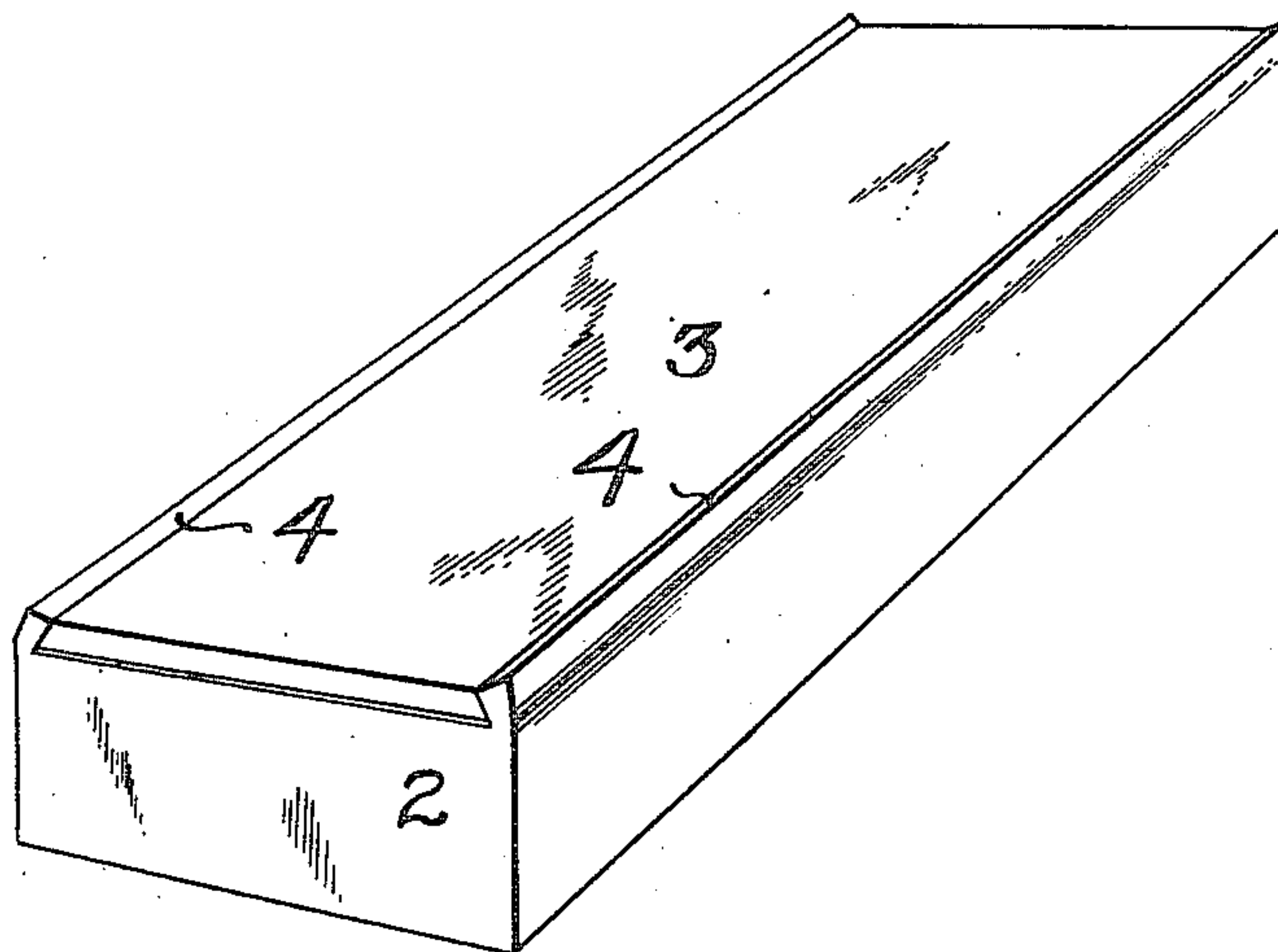


W. GRIFFITH.  
METHOD OF UNITING METALS.  
APPLICATION FILED DEC. 7, 1908.

959,517.

