

(No Model.)

J. P. LAVIGNE.  
METHOD OF MAKING CANNON.

No. 406,452.

Patented July 9, 1889.

Fig. 1

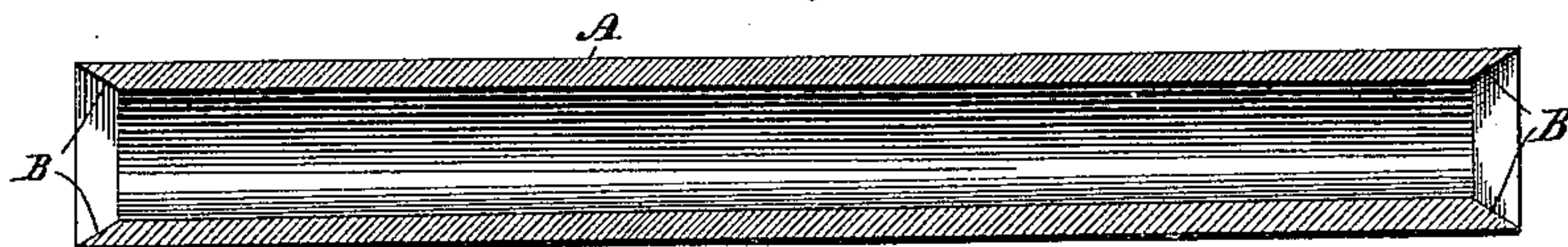


Fig. 2

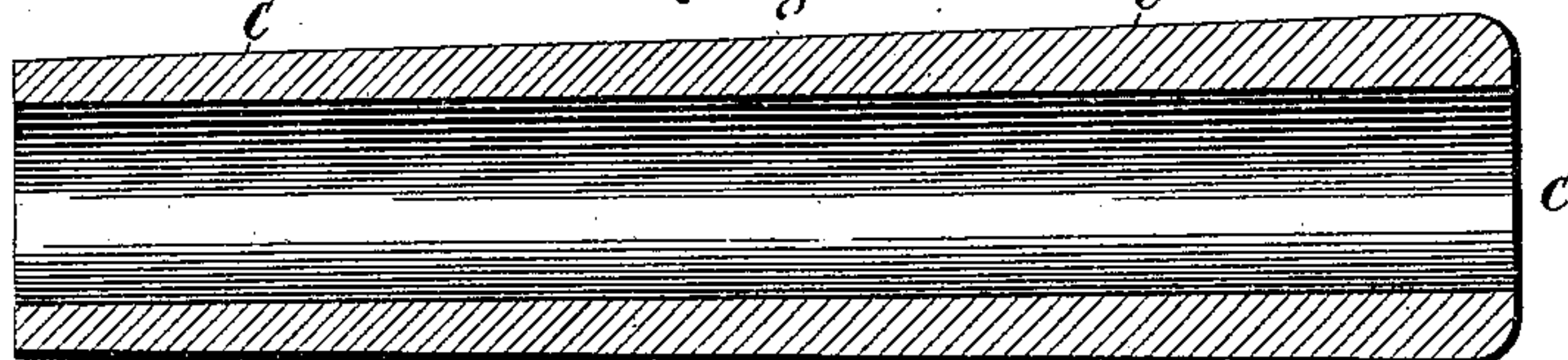


