

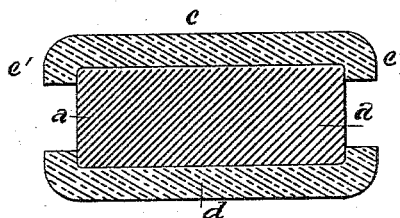
(No Model.)

G. F. McCLEANE & J. C. GRAY.

METHOD OF PLATING METALS.

No. 303,025.

Patented Aug. 5, 1884.



WITNESSES:

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GEORGE F. McCLEANE AND JAMES C. GRAY, OF PITTSBURG, PENNSYLVANIA,
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METHOD OF PLATING METALS.

SPECIFICATION forming part of Letters Patent No. 303,025, dated August 5, 1884.

Application filed December 28, 1883. (No model.)

To all whom it may concern:

Be it known that we, GEORGE F. McCLEANE and JAMES C. GRAY, citizens of the United States, residing at Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in the Method of Plating Metals; and we do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—like letters indicating like parts—the figure shows a cross-section of an iron bar plated above and below with copper sheets:

Our invention relates to the plating of iron with copper, brass, or bronze in such manner that a compound sheet may be formed, with a sufficiently close adhesion or intimate union of the metals composing it, so that such compound sheet may be worked up into articles for domestic or other use to which it is adapted.

It has been understood in the art heretofore that in order to unite a sheet or bar of copper, for example, with a sheet or bar of iron by heat and pressure the iron must be first subjected to some special preparation—such as is involved in cleaning or scaling it or removing its oxide surface, or in some cases by grooving or scoring it; and, as a reason for the use of the first of these operations, it was generally understood and believed by skilled metal-workers that the presence of the ordinary oxide surface on the iron would effectually prevent or render impossible that intimate union of the iron and copper which is essential to a good product. The grooving or scoring operation was resorted to in order that the softer copper entering the grooves or other irregularities so made (and which of necessity removed a portion of the scale) would thereby take a firm and durable hold on the iron, and thus effect a sufficiently perfect union for the purposes in view. We have discovered, after sundry trials and experiments, that such preparatory processes so applied to the iron bars or sheets are not necessary, and that copper, brass, and bronze can, by heat and pressure, be caused to combine intimately with iron while still having the fixed scale commonly found on it when finished at a comparatively low heat; hence, in working our invention, we select or prepare a bar or sheet, *a*, of any desired size and thickness, according to the product desired, taking care, however, that it

be free or comparatively free from raised or free scale, but with the fixed scale—such as exists when it is finished at a low red heat—still on it. To this, without further preparation, we apply the copper, brass, or bronze sheet *c*, the latter being of suitable size and thickness with reference to the product desired. The latter requires no special preparation, and the two are superposed or laid together, one on top of the other, the only special care necessary being to provide that air or other oxidizing agent shall not get between the two metals to such extent as to form a free or raised scale on the iron. This may be done by luting the edges of the joint or by bending down the edges of the softer sheet, as represented at *c'*. Suitable fluxes or solder may be interposed, if desired; but the use of such is not essential, and hence constitutes no part of the invention herein claimed. The metals so combined are then charged into any suitable heating-furnace and raised to a good heat—say till the iron is a bright red, or, preferably, to a temperature a little short of that at which the softer metal is liable to be fused. They are then removed and hammered or rolled to the desired gage or condition. We have found that in this way the two metals can be united so closely or intimately that their union is permanent, so that the plates or sheets so made are well adapted to the manufacture of domestic utensils or for other uses to which such material has heretofore been applied in the arts. If desired, the iron can be coated on both sides by adding a sheet, *d*, on the other side thereof, in the same way.

We are unable to state what chemical or other action takes place between the oxide of the iron and the contiguous face of the softer metal, except as above explained, and hence do not limit ourselves in this regard.

What we claim as our invention is—

The process of making a compound plate of iron and soft metal, which consists in superposing the soft metal on the unscaled iron, closing the joint, and subjecting both to heat and pressure, substantially as set forth.

In testimony whereof we have hereunto set our hands.

GEORGE F. McCLEANE.
JAMES C. GRAY.

Witnesses:

R. H. WHITTLESEY,
C. M. CLARKE.