

No. 689,413.

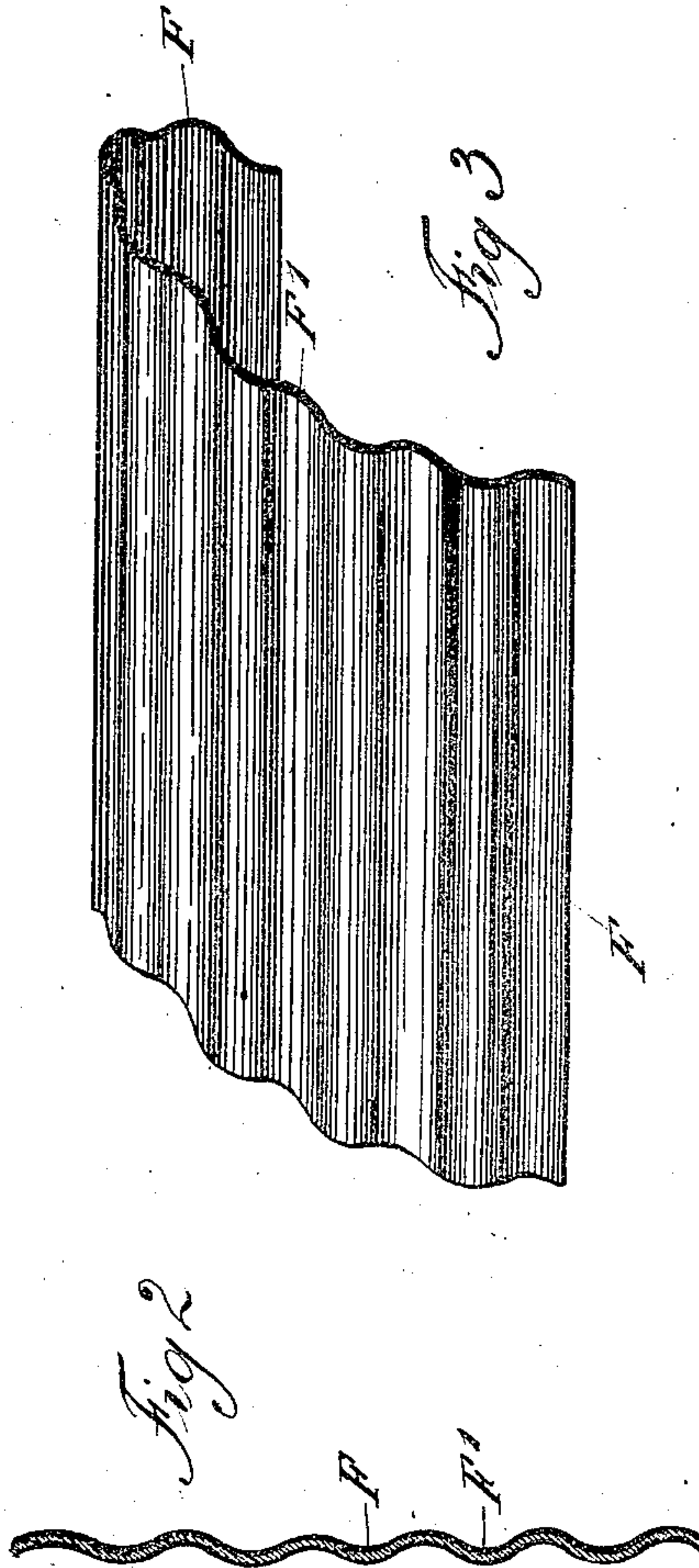
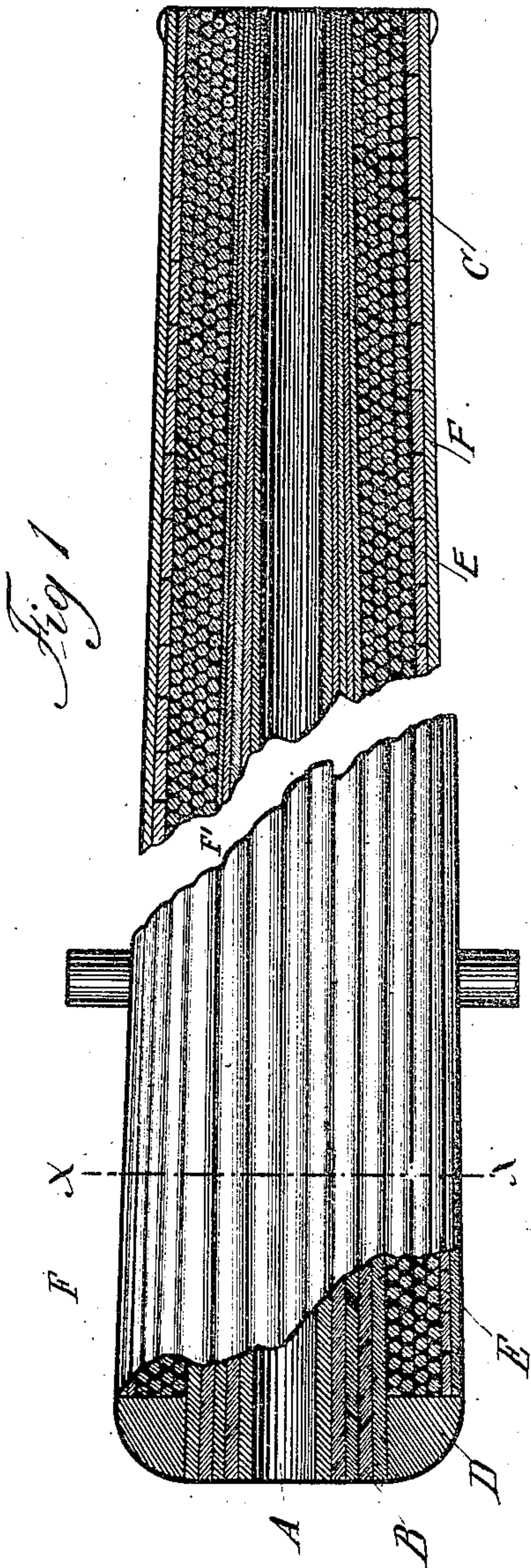
Patented Dec. 24, 1901.