Patented May 31, 1910.



WITNESSES

*M. Arthur Keller,*  
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INVENTOR

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*his attorney*

# UNITED STATES PATENT OFFICE.

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## METHOD OF UNITING METALS.

959,517.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed December 7, 1908. Serial No. 466,285.

*To all whom it may concern:*

Be it known that I, WILLIAM GRIFFITH, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Methods of Uniting Metals, of which the following is a full, clear, and exact description.

My invention relates to an improvement in the art of uniting or welding metals, such as iron, or steel, with copper, brass, bronze, nickel, aluminum, or other metal or alloy, as will be hereinafter more fully set forth.

I will now describe my invention so that others skilled in the art to which it appertains may understand and use the same, referring to the accompanying drawing forming part of this specification, and in which—the perspective view shown illustrates a steel billet or bar having a plate of softer metal attached thereto preparatory to welding.

In carrying out my invention, the iron or steel billet, bar, or other shape adapted to receive the softer metal is first subjected to a cleaning or preparatory bath to remove the scale and oxid. After being so treated, the bar, billet, or other shape is subjected to a chromate of potash or chromate of soda solution or other alkali solution to prevent further oxidation. A suitable solution may be prepared by dissolving one pound of either chromate of potassium or chromate of sodium in from fifteen to twenty gallons of water. Leaving this bath, the bar, billet, or other shape is placed in a solution of any desired strength of one of the salts of copper or other metallic salt corresponding with the softer metal to be united with the bar, billet, or other shape, which leaves a uniform deposit of the softer metal on the surface of the billet. This deposit is the main factor in the union of the sheet, plate, or other form of softer metal with the harder metal when the two metals are heated and subjected to pressure. After receiving this treatment, the bar, billet, or other shape may be given a coating of brass, copper, or other desired

metal. This coating may be applied to the billet in the form of a powder and may be applied dry or it may be mixed into a liquid vehicle and applied by a brush, spray, or by dipping; it is, however, not necessary to apply this latter coating in all cases.

After being given the above preparatory treatment, the bar, billet, or other shape is passed to a table to receive the softer metal 3. This softer metal 3 may be secured to the bar, billet, or other shape by any suitable means. In the drawing I have shown a bar 2 formed with the side flanges 4 which are adapted to be folded down against the soft metal 3 in the manner shown, to hold the body of soft metal rigidly to the bar. The bar, billet, or other shape having the soft metal attached thereto is then taken to a heating furnace where the metals are brought to a welding heat. This bar, billet, or other shape having the softer metal attached thereto is then passed through suitable welding rolls, or subjected to other pressure device, which welds the softer metal perfectly to the treated surface of the iron or steel bar or other shape. The two metals having been welded together, in the manner above described, the same may be rolled, drawn, or otherwise worked.

The advantages of my invention will be appreciated by those skilled in the art. By the use of the alkali solution, oxidation of the metal is prevented, insuring a perfect weld at every point of contact.

While I have described my invention as carried out in the preparation of a bar, billet, and rolled shapes, it will be apparent that tubing may be prepared in a similar manner.

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

1. The hereindescribed process of uniting or welding metals of different kinds, which consists in first cleaning one of the kinds of metal, applying a coating of alkali solution, coating with a metal by depositing from a

metallic salt, applying the desired metal to the last named coating, then applying heat to the metals and uniting by pressure.

2. The hereindescribed process of uniting  
5 or welding metals of different kinds, which consists in first cleaning one of the kinds of metal, applying a coating of alkali solution, coating with a metal by depositing from a metallic salt, applying a second metallic

coating, covering the last named coating 10 with the desired metal, then applying heat to the metals and uniting by pressure.

In testimony whereof, I have hereunto set my hand.

WILLIAM GRIFFITH.

Witnesses:

M. ARTHUR KELLER,  
M. A. BARTH.