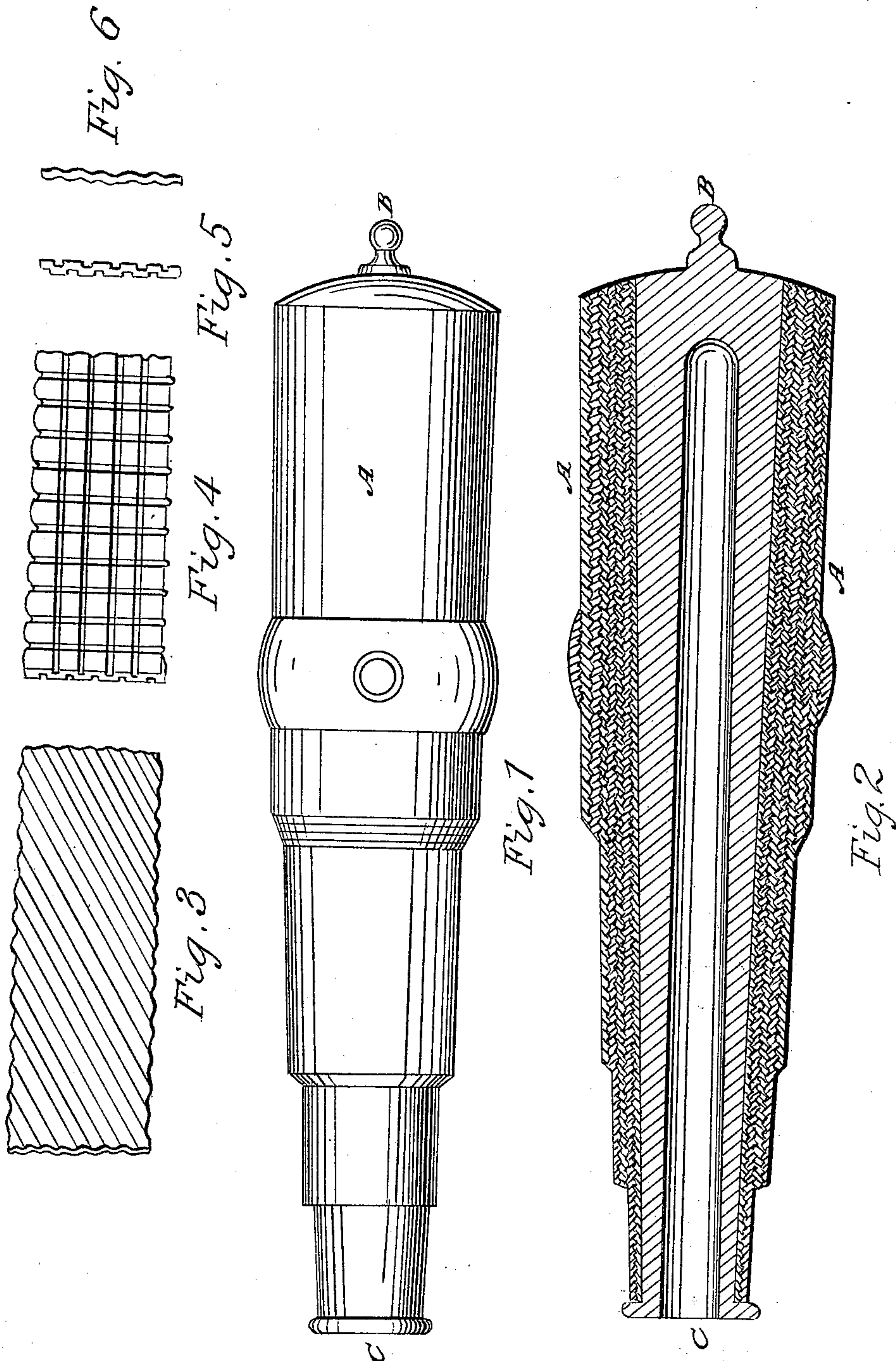


J. B. READ.
Making Ordnance.

No. 95,604.

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IMPROVEMENT IN THE CONSTRUCTION OF ORDNANCE.

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, JOHN B. READ, of the town and county of Tuscaloosa, and State of Alabama, have invented certain new and useful Improvements in the Construction and Reinforcement of Ordnance, Hydraulic Cylinders, &c.; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in surrounding any inner tube, core, or mass of metal, whether for ordnance, hydraulic cylinders, &c., or shafting, as for steamers, &c., with a scroll or scrolls, of any metal, in sheets, such sheets to be rolled, with corrugations, whether transverse or diagonal, or a combination of the same, with longitudinal grooves, and whether upon one or both sides of said sheets, for the purpose of leaving regularly-defined recesses between the convolutions of the scrolls, and afterward filling up the same with any bronzing or brazing alloy, solder, or deposit, or instead of scrolls, as above, using cylinders of corrugated metal.

Figures 1 and 2 show my improvement, as applied to ordnance.

Fig. 1 shows, at A, the enveloping-scrolls or cylinders, covering all the exterior of a gun, except at B and C, where the different composition of the interior tube is represented.

Fig. 2 is a longitudinal mid-section of the same; the inner tube is shown extending from B to C, and surrounding it at A.

A are the scrolls or cylinders described above.

Figure 3 represents a sheet of metal, corrugated diagonally, so as to fit it for being made into scrolls or cylinders for enveloping the central tube.

Figure 4 represents a sheet of metal, prepared for the same purpose, but with longitudinal and transverse grooves, for the admission of the bronzing or brazing mixture.

Figure 5 is an edge or end view of fig. 4.

Figure 6 is an edge or end view of fig. 3.