Fig. 3

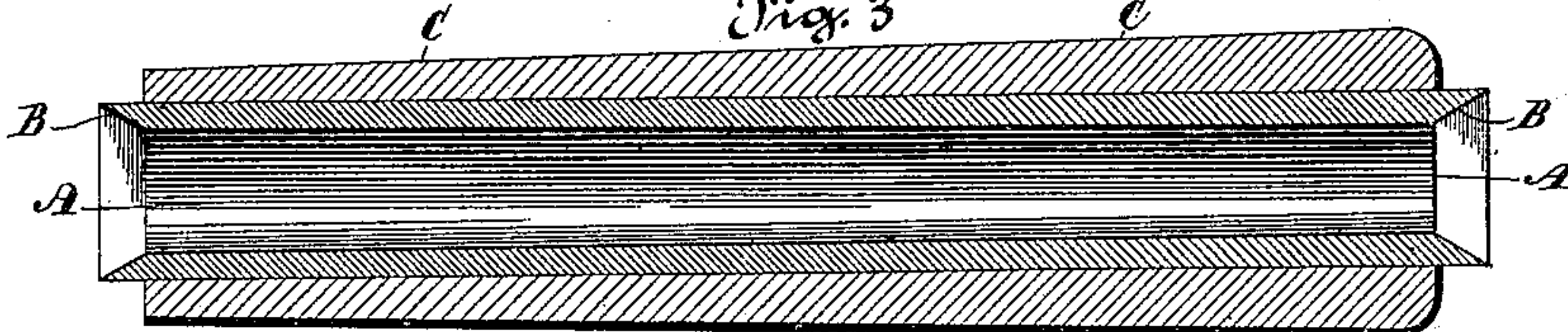


Fig. 4

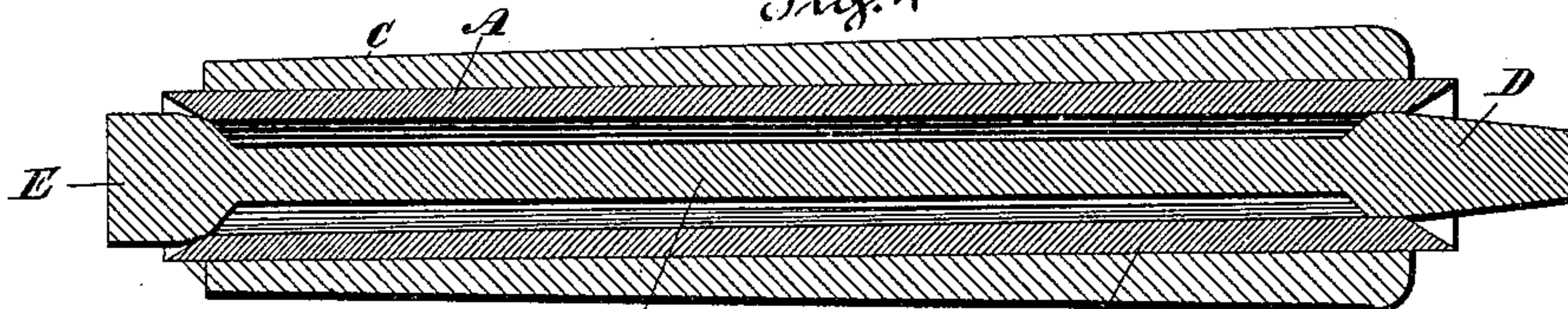


Fig. 5

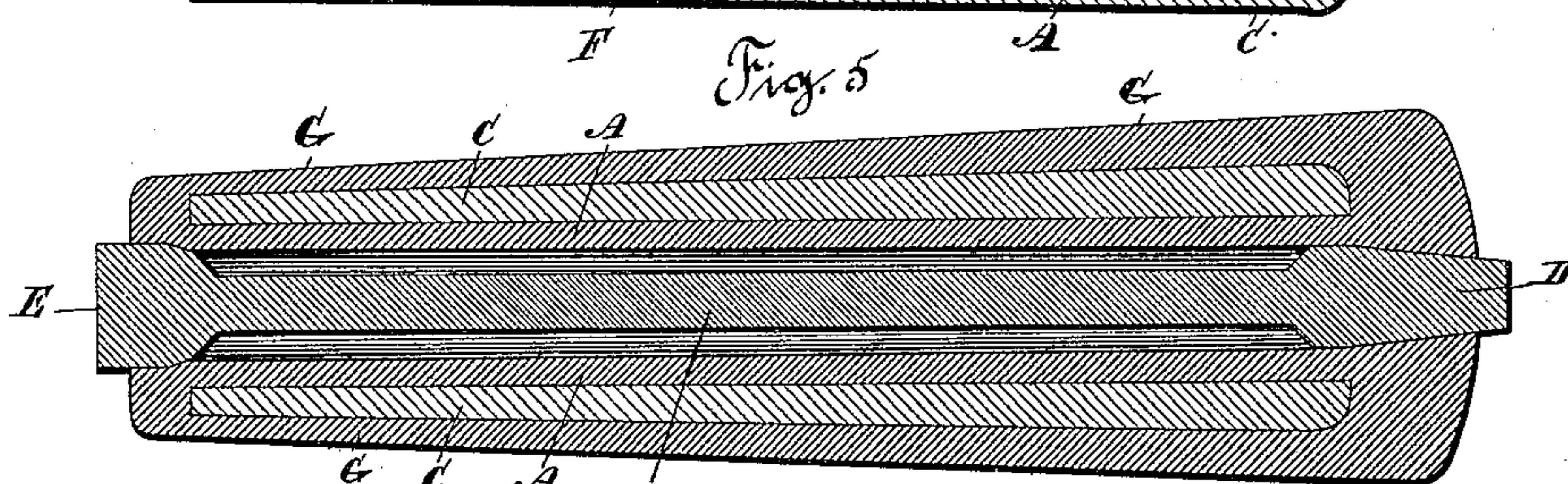
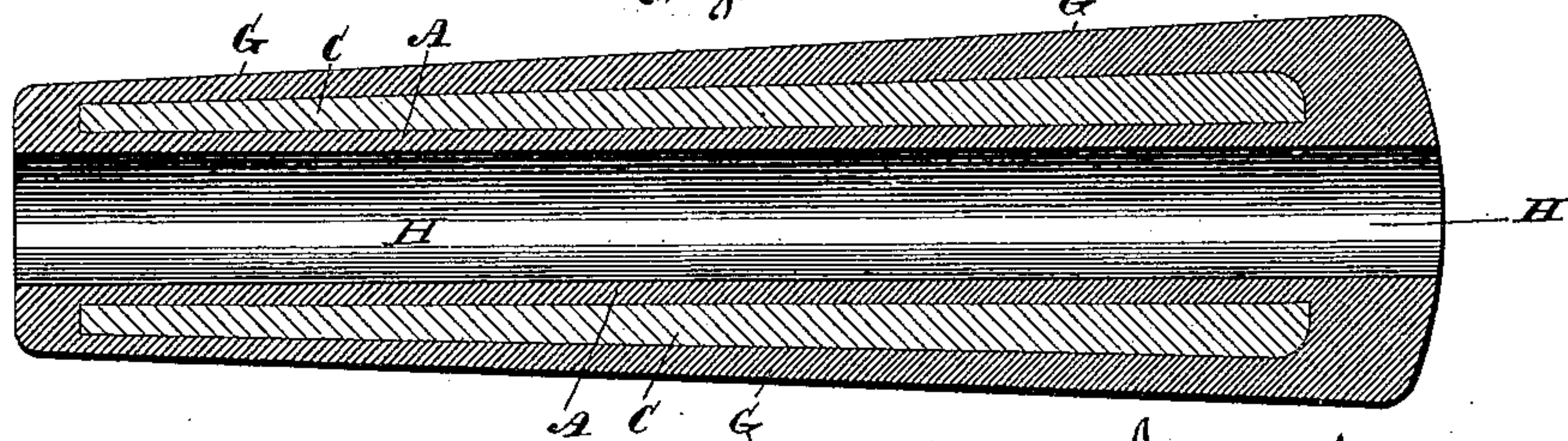


