

No. 666,450.

Patented Jan. 22, 1901.

J. T. WILSON.
MANUFACTURE OF TUBULAR STRUCTURES.

(No Model.)

2 Sheets—Sheet 1.

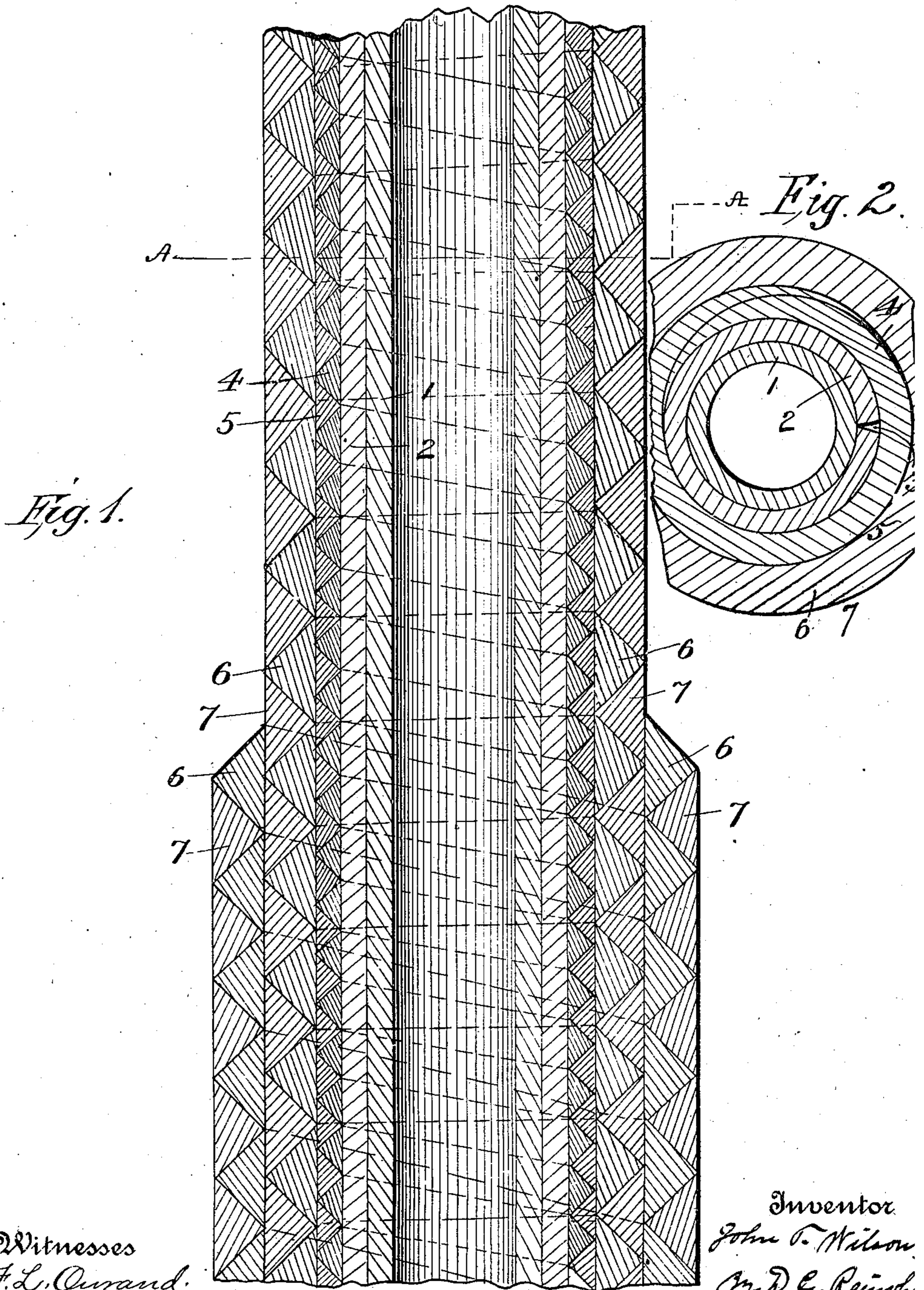


Fig. 1.

Fig. 2.