F. P. & A. McD. ROBERGE.  
ORDNANCE.

(Application filed Apr. 5, 1901.)

(No Model.)

2 Sheets—Sheet I.



*Fig 3*

INVENTORS  
Franklin P. Roberge and  
Abijah M. Roberge  
BY *Edgar Tate* ATTORNEYS

WITNESSES

*L. A. Stewart*  
*A. H. Meller*

No. 689,413.

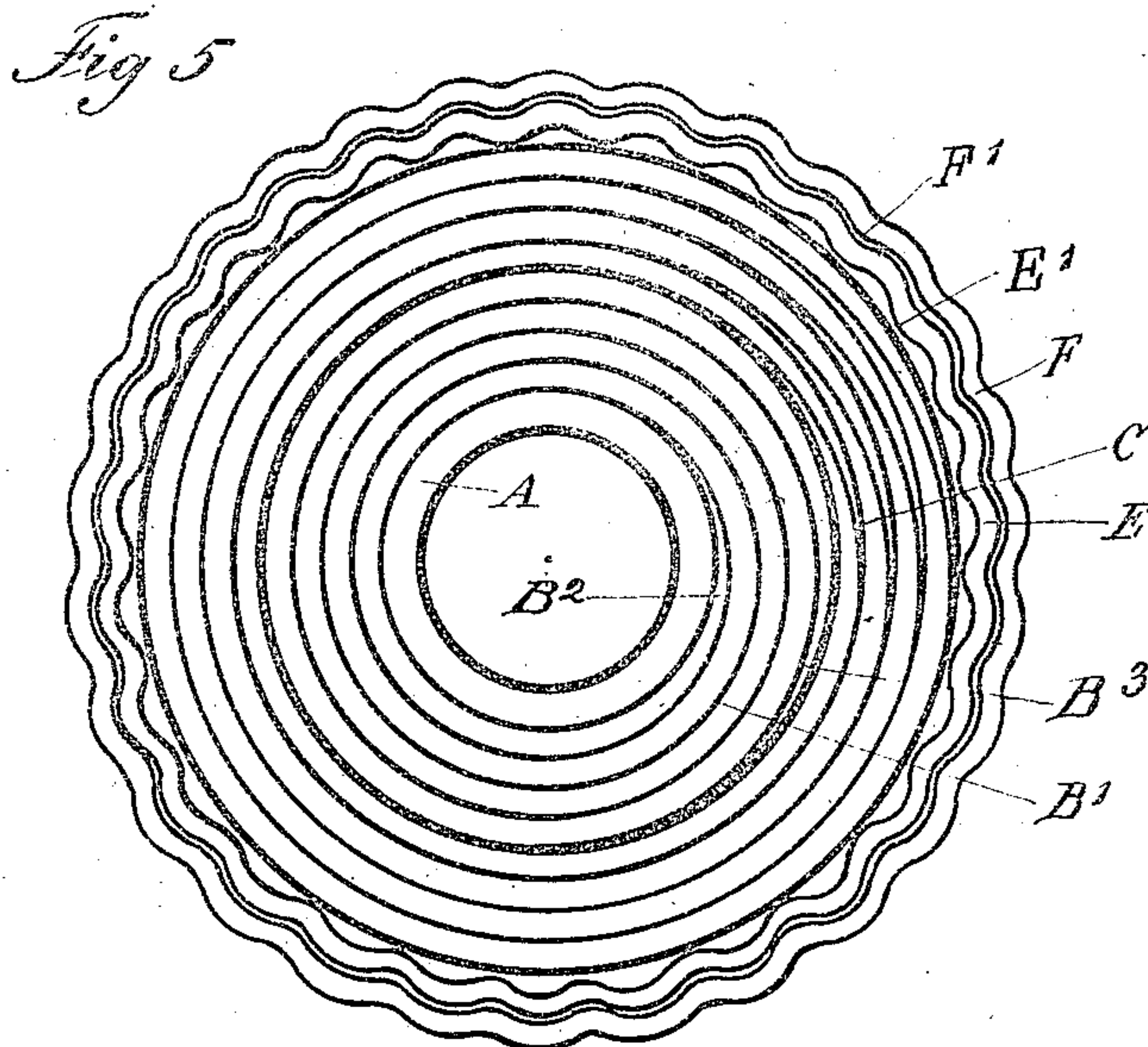
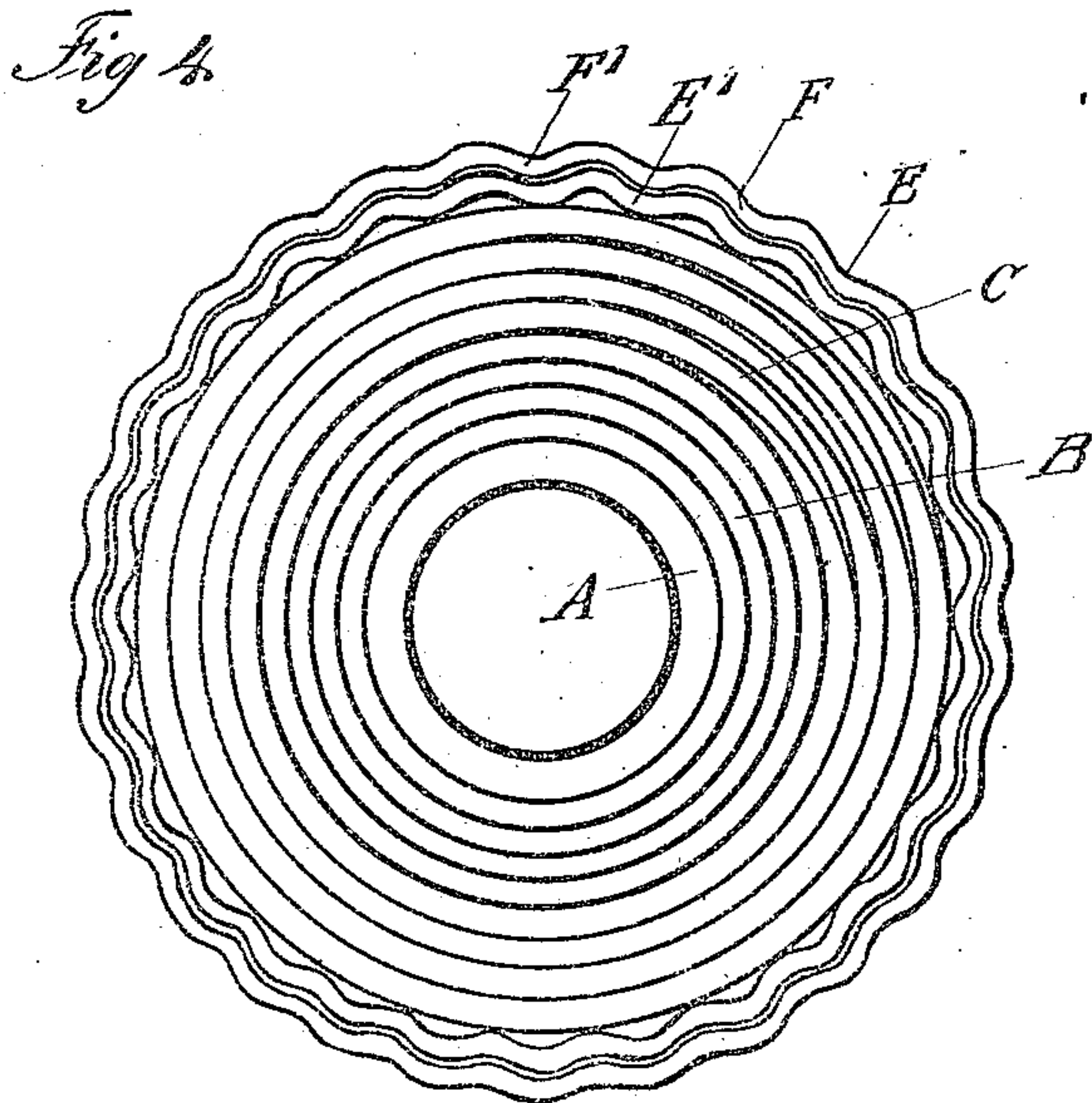
Patented Dec. 24, 1901.