Fig. 6



Witnesses:

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Att'y.



# UNITED STATES PATENT OFFICE.

JOSEPH P. LAVIGNE, OF NEW HAVEN, CONNECTICUT.

## METHOD OF MAKING CANNON.

SPECIFICATION forming part of Letters Patent No. 406,452, dated July 9, 1889.

Application filed August 13, 1888. Renewed June 7, 1889. Serial No. 313,439. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH P. LAVIGNE, residing at New Haven, in the county of New Haven and State of Connecticut, have  
5 invented certain new and useful Improvements in Methods of Making Cannon; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying  
10 drawings, which form a part of this specification.

My invention relates to an improved method of making cast cannon of that class which have a cheap metallic filling between their  
15 inner and outer walls, the object being to cheapen the construction of this class of guns without impairing their strength and efficiency.

With these ends in view my invention consists in forming the filling independently,  
20 then inserting the tube forming the inner wall of the gun into it, and then casting the outer wall of the gun over such filling and tube.

My invention further consists in a method having certain other steps and details, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is  
30 a view in central longitudinal section of the tube employed under my invention for forming the inner wall of the gun. Fig. 2 is a similar view of the filling, which is made independently of the tube. Fig. 3 is a similar  
35 view showing the tube in place in the filling. Fig. 4 is a similar view of such parts with a skeleton core in the tube. Fig. 5 is a view showing an envelope cast over the tube and filling and illustrating how the metal of such  
40 envelope has melted and obliterated the beveled ends of the tube, and Fig. 6 is a similar view of a cannon made under my invention.

In carrying out my improved method I prepare a tube A from brass, bronze, or whatever  
45 metal is selected for the inner wall of the gun, by beveling its ends, as at B B, to reduce the amount of metal at such points to such a degree as to secure their being melted when

enveloped in fluent metal. I also prepare, 50 from iron or some metal or composition cheaper than that selected for the rest of the gun and preferably by casting, a tapering cylindric filling C, thicker at its breech end than at its muzzle end, open at both ends 55 and having a uniform bore corresponding in diameter to the exterior diameter of the said tube. This filling is heated very hot and hence expanded, and when so heated the tube is introduced into it. The filling being now 60 allowed to cool shrinks upon the tube, whereby the two parts are firmly secured together. After the filling and tube have been secured together, as described, a skeleton core having beveled heads D and E and a shank F is 65 driven into the tube, which with its filling is then placed in a mold and an envelope G, of metal preferably corresponding to that of which the tube is composed, cast upon them, so as to completely envelop them, as shown. 70 In this operation the heat of the fluent metal melts the thin beveled ends C C of the tube, so that the same virtually forms one piece with the said envelope. The filling A is therefore hermetically sealed in between the 75 tube and the envelope, respectively, forming the inner and outer walls of the gun and protected from the action of the air and from moisture. The skeleton core is now removed from the gun, which is then reamed out to 80 form the smooth bore H, as shown by Fig. 6 of the drawings.

Under the described method a cannon is produced having the firing merit and durability of a gun cast from brass or bronze 85 alone and much cheaper than such a gun, as it is composed in part of a much less expensive metal.

Having fully described my invention, what I claim as new, and desire to secure by Letters 90 Patent, is—

1. A method of making cannon, consisting in independently preparing a filling and a tube and securing them together, and then casting an envelope over such filling and 95 tube, so as to hermetically seal the filling between the tube and envelope, substantially as set forth.

2. A method of making cannon, consisting  
in independently preparing a filling and a  
tube, then shrinking the former upon the lat-  
ter, and then casting an envelope over them,  
5 so as to hermetically seal the filling from the  
air, substantially as set forth.

In testimony whereof I have signed this

specification in the presence of two subscrib-  
ing witnesses.

JOSEPH P. LAVIGNE.

Witnesses:

CHAS. B. SHUMWAY,  
WILLIAM HARRISON.