

(No Model.)

W. H. BROWN.
METHOD OF MAKING ORDNANCE.

No. 348,719.

Patented Sept. 7, 1886.

Fig1.

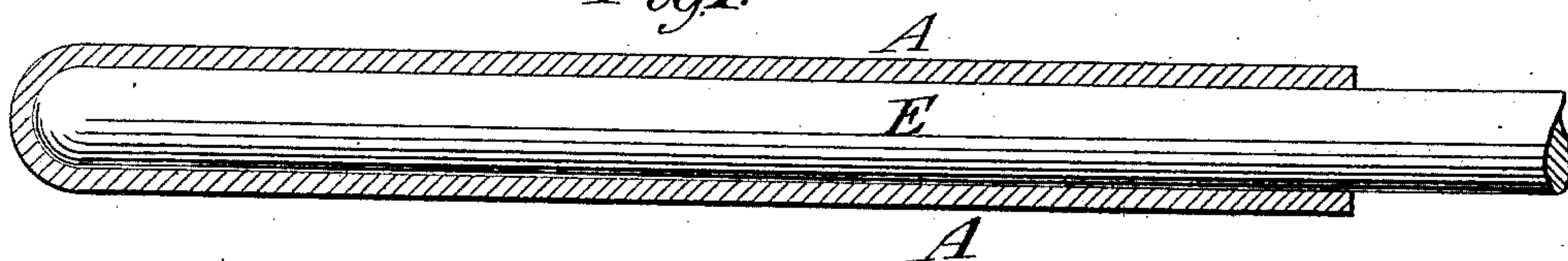


Fig2.

