

No. 662,787.

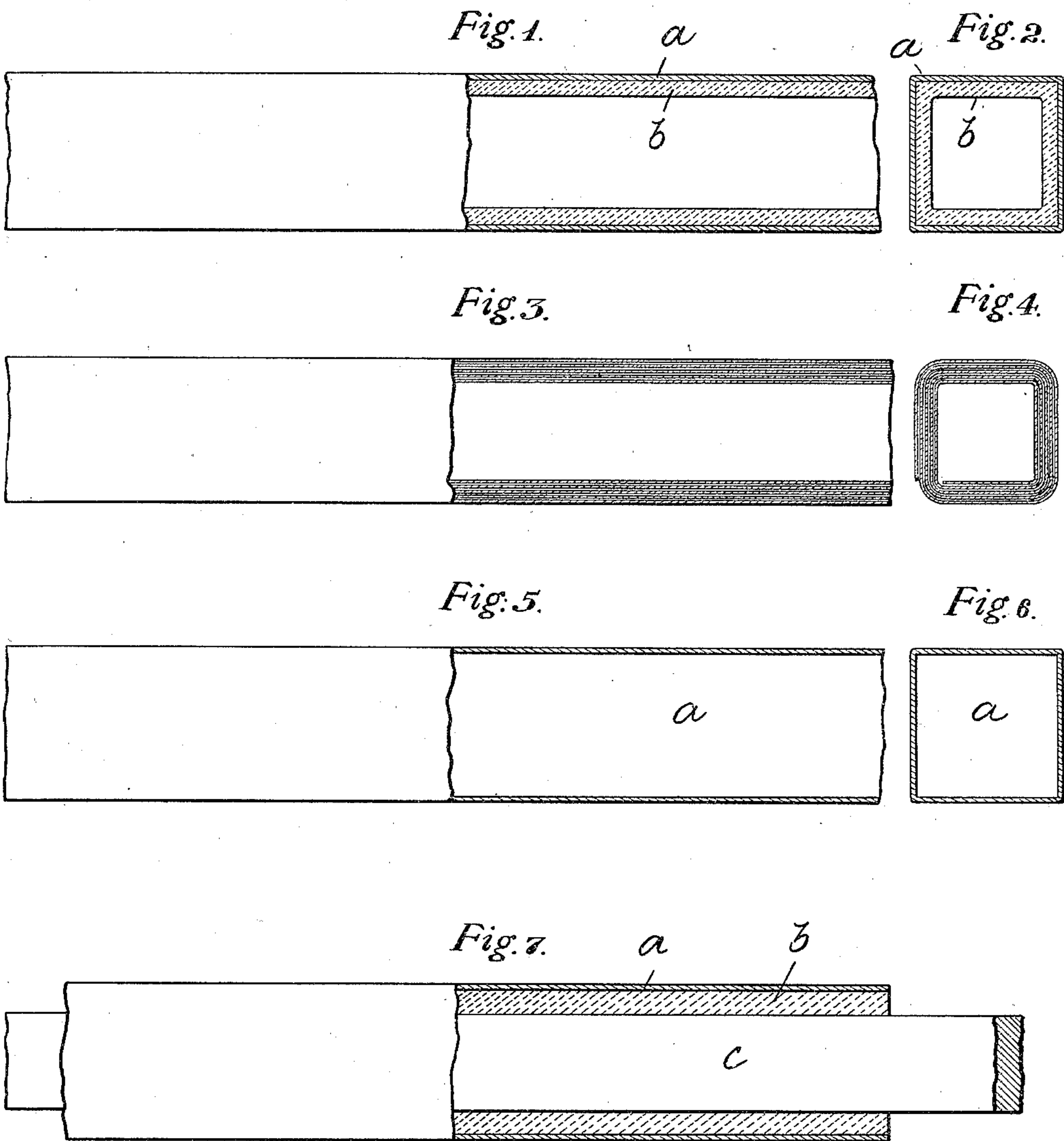
Patented Nov. 27, 1900.

C. HARVEY.  
TUBING.

(Application filed May 28, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

*F. B. Keeler*  
*Robert Everett*

INVENTOR

*Charles Harvey.*  
*By James L. Norris.*  
*Atty.*

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2 Sheets—Sheet 2.

