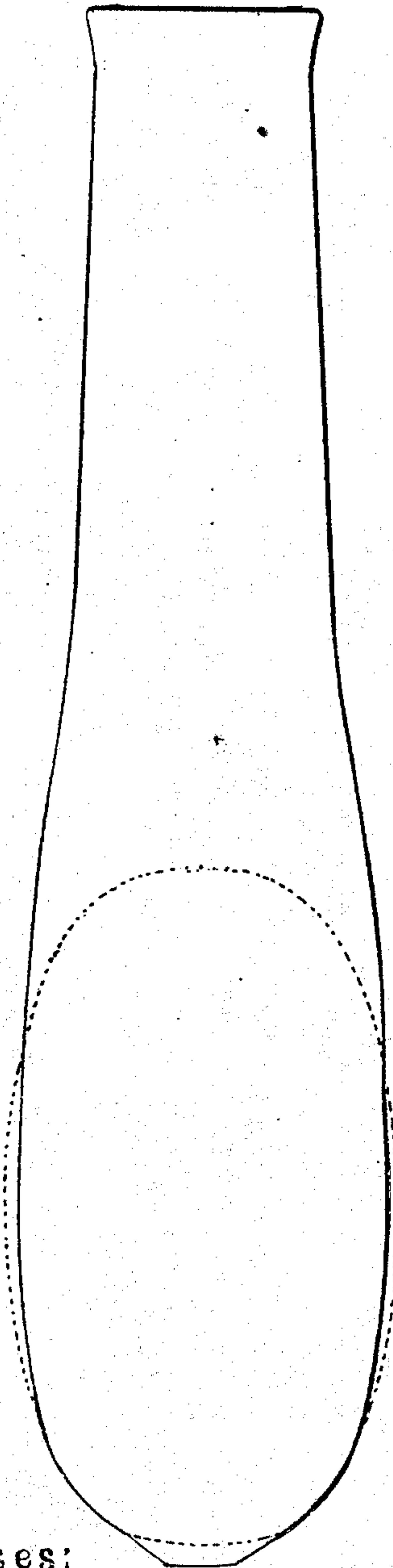


J. A. DAHLGREN.
Muzzle-loading Ordnance.

No. 1,980. }
No. 32,984. }

Patented Aug. 6, 1861.

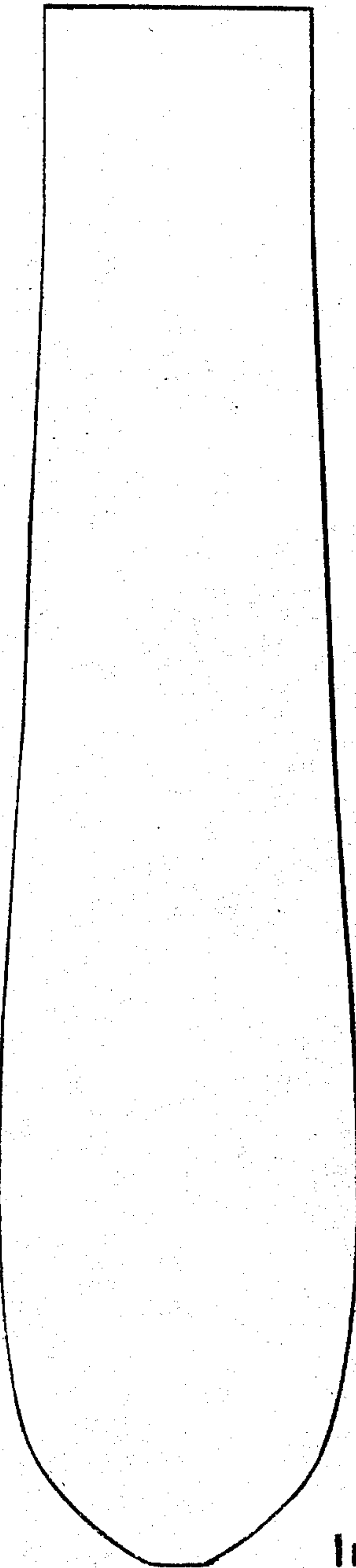
Fig. 1.



