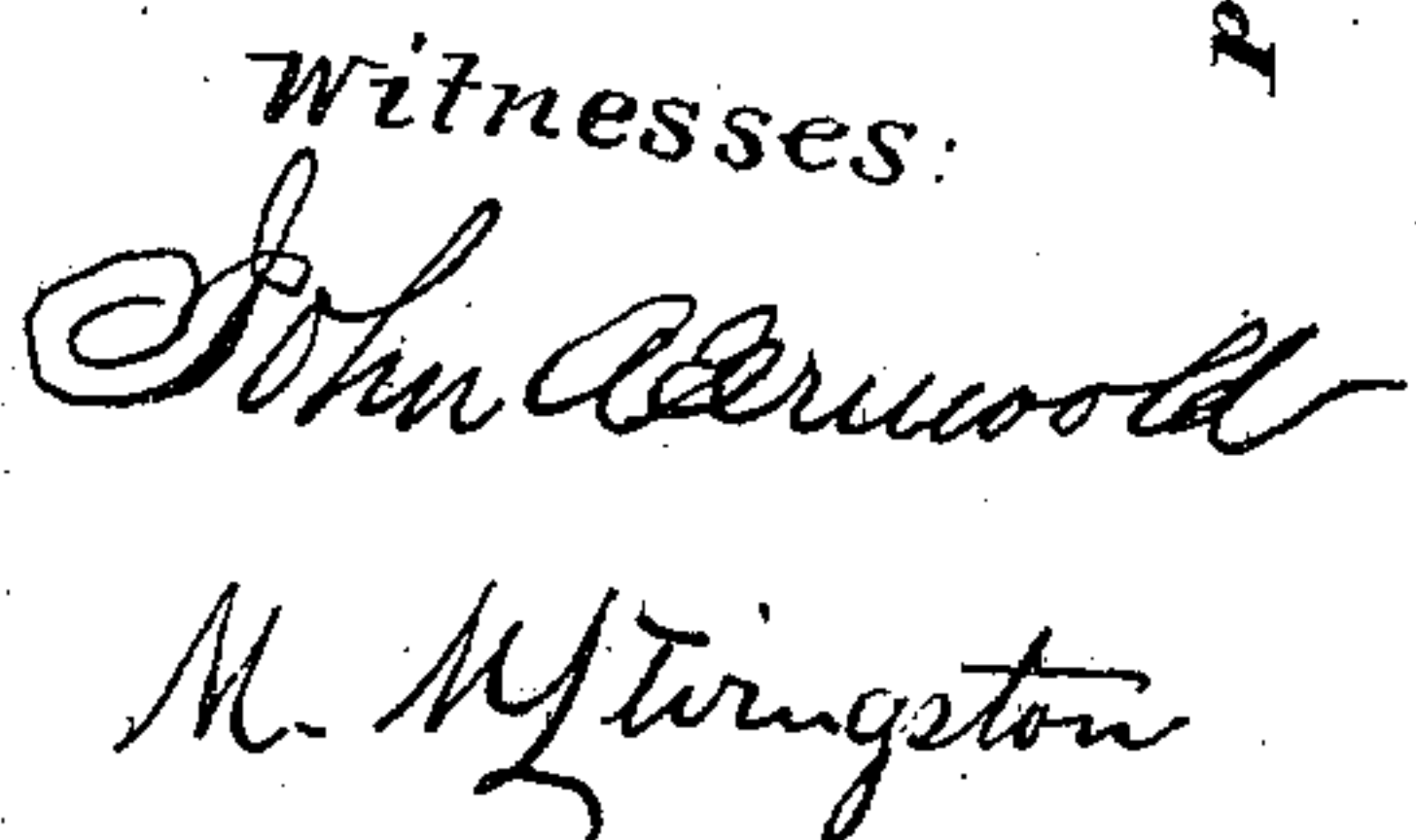


Ordnance.

Patented Jan. 12, 1864.



Inventor:

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UNITED STATES PATENT OFFICE.

JOHN ERICSSON, OF NEW YORK, N. Y.

IMPROVEMENT IN THE CONSTRUCTION OF ORDNANCE.

Specification forming part of Letters Patent No. 41,208, dated January 12, 1864.

To all whom it may concern:

Be it known that I, JOHN ERICSSON, of the city, county, and State of New York, have invented certain Improvements in Ordnance; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central longitudinal section of a cannon constructed according to my invention. Fig. 2 is a transverse section of the same taken through the trunnions. Fig. 3 is a side view of the trunnion-band. Fig. 4 is a central longitudinal sectional view of a modification of part of my invention.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to the manufacture of ordnance of a central core or barrel containing the bore, and a system of bands, hoops, or rings of wrought-iron surrounding the said core from the breech to within any desirable distance of the muzzle; and it consists in a certain novel construction of and mode of combining the several parts, whereby the fibrous character of the wrought-iron is preserved, and the union of the several parts is rendered such that their proper relation will not be disturbed by the firing of the piece, or by the heating and cooling to which it is subject in use, and, in short, to so construct ordnance as to obtain the necessary strength with the least weight of metal.

To enable others skilled in the art to construct a gun according to my invention, I will proceed to describe it with reference to the drawings.