Fig. 8.

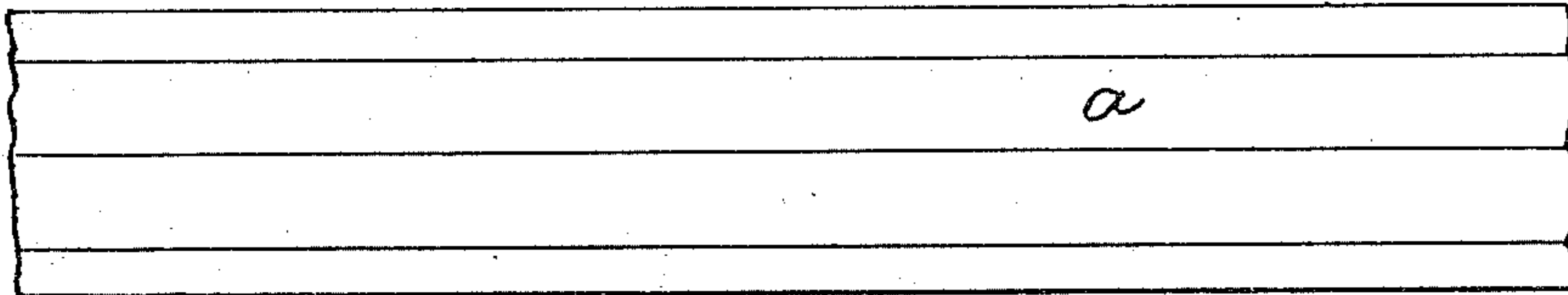


Fig. 9.

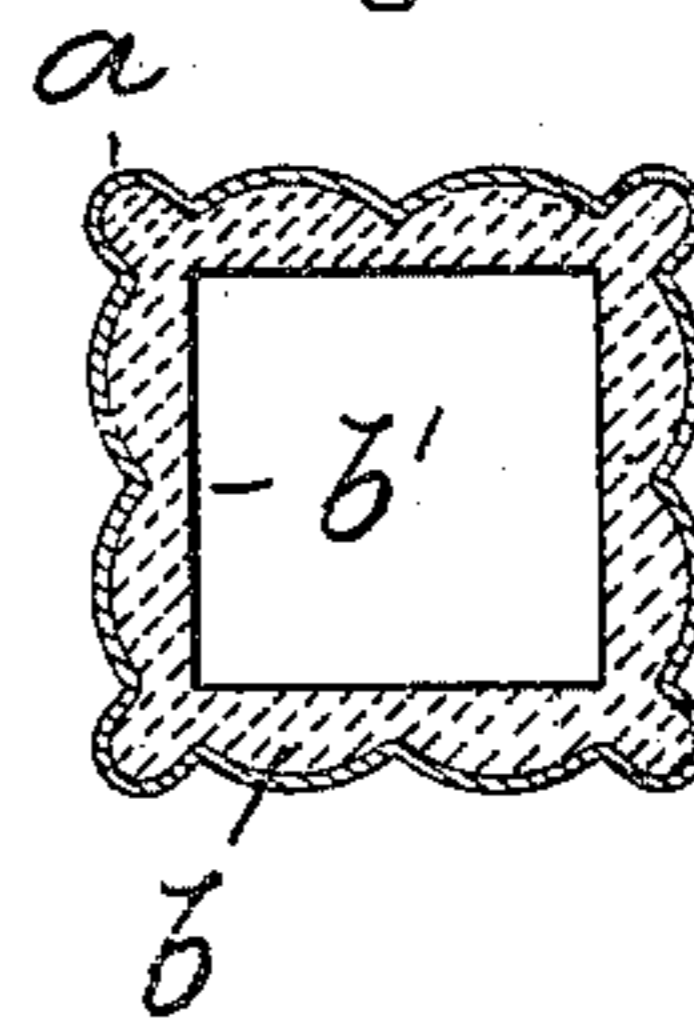


Fig. 10.

