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# UNITED STATES PATENT OFFICE.

CYRUS ALGER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN THE ART OF MANUFACTURING CAST-IRON CANNON.

Specification forming part of Letters Patent No. 208, dated May 30, 1837.

*To all whom it may concern:*

Be it known that I, CYRUS ALGER, of the city of Boston, in the State of Massachusetts, have invented an Improvement in the art of Manufacturing Cast-Iron Cannon, by means of which improvement such guns are rendered much more tenacious and less liable to be injured in the bore by the discharges of the ball than those made upon the plans heretofore pursued; and I do hereby declare that the following is a full and exact description thereof.

I cast and bore the cannon or gun in the usual way, taking care, however, that the bore is somewhat less than the intended caliber, for a reason to be presently explained. I then anneal it by the known process of rendering cast-iron malleable, when it will be found that the bore has actually enlarged, and in a six-pounder to the extent of about one-sixteenth of an inch in diameter. This enlargement is in consequence of the nearer approach of the particles of the metal while heated, by which that state of tension in which they are left by the cooling of the metal in the mold in the process of casting is greatly relieved or entirely removed. The gun will now, if due proportion has been

observed in the first boring, be of the exact size desired, and it is then ready for the last process, which consists in case-hardening its interior. This I effect by putting into it the case-hardening material, consisting of animal-charcoal or other substance used in this process, and submitting it to a red heat for such a length of time as may be necessary, depending upon the depth to which it is desired that the hardening should extend. I then discharge the hardening and apply cold water under a sufficient head, so as suddenly to cool and consequently to harden the interior.

I do not claim to be the inventor of the process for rendering cast-iron malleable, nor of that of case-hardening malleable iron; but

What I do claim as my invention, and not heretofore used or known, is—

The improvement in the manufacture of cast-iron cannon by the combined process of annealing and hardening, as herein described.

CYRUS ALGER.

Witnesses:

SAMUEL L. RIDGWAY,  
H. MONTGOMERY.