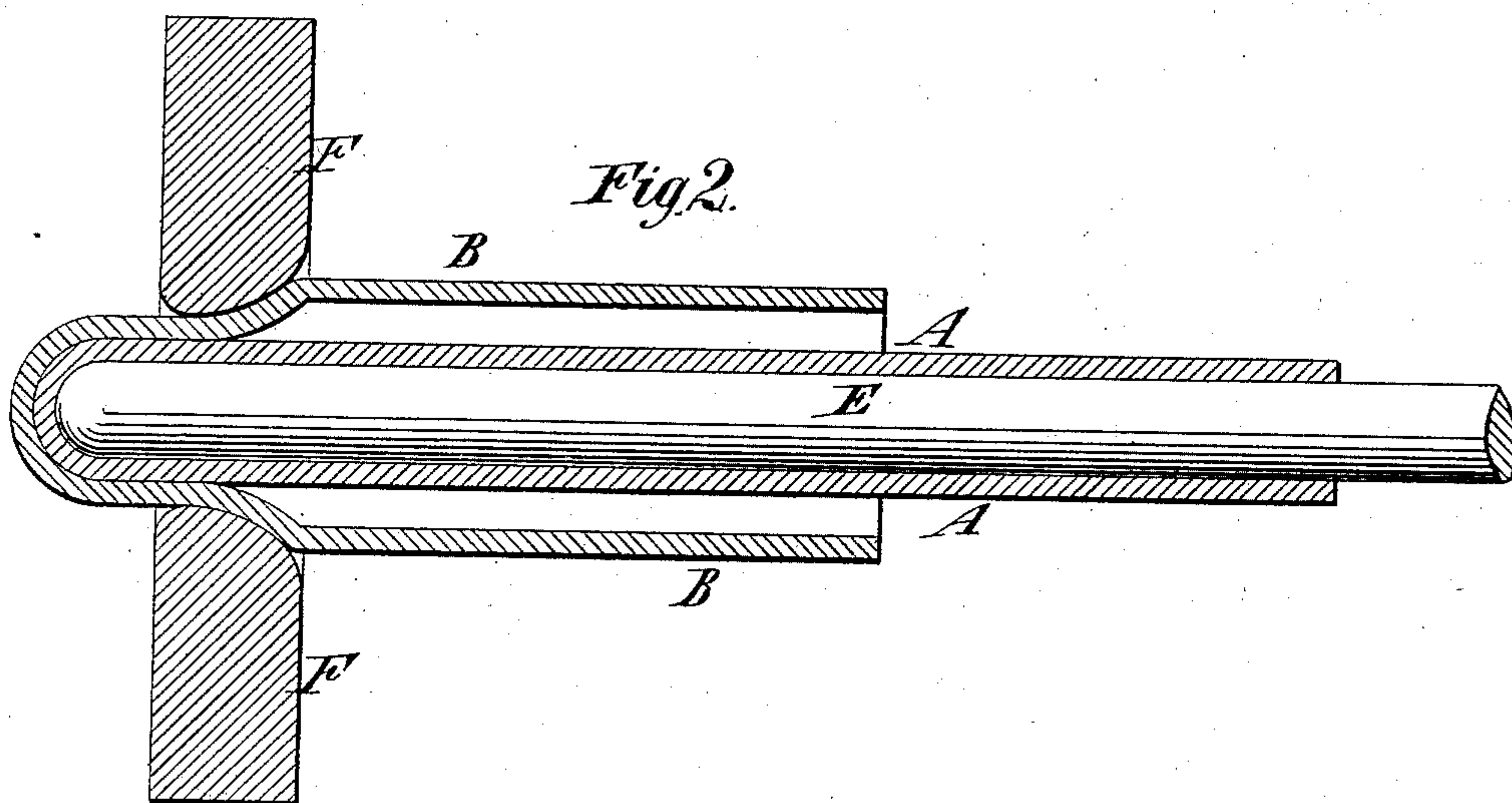
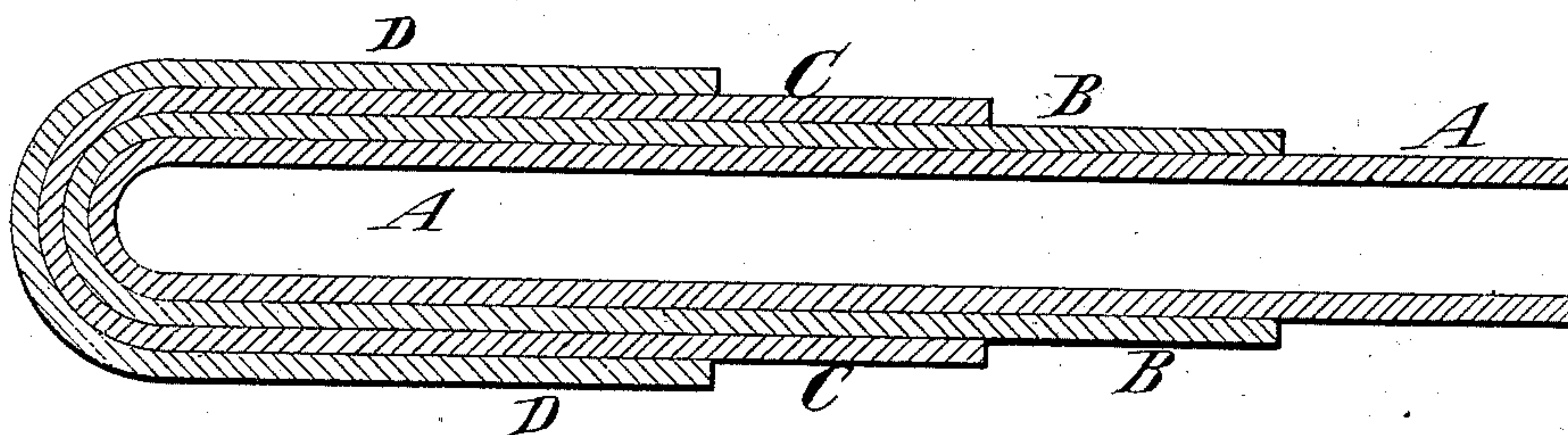


Fig3.



Witnesses.

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WILLIAM HENRY BROWN, OF NEW YORK, N. Y., ASSIGNOR TO BROWN'S SEAMLESS METAL COMPANY, OF JERSEY CITY, NEW JERSEY.

METHOD OF MAKING ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 348,719, dated September 7, 1886.

Application filed July 15, 1885. Serial No. 171,673. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY BROWN, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in the Method of Making Ordnance and Gun-Barrels, of which the following is a specification.

My invention relates to the method of making cannon and gun-barrels, which consists in first forming a number of cylindric shells and then securing them one upon and outside of another to form a composite cannon or gun-barrel; and the object of the invention is to secure a closer and more perfect fit between the shells which successively inclose one another.

According to my present invention I first produce by cupping and drawing with mandrels and dies, a series of seamless shells which are substantially closed at one end and are of such size as to enter easily one into another. I then place the smaller shell upon the mandrel, which it fits snugly, and close in or contract the shells one upon another successively by passing through dies, beginning with the next to smallest in size, and repeating the closing in or contracting operation until the shells are all combined one outside another.

