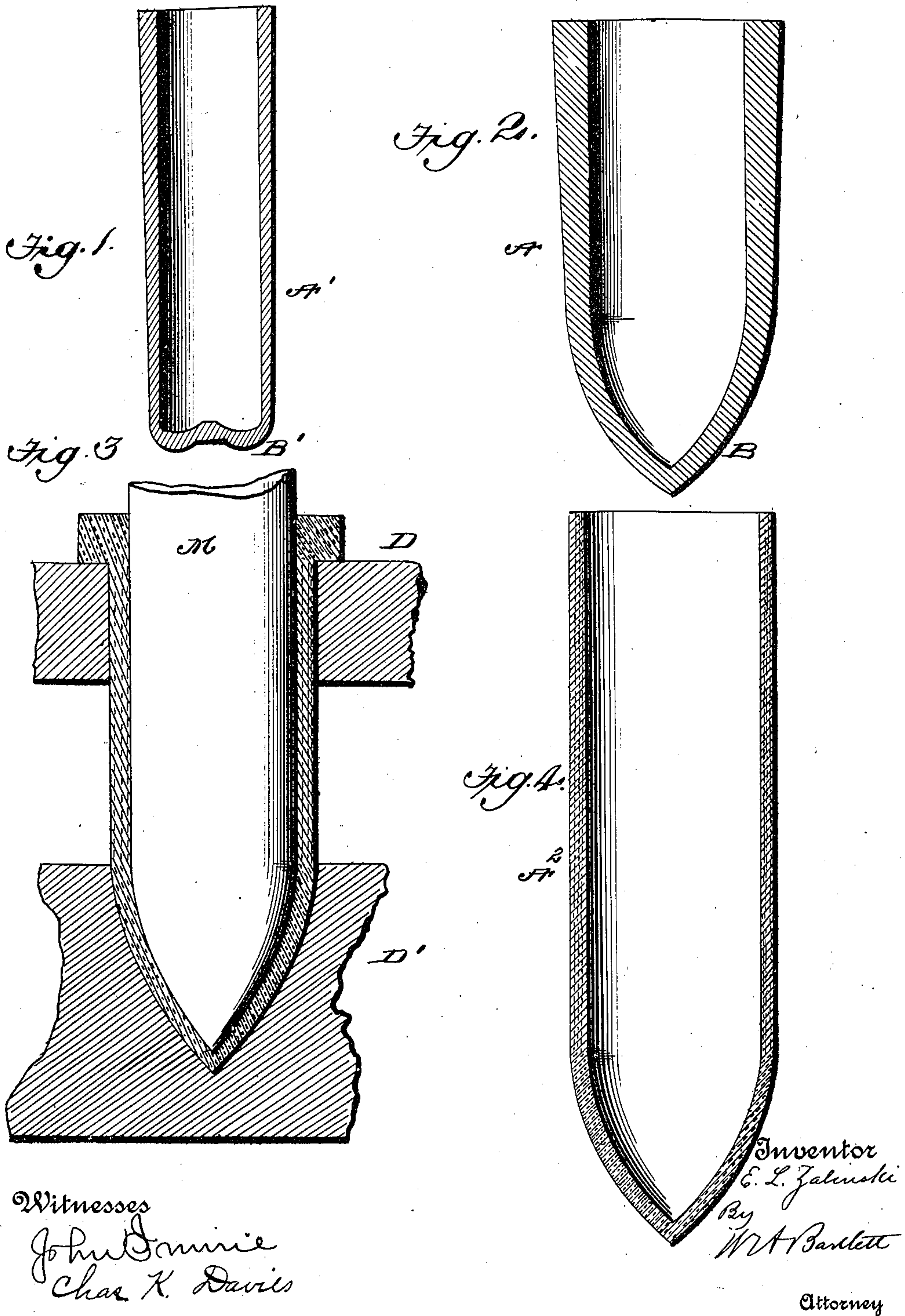


(No Model.)

E. L. ZALINSKI.  
TUBE AND METHOD OF MAKING.

No. 556,126.

Patented Mar. 10, 1896.





# UNITED STATES PATENT OFFICE.

EDMUND L. ZALINSKI, OF NEW YORK, N. Y.

## TUBE AND METHOD OF MAKING.

SPECIFICATION forming part of Letters Patent No. 556,126, dated March 10, 1896.

Application filed May 2, 1895. Serial No. 547,834. (No model.)

*To all whom it may concern:*

Be it known that I, EDMUND L. ZALINSKI, of the United States Army, (retired,) residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Tubes and Methods of Making, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to an improvement in the art or method of making metallic tubes having one closed end.

15 The object of the invention is to produce cylindrical or other metallic tubes having one permanently-closed end.

Heretofore it has been common to draw tubes—as for instance, metallic cartridge-shells—with one closed end from a blank material, by a succession of cupping processes, the die operating on the metal which forms the end as well as that which forms the side of the tube at each cupping. In large tubes it has been difficult to get good results, for the reason that the action of the end die and end of the mandrel on the metal is somewhat different from that of the open die and cylindrical portion of the mandrel. This difficulty I have overcome satisfactorily in the following manner: An ingot is cast having the portion which is to form the end of the tube complete in the desired form, or nearly so. A surplus of metal is left at the base of this head, and this surplus is afterward drawn out to form the cylindrical or other shaped body of the tube by mandrel and die. This may be more fully understood by referring to the drawings, in which—

40 Figure 1 is a longitudinal section of a casting from which a closed metal tube is to be drawn. Fig. 2 is another form of the tubular casting. Fig. 3 illustrates a section of the same in the die with the mandrel inclosed therein and partly embraced in dies. Fig. 4 is a section of the completed tube.

45 The tube illustrated is intended for a shell or torpedo, but it will be apparent that tubes of many kinds can be made in the same way.

A and A' represent castings of brass, copper, steel, or other ductile metal. The closed

end B of said castings is as nearly finished as such a piece can be made by casting. That portion back of the end is thicker than the finished tube will be.

The casting A is applied to a mandrel M and passed through a die D in any of the ways known in the art of drawing tubing. The body part A of the casting is reduced in thickness, either at one or a succession of drawings, so that it assumes the desired thickness, as at A<sup>2</sup>, for the finished tube.

60 The casting may be heated or annealed during the process of drawing, as found requisite.

The end of the casting which enters die D' is preferably changed but little in form and will retain its original crystalline structure. The final form of this end may be given by one or repeated drawings. The cylindrical body A<sup>2</sup> of the completed tube is preferably passed through a number of dies, one after the other, and gradually drawn to the desired length. The repeated drawing tends to give toughness of fiber to the metal of the body of the tube.

75 The closed end of the tube may be made thicker than the sides if strength is required in the ends.

After the tube is drawn to cylindrical form it may be "necked" in any usual way.

What I claim is—

1. The method of producing metallic tubes with one closed end, which consists in casting a hollow piece with a closed end and a quantity of metal in rear thereof thicker than the required tubing, and afterward drawing the thickened portion of the casting solely into a tube by means of a mandrel and die, or dies operating lengthwise on the body of the tube, substantially as described.

2. An integral metallic tube having one closed end of crystalline cast metal and the body portion of longitudinally-drawn metal, substantially as described.

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

EDMUND L. ZALINSKI.

Witnesses:

W. A. BARTLETT,  
CHAS. K. DAVIES.