F. P. & A. McD. ROBERGE.  
ORDNANCE.

(Application filed Apr. 5, 1901.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES

*L. H. Stewart*  
*A. A. Keller*

Franklin P. Roberge INVENTORS  
BY *Abijah M. Roberge*  
*Edgar Tate* ATTORNEYS



# UNITED STATES PATENT OFFICE.

FRANKLIN PIERCE ROBERGE AND ABIJAH McDONALD ROBERGE, OF NEW YORK, N. Y.

## ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 689,413, dated December 24, 1901.

Application filed April 5, 1901. Serial No. 54,483. (No model.)

*To all whom it may concern:*

Be it known that we, FRANKLIN PIERCE ROBERGE and ABIJAH McDONALD ROBERGE; citizens of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Ordnance, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to that class of guns or cannons which are built up around a central lining or bore, and particularly such as have the central built-up section thereof surrounded by wire wound tightly around the same.

The object of our invention is to produce a strong, durable, and efficient piece of ordnance of this character which will withstand effectually all the necessary strains due to the explosion of powder charges therein; and it is particularly the object of the invention to provide effective means for overcoming the at present serious disadvantage of such guns due to the outer jacket or casing thereof breaking under the expansive force of the explosion.

With these ends in view our invention consists, primarily, of a gun or cannon built up of a plurality of casings surrounding an interior central lining or bore, the outermost of which casings is covered with a series of windings of wire, over which are secured a series of circumferential resilient rings or bands corrugated in the longitudinal direction of the gun or cannon, whereby they will expand or somewhat elongate circumferentially under the expansive force of an explosion and will likewise contract after the explosive effect upon the gun has ceased, these rings or bands being surrounded by an exterior resilient jacket wholly covering the entire outer surface of the gun and similarly longitudinally corrugated with its corrugations seated in the corrugations of the rings or bands, whereby correspondingly the said exterior jacket of the gun or cannon will expand under the action of the explosion thereof.

The invention further consists in the novel

construction and arrangement of parts hereinafter described and claimed.