In carrying out my invention, I prefer to subject the metal in a hot state during the early stage of the process to the folding or cupping operations necessary to change the shape from the flat to the cylindric, and in a cold state to the subsequent drawing operations by which the cylindric shells are condensed, consolidated, tempered, and finished, and I also prefer to subject the shells in a cold state to the closing in or contracting operations by which the shells are contracted one upon another.

In the accompanying drawings, Figure 1 represents a mandrel, and a sectional view of a shell folded or drawn thereon. Fig. 2 represents in section two cylindric shells and a die and mandrel, illustrating the operation of closing in or contracting the shells one upon another; and Fig. 3 is a sectional view of a cannon made according to my invention and composed of four shells, the cannon being ready for the application of the trunnion-band.

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

A B C D designate four cylindric shells, which are combined to form the gun here represented.

The invention may be employed in making guns or barrels having two or any greater number of shells. These several cylindric shells are made by subjecting sheet or plate metal to the operations of folding and drawing by means of suitable dies and mandrels. The metal may be subjected in a hot or cold state to such folding and drawing operations, or I may, and I now prefer, to subject the metal in a hot state to the early stages of the operation, whereby the metal is folded to change its form from flat to cylindric, and in a cold state to the later stages of the operation, whereby the shells are condensed, consolidated, hardened, and tempered. Such process of making cylindric shells forms the subject-matter of my United States Letters Patent No. 316,600, dated April 28, 1885, and I do not desire to here claim that process, broadly. When thus produced, the cylindric shells vary very considerably in size, as will be seen from Fig. 2, each shell being considerably larger in diameter than the one which it is to receive, and considerably smaller than the shell which is to receive it. The shells may all be of the same thickness, or the inner shell, A, may be thicker than those surrounding it.

In combining the shells together I first place the innermost and smallest shell on a mandrel, E, and, having introduced the mandrel and shell A within the larger outer shell, B, I force them together through a suitable die, F, of such size that by the passage of the shells through the die the outermost shell, B, will be closed down tightly or contracted onto the exterior of the shell A and caused to fit snugly thereon from end to end. One passage of the shells through a single die may suffice to close each shell tightly upon the one within it, or two or more passes of the shells through dies of different sizes may be necessary to complete the closing or contracting of each shell upon the one next within it. I now prefer to subject the cylindric shells in a cold state to the closing or contracting operations necessary to fold them tightly one upon another, as in that case the hardness, solidity, and temper which the shells have received from the previous cold-

drawing operations will remain unimpaired, and because the additional solidity, hardness, and temper imparted to the metal would not be secured by closing in or contracting the shells one upon another while in a hot state. The closing in or contracting operation or operations are repeated with each shell until the shells are all contracted solidly one on another, as shown in Fig. 3, thus preparing the cannon or gun for the reception of the trunnion-band, and the mandrel E is then removed and the gun completed.

The shells may have in their closed ends a small hole, serving as a vent to facilitate the withdrawal of the mandrel.

The invention is applicable either to muzzle or breech-loading guns, and by it a very strong and light gun may be produced, and one which may be finished at small cost.

I am aware that it is not new to fold a strip of metal longitudinally to form a tube, which is completed by soldering the joint, and then inserting such tube within an outer tube and subjecting them together to a drawing operation, whereby they are reduced in thickness and solidly united one upon the other.

I am also aware that it is not new to re-enforce the end of a boiler-tube by placing a ferrule upon a mandrel and a tube outside the ferrule and mandrel; and subjecting the tube and ferrule to a drawing operation, whereby

they are reduced in thickness and solidly united. In the closing in or contracting operations to which I successively subject my shells to form a gun I do not seek to reduce the thickness of metal, but simply to combine them solidly together, and the closed ends of the shells sustain the end of the shell which is outermost during the closing-in or contracting operation and holds said outer shell in place or prevents it from being drawn or moved lengthwise over or along the inner shell.

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

The improvement in the method of making a gun or gun-barrel, consisting in first producing, by cupping and drawing with mandrels and dies, a series of seamless shells, which are substantially closed at one end, and are of such size as to enter easily one into another, and in then placing the smaller shell upon a mandrel and closing in or contracting the shells one upon another successively by passing through dies, beginning with the next smallest in size and repeating the closing-in or contracting operations until the shells are all combined, substantially as herein described.

WM. HENRY BROWN.

Witnesses:

C. HALL,

T. B. CLATWORTHY.