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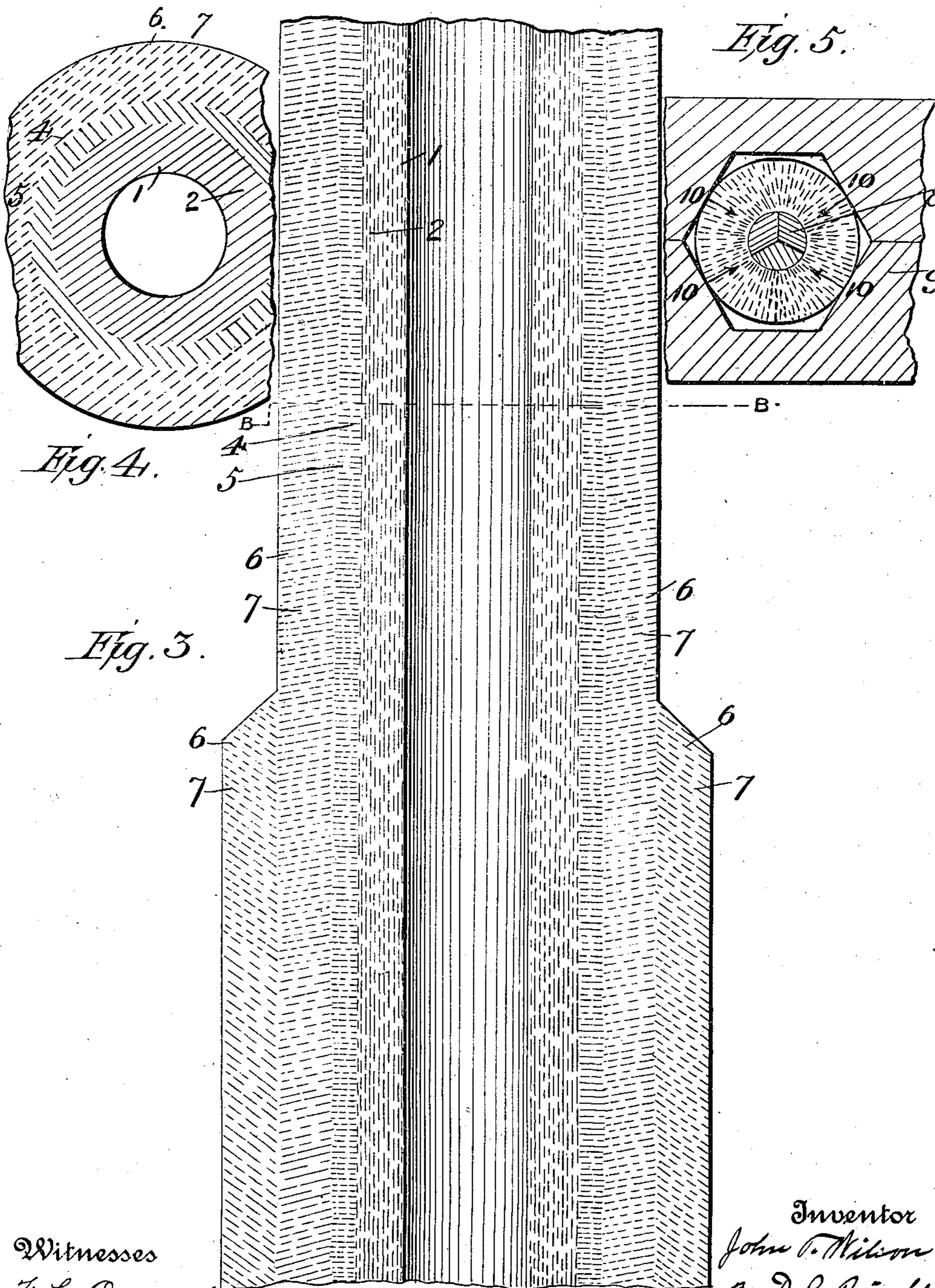
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UNITED STATES PATENT OFFICE.

JOHN T. WILSON, OF PITTSBURG, PENNSYLVANIA.

MANUFACTURE OF TUBULAR STRUCTURES.

SPECIFICATION forming part of Letters Patent No. 666,450, dated January 22, 1901.

Application filed November 1, 1900. Serial No. 35,180. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN T. WILSON, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Tubular Structures; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the art of forging metals for making tubular structures—such as ordnance, shafting, and the like—has for its object the securing of great tensile and torsional strength, and consists in certain improvements which will be fully disclosed in the following specification and claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a longitudinal section of a tubular structure showing the manner of assembling the component parts; Fig. 2, a transverse section on line A A, Fig. 1; Fig. 3, a longitudinal section of the structure after it has been forged and welded into a homogeneous body; Fig. 4, a transverse section on line B B, Fig. 3; and Fig. 5 a vertical transverse section of the die, on a reduced scale, in which the structure is forged.

Reference being had to the drawings and the designating characters thereon, 1 indicates the base or core of the structure, and consists of a tube, which may be a drawn seamless tube, a welded tube, or a tube with the edges or seam not welded; and 2 a tube surrounding the base or core, and is preferably made with an open seam 3, extending throughout the length of the tube. The opening between the edges of the metal is of the shape of the letter V inverted, as shown in Fig. 2. These two tubes may be assembled by telescoping the one upon the other by any suitable means, and the two constitute the base or core, or the tube 2 may be omitted for some purposes.

