

(No Model.)

F. J. SEYMOUR.

METHOD OF MAKING GUNS AND ORDNANCE.

No. 376,168.

Patented Jan. 10, 1888.

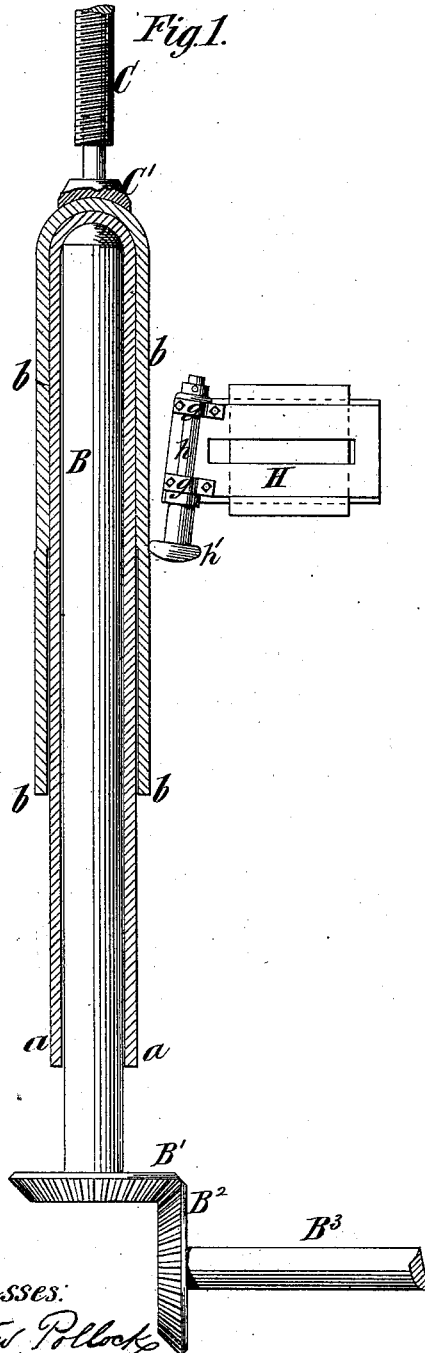
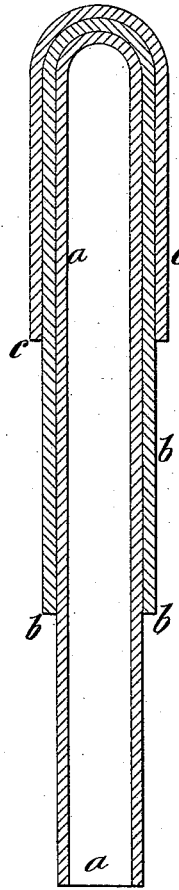


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING GUNS AND ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 376,168, dated January 10, 1888.

Application filed June 15, 1885. Renewed June 17, 1887. Serial No. 241,612. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK J. SEYMOUR, of the city of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in the Method of Making Guns or Ordnance, of which the following is a specification.

This invention relates to the manufacture of ordnance and cannon by first producing a number of drawn tubes or shells, which are preferably of steel, and in then securing them one within another to form a cannon or piece of ordnance, whereby a very strong gun will be produced.

In carrying out my invention I first produce a number of seamless drawn metal tubes or cylindric shells which are of such relative size that they may be slipped easily one within another, and which have their surfaces finished in the operation of drawing, and I afterward contract the several tubes or shells one upon another, so as to permanently connect them, each tube or shell forming the mandrel upon which the next outermost tube or shell is contracted and secured.

In carrying out my invention the contraction of the metal tubes or shells may be effected by an operation analogous to spinning, or by forcing the tubes through a die of suitable size by a proper mandrel, or I may secure the tubes one upon another by means of a machine similar to that shown in my application for Letters Patent, Serial No. 166,833, filed May 27, 1885.

In the accompanying drawings, Figure 1 represents in sectional view two tubes or shells arranged one within another and such parts of a machine similar to that described in my aforesaid application as are necessary to clearly illustrate the invention; and Fig. 2 represents a sectional view of three tubes secured one upon another and forming a gun, which only requires the addition of a trunnion-band to complete it.

Similar letters of reference designate corresponding parts in both figures.