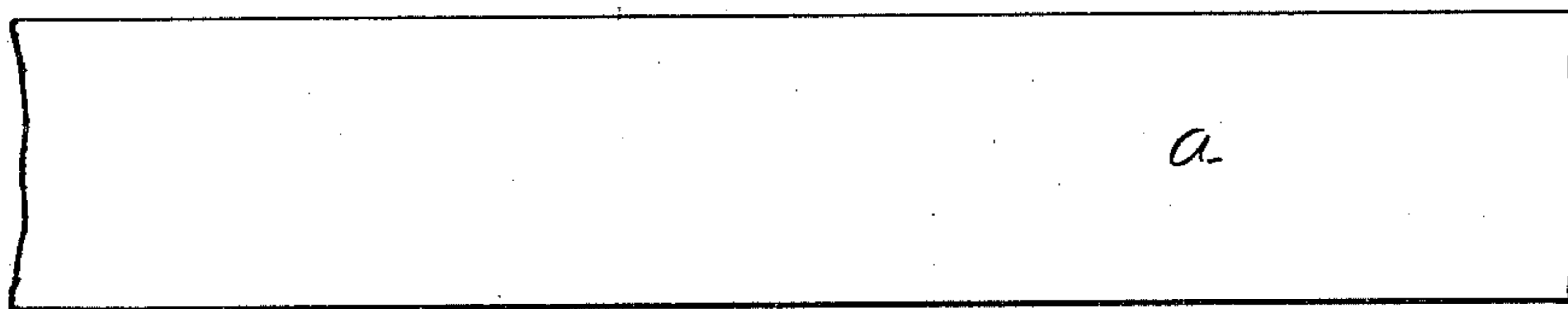


Fig. 11.

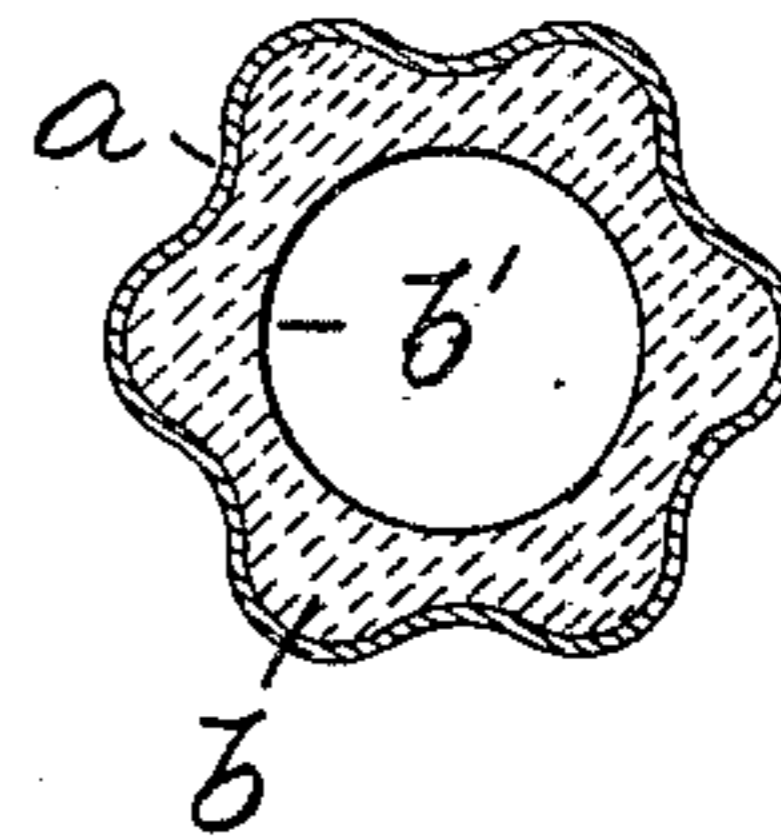


Fig. 12.