4 indicates a course of triangular bar metal, steel or iron, as preferred, about one and one-half or two inches thick and whose sides are at an angle of forty-five degrees to the base, wound spirally upon the base or core of the structure, with the base of the triangle toward

the transverse center of the core, and upon this course is wound a course 5 of the same kind of metal, with the apex of the triangle toward the core. The body thus formed or with the omission of the tube 2 is then heated and subjected to a forging process, by which the fiber of the metal is forced toward the transverse center of the body and the parts welded into a homogeneous body.

6 and 7 indicate concentric courses of heavier triangular bar metal from two and a half to three and a half inches thick, having the same angle to the sides and which are wound upon the forged body in the same manner as the courses 4 and 5 were wound, but in the opposite direction, to cross the fiber of the metal, and the whole is then heated and subjected to a like forging process, and these concentric courses welded together and to the body as previously formed.

As thus constructed the tubular structure is adapted for use as shafting and other purposes, in which great tensile and torsional strength is required, especially in propeller shafting and shafting used for driving heavy machinery.

The tubular body is supported and revolved by any suitable means, and the triangular bar metal as it proceeds from the rolls is wound spirally in the usual manner of coiling or winding metal strips or bars.

The spirally-wound sections of bar metal serve to reinforce the tubular core, and they may be multiplied as required in the construction of ordnance or other articles to any desired extent for forming the breech end of a gun, as shown, or thickening or reinforcing any particular part of a tubular structure. The courses, it will be observed, are in pairs or double, one fitting into the other, and the alternate double course in each instance is wound spirally in a direction opposite to the preceding double course.

The structure is forged upon a suitable expansible mandrel 8, which secures the welding of the seam in the core or base 1, should it be open, as described, and the closing and welding of the seam 3 in tube 2 when it is used, and this working of the metal in the core by the external pressure or force of a hammer, with a section of a suitable die attached thereto, greatly solidifies the core of

the structure, which in its use for ordnance becomes the bore of the gun. The forging is done in a die 9, (see Fig. 5,) having converging walls 10, in which the structure is manipulated longitudinally and rotated while it is being forged and welded, thus forcing the metal from the periphery toward the transverse center of the structure, as indicated by arrows, firmly welding the several courses together and forming a homogeneous body of the whole, in which part of the fiber of the metal extends longitudinally throughout the length of the structure, and part of the fiber extends diagonally around the structure in one direction and another part of the fiber of the metal extends in like manner in the opposite direction, thus insuring great tensile and torsional strength.

Having thus fully described my invention, what I claim is—

1. The method of making metallic structures, which consists in forming a base or core, building a body thereon by winding double courses of triangular bar metal in opposite directions on said base, heating, forging and welding the component parts together by force applied to the surface and converging toward the transverse center of the structure.

2. The method of making tubular structures, which consists in forming a tubular base or core, building a body thereon by winding triangular-shaped bar metal in opposite directions and in double concentric courses on said base, heating, forging and welding the component parts together by force applied to the surface and converging toward the transverse center of the structure.

3. The method of making tubular structures, which consists in forming a tubular base or core, reinforcing said base by a double course of triangular-shaped bar metal wound spirally thereon with the base of the triangle of the inner course toward the transverse center of the structure, and the other course filling the spaces thereof, and a double course wound in like manner and relation to the base but in the opposite direction and crossing the fiber of the metal, heating, forging and welding the composite parts into a homogeneous body.

4. The method of making tubular structures, which consists in forming a tubular base or core, surrounding said base by a con-

centric tubular body having an open seam the length of the body, then winding courses of triangular bar metal thereon, then heating, forging, and welding the composite body and closing and welding said seam, then winding additional courses of triangular bar metal thereon in the opposite direction and crossing the fiber, then heating, forging and welding said courses and forming a homogeneous body.

5. The method of making tubular structures, which consists in forming a tubular base or core, surrounding said base by a concentric tubular body having an open seam the length of the body, then winding double courses of triangular bar metal thereon with the base of the triangle of the inner course toward the tubular base, then heating, forging and welding the composite body and closing and welding said seam, then winding courses of heavier triangular bar metal in like manner, but in the opposite direction, upon the structure, then heating, forging and welding said courses together and to the previously-formed body.

6. A metallic structure composed of a base or core, and a plurality of double courses of triangular bar metal wound upon the core in opposite directions, and the whole welded into a homogeneous body.

7. A tubular structure composed of a tubular base or core, and a plurality of double courses of triangular bar metal wound upon the core in opposite directions and the whole welded into a homogeneous body.

8. A tubular structure composed of a tubular base or core, and a plurality of concentric courses of triangular bar metal of different thicknesses wound upon the base or core in opposite directions, and the whole welded into a homogeneous body.

9. A tubular structure composed of a plurality of concentric tubes, and a plurality of concentric double courses of triangular bar metal of different thicknesses wound spirally upon said concentric tubes in opposite directions, and the whole welded into a homogeneous body.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN T. WILSON.

Witnesses:

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W. PARKER REINOLD.