The gun represented in Fig. 2 is composed of three separate tubes or shells, *a b c*, which are made of iron or of a mild steel, or which may, in the case of brass ordnance, be made of drawn brass. These tubes or cylindric shells

are formed from disks or circular plates of metal of a thickness much greater than the shells or tubes are to have when finished. The method of forming them may be that commonly practiced in making drawn seamless hollow tubes of metal, and I prefer to make them by the method described in Letters Patent No. 316,600, granted April 28, 1885, to William Henry Brown, and which consists in subjecting the metal to the principal operations of drawing or folding in a heated state and to the later operations of drawing in a cold state. According to this method the disks or circular blanks of metal are heated and first dished up by machinery commonly used for such operations. They are again heated and pushed through dies by means of cylindric plungers or mandrels, and this operation, commonly used in drawing hollow cylinders, is repeated as many times as may be necessary for each tube or shell, using smaller and smaller plungers or mandrels and corresponding dies in the successive repetitions of the operations until the tube or shell is of the requisite caliber externally and internally. The last few passes of the tube or shell on the mandrel through the die are made with the metal in a cold state, in order to condense or harden the metal and increase its tensile strength, and that in the case of the innermost tube, *a*, the interior of said tube may be smoothed and hard-finished to constitute the bore of the gun without further finish.

Of the several tubes *a b c* required to form a gun or cannon the innermost one is of the full length of barrel, and the outer ones may be successively shorter, so that all their several thicknesses are combined only in and near the breech, where the greatest strength is required, and the walls of the barrel of the gun are gradually thinner toward the muzzle, where least strength is required.

The several tubes or shells are made of such size that when complete and finished by the operations of drawing they may be slipped one inside another.

In Fig. 1 I have represented a part of the apparatus whereby the tubes may be contracted one on another. In the figure, B designates a mandrel or spindle, which may be supported

in suitable bearings, (not shown,) and receives rotary motion by bevel-wheels B' B^2 from a driving-shaft, B^3 . I have also represented a binding-screw, C , which is concentric with the mandrel and has at its lower end a rotary foot-piece or steadiment, C' , by which the one or more tubes or shells may be clamped upon the mandrel B , so as to rotate therewith.

H designates a slide or a portion of the carriage to which is fitted in suitable bearings, g , a spindle, h , provided at its lower end with a spinning tool or disk, h' . By means of mechanism such as described in my aforesaid application for Letters Patent the spinning tool or disk is traversed from top to bottom of the tube b , at the same time being pressed forcibly against the outer circumference thereof, and as the mandrel, with the tubes upon it, rotates the spinning tool or disk h' contracts the outer tube or shell, b , upon the inner shell, a , and permanently secures it thereon. Consequently the two tubes or shells which were previously slipped one upon another will be permanently connected, the inner tube, a , constituting the mandrel upon which the next outer tube, b , is contracted or reduced. This operation is to be repeated one or more times with each tube b c as may be found necessary, and in this way the tubes or shells are contracted and caused to bind or grasp firmly upon the tube or shell which is next innermost. After the required number of tubes or shells to form a gun of the necessary strength have been secured one upon another, as described, a trunnion-band may be secured upon the shells by shrinking or otherwise to complete the gun.

I am aware that it is not new to produce a vessel made of layers or thicknesses of two or more metals by first spinning one metal to the

desired shape and then spinning a disk of another metal to change its form, so that it will closely hug the exterior of the vessel. Such a method of making composite vessels is described in the patent granted Philip P. Meyer, January 1, 1867, and numbered 60,770. My process or method differs from that described in Meyer's patent in that I first produce all the component parts of my gun in the form of drawn cylinders each having its internal diameter but slightly greater than the external diameter of the cylinder which it is to receive. Before the process of contracting them one upon another is performed they are all produced in the form of cylinders, and all have the close texture and the extremely hard surfaces which can be obtained only by drawing, and cannot be obtained by a spinning operation whereby the metal is changed in form from a disk to a cylinder.

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

The improvement in the method of making cannon or ordnance, consisting in producing a number of cylindric drawn tubes or shells each having its interior and exterior surfaces finished in the operation of drawing, and the several tubes or shells being of such relative diameters that they may be slipped one upon another, and in afterward contracting the several tubes or shells by successive operations one upon another, each tube or shell forming the mandrel upon which the tube or shell next outermost is contracted, substantially as herein described.

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Witnesses:

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