United States Patent Office.

JAMES PARK, JR., OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 73,375, *dated January* 14, 1868.

IMPROVEMENT IN COMBINING COPPER AND CAST STEEL.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JAMES PARK, Jr., of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Combination of Copper and Cast Steel; and I do hereby declare the following to be a full, clear, and exact description thereof.

A combination or union of copper with some harder and stronger metal has been long needed for many purposes in the arts and manufactures, such as locomotive fire-box sheets, wire for ships' rigging, rods, bolts, spikes, and various other articles for which copper alone cannot be employed, owing to its softness and want of strength.

My invention consists of combining copper with cast steel, by casting the molten steel on or around the copper, which is previously heated, thus forming an ingot which may be hammered, rolled, or otherwise worked into any desired shape, the steel being tempered or hardened as may be desired after it is worked.

In order to enable others skilled in the art to make use of my invention, I will proceed to describe the manner in which it is put in practice.

The relative position of the copper and cast steel will be regulated according to the purpose for which it is designed. The slab, plate, bar, or rod of copper, to which the cast steel is to be united, is first heated in a suitable furnace to a good red heat. It is then immediately placed in a suitable mould, made of cast iron or other proper material, the interior or cavity of the mould being so shaped as to make an ingot of the required size and shape. Molten cast steel is then "teemed" or poured into the mould, on or around the red-hot copper, and the result is a union of the two metals sufficient to permit of the ingot of steel and copper being hammered or rolled out into plates, rods, spikes, bolts, or other desired article. The steel and copper roll or hammer out together, and after the combined metals have been reduced or shaped as may be desired, the steel may be tempered in the usual way. The copper serves to give strength to the steel, preventing its cracking or breaking readily, by imparting its toughness to the combined metals, while the steel gives firmness and rigidity to the copper.

If it is desired to make an article in which the copper is to be covered externally with a coating of cast steel, the heated piece of copper is so placed in the mould that the cast steel may be poured on both sides of the copper. From such an ingot may be rolled plates or bars of steel-coated copper. The combined metals are hammered or rolled after the steel has become thoroughly set, and hard enough to be reduced by hammering or rolling.

If it is desired to make any articles of steel covered with a coating of copper, an ingot is formed in a suitable mould by placing two or more pieces of heated copper against the sides of the mould, and pouring the melted steel into the cavity between the pieces of copper.

If it is desired to have steel on one side and copper on the other, the heated copper is placed against one side of the mould, and the molten steel is poured into the cavity against or on to one side only of the copper.

If it is desired to have steel in the centre and copper all around it, as is required for making copper-coated steel wire, or copper-coated spikes or rods, I prepare a hollow ingot of copper, into the centre or cavity of which, after it has been heated to a good red heat, I teem or pour the molten cast steel. In this case no mould would be necessary, but may be used if preferred. Such an ingot may be drawn out into wire, or worked into other articles, such as bolts, spikes, &c.

It is desirable to teem the steel against the copper as soon as possible after the copper is removed from the furnace in which it was heated, so as to prevent the formation of scale on the copper.

The relative thickness of copper and iron will be easily regulated by the size of the slabs or pieces of copper and the size of the cavity of the mould.

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

Combining copper and cast steel by heating the copper to a good red heat, and teeming or pouring thereon liquid molten cast steel, substantially as and for the purposes hereinbefore described.

In testimony whereof, I, the said JAMES PARK, Jr., have hereunto set my hand.

JAMES PARK, Jr.

Witnesses:

GEO. H. CHRISTY,

W. F. GRAHAM.