained by placing them, while still wet from the bath, directly in the furnace. I have used what is known as a "muffle-furnace," of iron, heated to a bright-red heat. The articles should be left in said furnace long enough for the surface-coating to disappear, when they should be taken out and be allowed to cool, when they are ready to be coated with the rubber.

As articles of different sizes and weights will require a greater or less length of time to become sufficiently heated, no rule can be given for the time required for heating. This will have to be governed by the bulk and character of the articles to be heated, and can be ascertained only by practice. I have found that in some instances, particularly where the iron has been subjected to a long heat in the furnace, its surface will be covered with a kind of fine dust or powder, which should be carefully wiped off before applying the rubber. In the use of this process I have applied the rubber to the iron as soon as it became cool enough for handling after coming out of the heating-furnace, and I have found one deposit on the surface of the iron to be sufficient for effecting the desired end; but it is obvious that, if desired, the deposits on the iron by the bath and the heating in the furnace may be repeated until the desired result is obtained, and this may be necessary in some instances, as with some kinds of iron or other metal.

I do not confine myself to any particular manner of forming the metallic deposit upon the article to which the rubber is to be applied; neither do I confine myself to any particular kind of alloy or metal for forming the deposit, as in coating articles formed of metals other than iron or steel it may be necessary to use various kinds of baths or processes to form the proper deposits before they can be heated in the furnace.

I do not claim the cleaning of the iron;

neither do I claim the forming of a deposit of brass, copper, or other alloys or metals upon articles of iron or steel for the purpose of causing the rubber to adhere, as I am aware that these processes are now practiced, and the patent granted to Louis Sterne, No. 87,307, February 23, 1869, describes the process of attaching rubber to iron or steel by the use of a bath prepared to deposit the necessary precipitation of copper and zinc by the electro-metallurgical process.

What I claim as new, and desire to secure by Letters Patent, is—

1. The process of first cleaning the surfaces of the articles of iron, steel, or other suitable metals, forming the proper deposit upon the articles so cleaned, and then driving this deposit into the surface of such articles before covering the same with rubber.

2. Articles of metal to which rubber is attached, when the same have been produced or made by first covering the surface of the metal with a coating of another alloy or metal, then driving such coating into and under the surface of such metal, and then covering said articles with rubber and vulcanizing the same, substantially as described.

STANLEY GREACEN.

Witnesses:
S. A. BAILEY,
JOHN I. RATHE.