The inner tube B C may of course vary greatly in shape; it may taper regularly from breech to muzzle, as shown in the drawing; or it may have variations in diameter, and the breech, as well as the sides of of the tube, may be surrounded by the scroll or scrolls or cylinders.

In whatever mode the enveloping-scrolls or cylinders are arranged, there must always be sufficient interstices left for the passage of the brazing alloys, &c., to bind the whole compound mass together, and thus secure the greatly-increased strength and endurance sought by this invention.

To secure regularly-defined interstices between the

scrolls or cylinders, plates of iron, steel, copper, or any suitable metal should be rolled with grooves, which may be transverse, diagonal, longitudinal, or a mixture of the same, and upon one or both sides of the plates, or running in different directions on the two sides.

Projections of small metallic points might be studied over the sheets, but corrugations are preferred.

The scroll-plates may vary in width and length, according to the part they are to subserve and convenience of construction, and one or more may be applied over another; the number is not very material, as the whole will be consolidated by the permeating, bronzing, or brazing mixture, &c.

The inner end of each scroll is to be attached to the tube by screws or otherwise, and then the scroll is to be wound around the tube, which will be most conveniently accomplished by hanging the inner tube upon pivots, and rotating it while the scrolls are being applied.

The scrolls are to be applied with such degree of tension as may be deemed best adapted to the object in view, and, as fast as applied, the outer margin of each scroll is to be made fast by rivets or otherwise.

Then, when the coiling is completed, the gun is to be placed on end (after using an acid solution of the proper strength, to cleanse the scroll-plates) in a mould prepared for the purpose, and sufficient heat applied to bring the whole mass up to the proper point for brazing or soldering.

When this point is attained, the bronzing, brazing, or soldering mixture is to be run into the mould, and with a proper head for pressure, or by exhausting the air, if necessary, will readily permeate all the interstices.

Holes may be drilled, if desired, through the enveloping-scrolls, by which a still more binding effect of the brazing mixture may be secured; and it may be found advantageous to add to the brazing mixture antimony or other metals, so as to secure expansion in cooling.

A sufficient amount of the brazing mixture must always be used to coat the exterior of the gun, so as to cover it perfectly when finished, and thus prevent all oxidation, &c.; or, the interstices of the scrolls, instead of being filled by brazing mixtures, may be filled and bound together by deposits of metal precipitated by the galvanic battery, as in the process of electro-plating.

When steel plates are used for the scrolls, the temper of the plates may be best preserved by using the galvanic process for filling the interstices, and the same may be said of steel wires.

A gun, constructed and consolidated as above described must, it is evident, have very great powers of

endurance, and when at last destroyed by long-continued firing, it is equally evident that the yielding of the gun will be so gradual that fair notice will be given, and thus no lives endangered by a sudden explosion.

Guns thus constructed claim economy as well as safety as distinguishing merits; they may also have less weight than ordinary guns of the same calibre; a very important consideration when intended for field or naval service.

Besides, guns and mortars of larger calibre than any now in use, may be constructed on this plan, with the certainty of securing strength in proportion to their size, a result heretofore unattainable.

Monitor mortars, capable of throwing shells of more than a ton weight, may be safely used if constructed on the above plan.

Should any flaws or imperfections show themselves at any time in guns made on this plan, they may be placed again in the mould, and fresh brazing metal used to close all imperfect joints or crevices.

As already stated, cylinders formed of corrugated metal may be used, as above, instead of scrolls, and each cylinder, properly riveted or welded, may be applied one upon another, with the degree of tension best suited to its place upon the gun, and the interstices left by the corrugations, filled as before; or the cylinders may be driven on. Whether a series of scrolls or a series of cylinders be used, they should be so applied as to alternate or break joints.

Ordinary cast-iron or other guns may be reinforced by having scrolls or cylinders, as described above, fitted over the parts of the gun most exposed to strain, and the interstices filled, as already directed.

Trunnions and breech-straps may be attached by shrinkage or may be fitted upon the gun when placed in the moulds, and united to the exterior of the scrolls or cylinders by the same application of brazing or soldering alloy, which fills the interstices of the scrolls, &c. Vents of guns to be fitted with a brushing-screw, as usual.

Wrought-iron, cast-iron, or steel may be used for the inner tube of the gun.

When cast-iron or steel are used for this purpose, the trunnions may be cast with the tube, taking care

to leave the trunnions of sufficient length to allow the proper number of scrolls or cylinders to be arranged upon the tube or gun.

The above-described method is obviously applicable to the cylinders of hydraulic presses and other cylinders requiring great strength.

Another application of the same is, to the large shafts required for river and ocean steamers, whether such shafts be solid or hollow, also to shafting generally, and axles of railroad-cars, &c.

Shafts in actual use may be strengthened or repaired in the manner indicated above.

I am aware that it is not new to construct ordnance by winding a sheet or sheets of metal around a central core, and consolidating the whole by filling the interstices between the several coils with melted metal or alloy, and that the same method of consolidation has been applied to ordnance formed of a series of concentric cylinders, surrounding a central core; and I do not wish to be understood as making any claim to this method; but

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

In the construction of ordnance, shafts, axles, cylinders, and the like, of concentric coils or cylinders, applied to a central tube or core, in the manner described, providing channels or spaces for the introduction of the melted metal or alloy between the several coils or cylinders by previously grooving or corrugating the surface or surfaces of the plates to be coiled, or of the cylinders to be applied; or by holding the successive coils or cylinders apart from each other by the interposition between them of studs or points, as described, and then filling said grooves, channels, or spaces, as well as all other interstices, with melted metal or alloy, in the manner substantially as set forth, whereby the full strength and tension of the metal composing the enveloping-coils or cylinders may be secured while the whole mass is firmly consolidated by bronze or other alloy.

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Witnesses:

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