A is the central core or barrel, which I prefer to make of wrought-iron, forging it of a length equal to the entire length of the gun, and of such external diameter that when bored to the desired caliber and turned externally there will be thickness for the chase and muzzle of the gun, and around the breech end there is forged a solid flange or collar, *a*. This core or barrel is bored from the muzzle to within a suitable distance of the breech end, to leave a suitable depth of breech, and its exterior is so turned as to present the form of a series of cylinders, *b c d e f g h*, of slightly-varying diameters, the largest, *b*, next the flange *a*, and the diameters diminishing in a forward

direction to the smallest, *h*, which is some distance in front of the trunnions. In front of the cylinder *h* there is cut a screw-thread, *i*, of slightly-smaller diameter, and from this thread there should be a slight taper to the muzzle.

j j' are the bands or hoops, made of rolled-iron plate, such as is commonly known as "boiler-plate," confined between two heavy forged wrought-iron bands, *k l*, one of which is fitted tightly to the first and largest cylinder, *b*, on the extension of the core *A*, and against the flange *a*, and the other is fitted tightly to the last and smallest cylinder, *h*, where it is held firmly against the hoops *j j'* by means of a nut, *m*, fitted to the screw-thread *i*. The hoops *j j'*, after having been cut from the plate and faced on both sides, are turned or bored internally to fit tightly to the cylinders *b c d*, &c., as many being fitted to each cylinder as will occupy its whole length when they are all pressed tightly together, and the said hoops are so put on that the fiber of the iron in each will run nearly at a right angle to the fiber in the next one on either side of it. The width of the several hoops *j j'*, from their inner to their outer circumferences, is such as to give the necessary re-enforcement to the barrel or core *A*, and to give a desirable form to the gun when finished, except that a number of the said hoops *j j'* are of a sufficiently-reduced size to enable the trunnion-band *h* to be put on over them, and to be secured between the larger hoops in front and rear, as shown in Fig. 1. The trunnion-band *n* is forged with the trunnions *p p* upon it, and turned so that it fits tightly over the cylindrical surface presented by the reduced hoops *j j'*, and that its depth from back to front will exactly correspond with the aggregate thickness of the smaller hoops *j j'* when the latter are pressed as closely as possible together. The band *k*, which bears against the solid flange *a*, is so formed wider in front as to present a broader bearing for the hoops *j*, and obviate the necessity of making the flange *a* so large as would otherwise be necessary. The band *l* is so formed wider in front as to form a broad front bearing outside of the nut *m*, as shown at 5 5 in Fig. 1, for the purpose of applying hydraulic pressure to press the several hoops as closely as possible together before screwing up the nut.

The several parts are all put together in a cold state by the aid of hydraulic pressure, the band (*k*) hoops *j j'* being severally so tightly fitted to their respective cylinders *b c d*, &c., on the core or barrel *A*, and the trunnion-band being so tightly fitted to the exterior of the hoops *j'*, as to require very powerful pressure to bring them to their places. By putting the parts together cold the joints are made closer and the gun is made more solid than if the parts were put together hot, as (though in the latter mode the several bands could be tightened circumferentially by the shrinkage in cooling) the shrinkage would produce openings between the several hoops and between the faces of the said hoops and the bands *k l m*.

Fig. 4 represents the substitution for the nut *m* of a band, *p*, which is placed on the core or barrel while hot and shrunk thereon while cooling. The screw-thread *i* is in that case dispensed with; but to prevent the band *p* from slipping off, a shallow groove or recess, *6*, is turned in the core or barrel for the reception of a slightly-projecting fillet formed around the interior of the said band, the thickness of the said fillet being such that by the expansion of the band produced by heating it may pass over that portion of the core or barrel which is to be occupied by the larger portion of the interior of the band when the latter is in place close to the band *l*. This band *p* is the equivalent of the nut *m*.

Owing to the manner in which the tightly-fitted hoops *j j* and bands *k l* are put on, it is of great importance to have the part of the exterior of the core or barrel *A* on which they are placed turned in the form of a series of cylinders of various diameters, as hereinabove described, as by that means some of the said hoops or bands require to be pressed a great distance along a tightly-fitting surface; and

hence the destruction of the surfaces of their bores and injury to their fit, which might occur if they were pressed along the whole or a great portion of the length of the gun, is obviated. The manner of applying the trunnion-band is also of great importance, especially in making a gun of large size, as it enables the said band to be made so thin that in forging the fibrous character of the iron may be preserved, and it may be so well hammered as to make it very tough.

To prevent any abrasion of the outer edges of the hoops *j j* by putting on the trunnion-band, the said band may be sufficiently warmed before being put on to so expand it as to enable it to pass easily over the said hoops.

Having thus described my invention, I will proceed to state what I claim and desire to secure by Letters Patent—

1. In a piece of ordnance composed of a central core or barrel and a series of surrounding hoops or bands, fitting the trunnion-band upon the exteriors of hoops *j j'* and between the faces of other hoops *j j* of larger external diameter, when the said hoops all constitute one longitudinal series, and the interior diameter of those *j j* are like those of *j' j'*, smaller than the interior diameter of the trunnion-band, substantially as herein described.

2. The construction of a piece of ordnance of a central core or barrel, *A*, provided with a solid flange, *a*, around its rear end, and fitted with a series of plate-iron hoops or rings *j' j'*, two forged bands, *k l*, and a trunnion-ring, *n*, the whole combined and secured by a nut, *m*, or its equivalent, substantially as herein specified.

J. ERICSSON.

Witnesses:

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