

UNITED STATES PATENT OFFICE.

WILLIAM GRIFFITH, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO JAMES ANDREWS, OF ALLEGHENY, PENNSYLVANIA.

UNITING OR WELDING METAL.

SPECIFICATION forming part of Letters Patent No. 580,344, dated April 6, 1897.

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To all whom it may concern:

Be it known that I, WILLIAM GRIFFITH, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Uniting or Welding Metals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to uniting or welding metals.

The object is to unite copper or alloys thereof with other metals so as to produce metal plates and other articles of metal having one or both faces of copper or of copper alloyed with other metals.

Heretofore while it has been possible to coat or plate iron and steel plates with copper the two metals have not been practically and successfully united by welding.

The purpose of this invention is to weld together plates, sheets, bars, or other forms of steel or iron and copper or alloys thereof in such manner as to effect a perfect and intimate union between the two metals.

To this end the invention consists in the process hereinafter described, in which the plate, bar, or other article of iron or steel is first cleansed from scale or oxid; its surface or surfaces then covered with a coating or deposit of copper or an alloy of copper or any other suitable metal or alloy thereof capable of being deposited by chemical or electrical deposition or otherwise, in this instance by the action of a bath of a solution of the salts of copper; is then placed face to face with a sheet or plate of copper or an alloy thereof or any other suitable metal or an alloy thereof; is then heated to the proper degree, and, finally, is passed through rolls or is subjected to pressure requisite to effect the perfect and intimate welding of the metals.

I will now describe the invention, so that others skilled in the art to which it appertains may employ the same.

The invention may be applied to various forms or shapes of metal, such as plates, bars, rods, &c.; but for the sake of brevity I will confine this description to the welding of

sheets or plates of metal, it being understood that only mechanical skill is required in adapting the process to other forms or shapes, and although either iron or steel may be welded or plated with copper or an alloy thereof or any other metal or alloy of the same I use the word "steel," the process being the same with either of the two metals.

The plate of steel is first carefully cleansed from oxid or scale in any preferred manner, in this instance by the use of a bath of sulfuric acid in the usual manner of removing such oxid, and it is then ready to receive a coating or surface of copper or an alloy thereof or of any other suitable metal or alloy thereof capable of being deposited by chemical or electrical deposition or otherwise. In this instance the plate of steel is placed in a bath of a solution of one of the salts of copper. This bath may be formed by dissolving sulfate of copper in weak sulfuric acid; but I do not desire to limit myself to the sulfate of copper or to the sulfuric acid, as any equivalent salt or acid may be substituted therefor. The plate is allowed to remain in this bath until its surface or surfaces will be covered with a deposit of copper or an alloy thereof, which is generally accomplished in from one-half an hour to an hour. The plate is then removed from the bath and a sheet of copper or an alloy thereof or of any other suitable metal or an alloy thereof of any desired thickness is placed on a face thereof and is secured thereon in any convenient manner, as by bending the edges of the copper or the like over the edges of the plate, or in order to save waste tangs may be provided at the corners or at suitable intervals and be bent to embrace the plate. Where the plate is to have both faces of copper or the like, two plates of the same are secured to the steel plate, one on each side or face thereof. The plate of steel, with the copper plate or plates or alloys thereof, is then placed in a suitable furnace and subjected to a heat of about 1,700°, more or less, Fahrenheit. After the plates are properly heated they are removed and passed through rolls or other pressure-exerting mechanism, thereby effecting the perfect welding together of the plates.

As above stated, I may, instead of using

pure copper, employ alloys of the same, such as Muntz's metal, or brass may be employed in a like manner as the copper, excepting with some alloys a greater or less heat may be required prior to welding, as will be apparent to those skilled in the art.

It is to be understood that this invention is not to be limited to the mere facing of a sheet or plate of iron or steel with copper or the like, as I may weld together two or more sheets or plates of the same or different metals and of the same or different hardness to build up armor-plate, or for sheathing for vessels I may employ iron or steel faced with yellow or ship's metal.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The herein-described process of uniting or welding plates of metal of different kinds, which consists in cleansing one of the plates from scale, oxid, or other impurities, then coating or covering one or more faces of this plate with a metal or an alloy thereof having a lower fusing-point, then applying to this coated surface a plate of metal or an alloy of the same character as the coating, but free from any coating, then applying heat to the two plates, and finally uniting by pressure, substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIAM GRIFFITH.

Witnesses:

JAMES K. BAKEWELL,
WILLIAM JOHNS.