Feet

Scale

Fig. 2



Witnesses:

Geo D Brandt
A. B. Norton

Inventor:

Jos A Dahlgren

UNITED STATES PATENT OFFICE.

JOHN A. DAHLGREN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN CAST-IRON ORDNANCE.

Specification forming part of Letters Patent No. 32,984, dated August 6, 1861.

To all whom it may concern:

Be it known that I, JOHN A. DAHLGREN, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in the Construction of Cast-Iron Ordnance, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents an elevation of the side of one of my improved guns finished, and Fig. 2 represents an elevation of the side of the rough casting or blank as it comes from the mold and before the finishing is commenced.

To produce cast-iron ordnance of the greatest strength, it is necessary that the molten metal, after being poured into the mold, should cool with evenness and regularity throughout the entire length of the gun, to effect which it is indispensable that the diameters of the casting should vary as little as possible, and that the external surface should be uniform and free from prominences of any kind, or at least from such as have material volume; if not, the mass cools and solidifies first where its diameters are least, and afterward where they are greatest, and the parts which cool last shrink from the parts which cool first, thereby straining the metal and diminishing its strength. The largest portions being located at and near the parts of the gun surrounding the charge renders it less capable of resisting the force of the explosion, which exerts nearly all if not the whole of its power within what I have termed the "fort of the gun," or that part surrounding the charge. Prominences of any kind also cool first and cause irregularity of contractile strains in their vicinity, which are highly detrimental if of material volume. For this reason, as well as from their locality and consequent effect upon the breech, the cascabel and trunnions should be made separately and afterward attached; and the rear portion of the gun, including the fort, should be of a substantially spheroidal or ellipsoidal form, as indicated by the red lines in Fig. 1, which represent the section of a prolate spheroid in a plane parallel to its long axis. To contribute still further to rendering the metal homogeneous, the mold should be surrounded by a layer of

charcoal or other slow conductor of heat, so as to render the cooling and solidification of the different portions of the gun more slow and even. After the casting has been slowly and thoroughly cooled, it is to be bored of the proper caliber, and its exterior turned down until reduced to the proper size, according to a rule of construction (in which the diameter of the bore is the unit of measure) invented by me, and fully described in another patent bearing even date herewith, and which need not therefore be here described. The size and shape of the rough casting at the breech and fort, or the parts surrounding the charge, when the gun is loaded, should be precisely such as are required in the finished gun, for as here occurs the greatest force of the explosion when the gun is fired, it is very desirable to retain the crust or outer shell of the casting intact, as it is much stronger and tougher than the interior metal and conduces materially to the strength of the gun where strength is most needed. The reduction of the rough casting should therefore be made between the forward part of the fort of the gun and the muzzle; and the finishing should be so executed as to leave the gun with a smooth surface and gradually decreasing mass from the region around the charge to the muzzle free from all moldings or ornamentations that would interrupt or disturb the waves of vibration that traverse the gun when discharged and occasion or accelerate its rupture. A slight swell of the ordinary form has been retained about the muzzle, to fortify it against accidental blows which might fracture metal so thin as that of the muzzle would be if the rule of construction before referred to were followed rigidly. It is to be understood that at this portion of the gun, so remote from the charge, the danger due to a slight departure from the law of construction, though existing, is less than that which would arise from the exposure of the muzzle, unprotected by a swell, to heavy blows. The swell is therefore to be regarded as the lesser of two evils.

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

1. The method herein described of manufacturing cast-iron ordnance by first casting it in the rough of such proportions as will give the metal the most tenacity and freedom from contractile strains, and then reducing the cast-

ing to such proportions as will produce the form of gun best calculated to endure the shocks of discharge.

2. The manufacture of cast-iron ordnance, substantially as described, with the rear portion thereof of a substantially spheroidal form, and the exterior surface smooth and free from the moldings and other ornamentation with which guns have heretofore been made.

In testimony whereof I have hereunto subscribed my name.

JNO. A. DAHLGREN.

Witnesses:

A. B. NORTON,
JNO. D. BRANDT.