In the accompanying drawings, forming part of this specification, in which like reference characters denote like parts in the several views, Figure 1 is a plan view of a cannon embodying our invention, partially broken away to show the interior construction in central longitudinal section. Fig. 2 is an enlarged edge view of the corrugated exterior jacket straightened out. Fig. 3 is an enlarged perspective view of a portion of the said exterior jacket. Fig. 4 is an enlarged transverse vertical section on the line  $x x$  of Fig. 1, and Fig. 5 is an enlarged similar section of a modified form of the device.

In the practice of our invention we first form a central lining or bore A of a length equal to the desired length of the cannon, which may be either tapered or uniformly cylindrical exteriorly. On the outside of the said lining or central cylinder are secured longitudinally-tapered casings or sleeves B, which are of greater thickness at the breech end than at the nozzle, thus building up the former end and giving it increased strength where the explosion takes place. One or more of the said casings or sleeves may, however, be uniformly cylindrical or may even be reversely tapered, so that the thicker end is at the nozzle in case it may be desired to add to the strength of that end of the cannon. These casings are placed one upon the other and may be shrunk upon the interior lining or cylinder and upon one another or may be secured in any desired manner. Exteriorly of the outermost casing or sleeve B is wound a plurality of longitudinal layers of wire C. This wire is of strong steel of any desired sectional form, and each layer is wound spirally around the gun from one end thereof to the other, the wire or spiral of the next outer layer fitting between the wires or spirals of the layer beneath it, as clearly shown in Fig. 1, and all of the layers abut at one end closely against the breech-head D. Upon the outside of the wire layers are then secured a number of resilient rings or circular bands E, which are preferably formed of strips of strong steel corrugated transversely of the band, and



therefore longitudinally of the gun, when they are in position, the ends of the said strips being welded together or otherwise connected, as desired, to make a continuous ring. The rings or bands E are secured upon the outermost wire layer side by side longitudinally of the cannon, and their corrugations E' aline, so as to form continuous longitudinal corrugations. Over and upon the said rings or bands E is secured a resilient jacket or outer casing F, formed of a single piece of strong steel longitudinally corrugated and having its ends welded together or otherwise united to form a continuous cylinder of uniform thickness and slightly tapering longitudinally. This jacket or exterior casing is secured upon the outside of the rings or bands E, with the corrugations F' thereof fitting in the corrugations E' of the said rings. Both the rings and the jacket at one end lie against the breech-head D, and they may be shrunk or otherwise secured, respectively, the rings upon the wire layers and the jacket upon the said rings.

The operation of our invention will be readily understood from the foregoing description, taken in connection with the accompanying drawings, and the advantages resultant from the use thereof will be manifest to all who are skilled in the art to which it appertains.

The gun is charged and fired in the usual manner, and the casings or sleeves B, one surmounting the other, and the wire layers or bindings C around them, the rings or bands E, and the jacket or exterior casing F all receive an expansive effect due to the explosion. The expansion is limited directly by the casing or sleeves B. The wire layers or bindings render the sleeves or casings more efficient against this explosive tendency and add vastly to the strength of the gun. When the effect of the explosion is received upon and by the rings E and the jacket F, these, being corrugated in a direction longitudinal to the gun, will expand or stretch radially or transversely, so as to increase in circumference in a degree proportionate to the expansive effect of the explosion. The rings receive the impact of the expansive tendency before it reaches the jacket, and to a certain slight extent the jacket will be relieved from this pressure. In the main, however, the jacket and the rings will expand mutually or coincidently. The rings or bands in particular being separate one from the other will receive the irregular impact of the explosion and will be permitted to expand irregularly or disproportionately, so as to meet and accord with the varied nature of the expansive effect of the explosion, which, if received directly on the jacket without the intervention of the said rings or bands, would expose the same directly to the irregular strain which causes the bursting of solid cylindrical jackets at present employed in cannon of this character. Not only is the dangerous breaking or cracking of an ordinary jacket under expansion prevented

by the use of our invention, but, moreover, after the expansive effect has subsided and as the gun cools off the rings and the jacket will easily and naturally contract together.

