

UNITED STATES PATENT OFFICE.

THOS. EDWARD VICKERS, OF SHEFFIELD, ENGLAND.

IMPROVEMENT IN THE MANUFACTURE OF ORDNANCE.

Specification forming part of Letters Patent No. 46,978, dated March 21, 1865.

To all whom it may concern:

Be it known that I, THOMAS EDWARD VICKERS, of Sheffield, in the county of York, in that part of the United Kingdom of Great Britain and Ireland called England, have invented a new and Improved Mode of Constructing Ordnance; and I do hereby declare that the following is a full and exact description thereof.

My invention of improvements in the construction of ordnance, relates to a novel mode of annealing and cooling blocks of steel or iron or any other suitable metal or alloy of which it is proposed to construct a gun or other piece of ordnance.

The object of my invention is to cool the block of metal in such a manner as to cause that portion of its section which is nearest to the inside of the bore to contract first, the other portions of the section being allowed to cool upon it in the order of their respective distances from the axis of the piece.

In carrying out my invention I first cast, roll, hammer, or otherwise form a solid block of steel or iron or other suitable metal or alloy of the required form in any convenient manner, and I then bore out the solid block of steel, iron, or other suitable metal or alloy to about the required size for the caliber of the piece. When bored out the block of steel, iron, or any other metal or alloy is to be subjected to heat in a reheating or annealing furnace, and when brought to a heat sufficient to expand the crystals in the mass, and while the block of metal is still in the furnace, I intro-

duce into the hollow portion of the gun a stream or jet of water which is continued until the gun shall have cooled down entirely. I do not, however, confine myself to the use of water alone, but I employ other fluids or air or any material which is capable of being passed through the bore of the gun and which possesses a sufficiently low temperature to cool the metal. I also subject to the above process of reheating and cooling from the center guns that have been cast of steel in a mold made of fire-proof material and with a hollow core.

It will be understood that the essential feature of novelty in the present invention, in contradistinction to that of cooling molten metal from the inside of the block as now practiced, consists in reheating and cooling from the inside metal gun-blocks, made either by casting, rolling, or forging the same, or of reheating and cooling from the inside gun-blocks that have been made with a hollow core.

Having thus described my invention of improvements in the construction of ordnance, what I claim as my invention, and desire to secure by Letters Patent, is—

Reheating gun-blocks made from cast-steel or other metal or alloy, either cast or wrought, and cooling the same while in the annealing-furnace, in the manner described.

Dated September 2, 1864.

T. EDWARD VICKERS.

Witnesses:

WM. G. COOLEY,
JOHN GERMANS.