We do not, however, desire to be understood as limiting ourselves to the exact details of construction or formation of parts herein described and shown nor to the exact relative arrangement and position of the elements of the construction, as the same may be varied within the spirit of our invention, which we conceive to be novel in its plan and broad in its scope. The resilient band E and the resilient jacket F may, for example, advantageously be employed upon other guns or cannons of a similar nature or upon any other ordnance or upon any other either tubular or expansible bodies, whatever their nature.

In the modified form shown in Fig. 5 we employ in place of the casings or sleeves B a casing B', made of a single piece of material, one edge of which is secured to the interior or bore A, and the sheet is rolled around the same and upon itself to form a plurality of folds or layers. This continuous strip is of course formed thicker at the breech end than at the nozzle, similarly to the casings or sleeves B, and the inner and outer edges B<sup>2</sup> and B<sup>3</sup> of the said strip are tapered or gradually reduced in thickness, as clearly shown in Fig. 5, so that the compound casing formed thereby around the bore or lining will be both interiorly and exteriorly of a perfectly rounded periphery and while externally tapered will be similar in any section thereof.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A gun or cannon formed of an interior lining or bore, a plurality of casings surrounding the same and a plurality of layers of wire wound circumferentially around the same longitudinally of the gun, and a resilient outer jacket longitudinally corrugated, whereby it is radially or transversely expansible.

2. A gun or cannon comprising an interior lining or bore provided exteriorly with a plurality of casings or bindings of the character described and a resilient outer jacket longitudinally corrugated whereby it is radially or transversely expansible.

3. A gun or cannon comprising an interior lining or bore provided exteriorly with a plurality of casings or bindings of the character described, and a plurality of rings or bands closely surrounding the said casings and formed of resilient metal corrugated in a direction longitudinal of the gun whereby they are radially or transversely expansible.

4. A resilient binding ring or band for cannon or other articles comprising a permanently-secured strip of resilient metal corrugated across the width thereof whereby it is radially or transversely expansible or capable of enlarging in its effective circumference under radial interior pressure.

5. A gun or cannon provided with a series



of resilient binding rings or bands surrounding the body of the cannon circumferentially and placed side by side longitudinally of the gun and corrugated transversely of the said bands or longitudinally of the gun, and an outer jacket formed of resilient metal longitudinally corrugated whereby the said rings and the said jacket are radially or transversely expandible.

6. A gun or cannon comprising an interior lining or bore provided exteriorly with a plurality of superposed casings, a plurality of superposed layers of wire wound around the said casings, a series of resilient binding rings or bands surrounding the said wire binding circumferentially and corrugated transversely of the said bands or longitudinally of the gun, and an outer jacket formed of resilient metal longitudinally corrugated, whereby the said rings and the said jacket are radially or transversely expandible.

7. A gun or cannon comprising an interior lining or bore provided exteriorly with a series of superposed casings tapering or of greater thickness at the breech end thereof, and a plurality of superposed layers or bindings of wire surrounding the said casings, a series of resilient rings or bands surrounding the said wire bindings circumferentially of the gun and corrugated transversely of the said bands or longitudinally of the gun, the said bands being placed closely side by side longitudinally of the gun whereby their corrugations align, and an exterior jacket formed of a sheet of resilient metal longitudinally corrugated.

8. The combination with a gun or cannon or other body subject to radial expansion, of a binding ring or band permanently connected therewith and longitudinally immovable thereon, and comprising an endless strip of resilient metal corrugated laterally whereby it is radially or transversely expandible and will enlarge in its effective circumference when the thereby-confined body expands under radial interior pressure, and will contract therewith.

9. The combination with a gun or cannon or other body subject to radial expansion, of a plurality of binding rings or bands surrounding the same at different points longitudinally thereof and permanently connected thereto and longitudinally immovable thereon, and comprising each a strip of resilient metal corrugated across the width thereof whereby it is radially or transversely expandible, and will enlarge in its effective circumference when the said body expands under radial interior pressure and will contract therewith; the corrugations of the several rings aligning longitudinally of the body beneath.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of the subscribing witnesses, this 4th day of April, 1901.

FRANKLIN PIERCE ROBERGE.  
ABIJAH McDONALD ROBERGE.

Witnesses:

F. A. STEWART,  
F. F. TELLER.