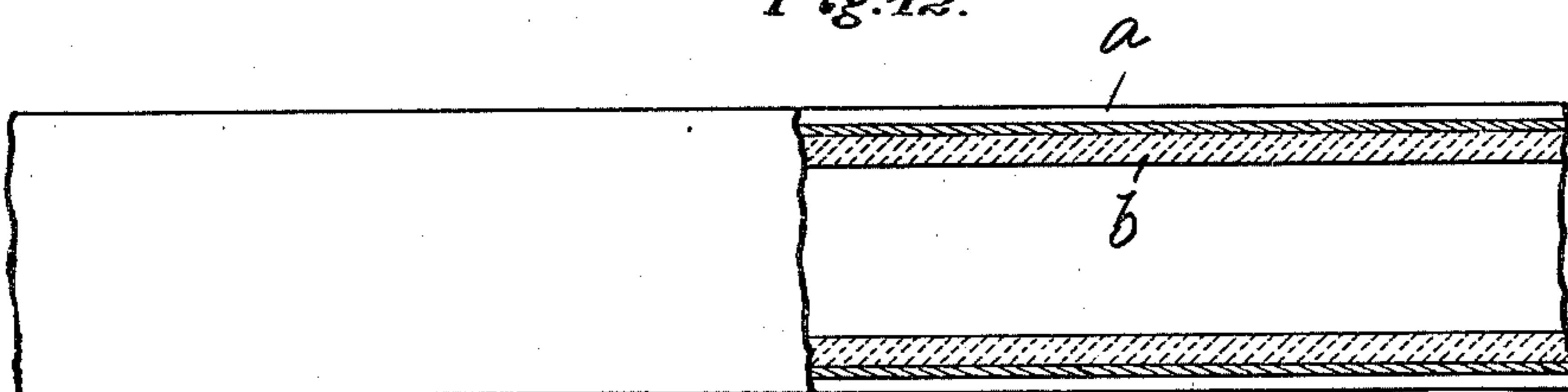
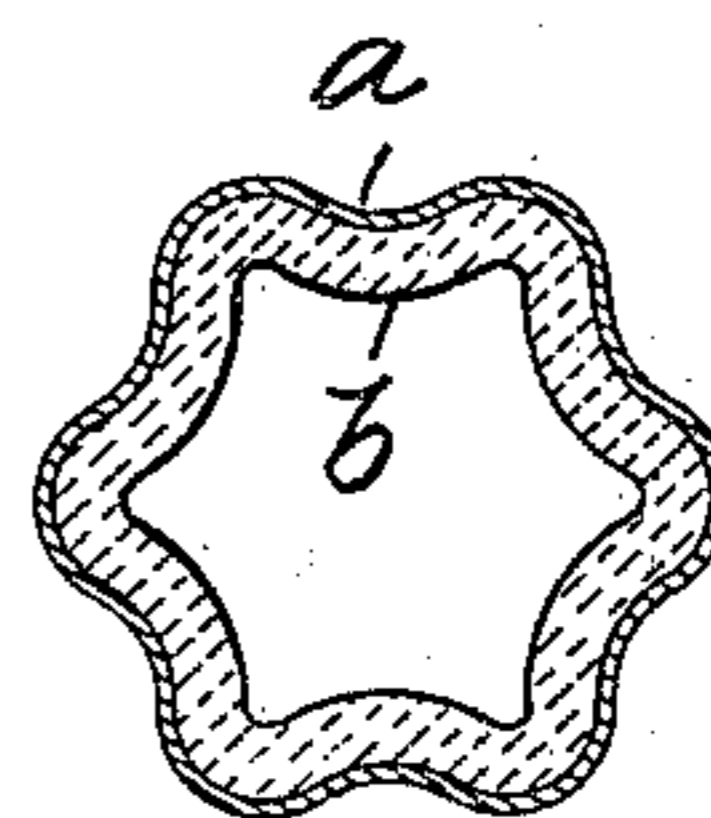


Fig. 13.



WITNESSES

*W. B. Keefe*  
*Robert Everett*

INVENTOR

*Charles Harvey.*  
*By James L. Norris.*  
*Atty.*

# UNITED STATES PATENT OFFICE.

CHARLES HARVEY, OF YARDLEY, ENGLAND.

## TUBING.

SPECIFICATION forming part of Letters Patent No. 662,787, dated November 27, 1900.

Application filed May 28, 1900. Serial No. 18,312. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES HARVEY, works manager, a subject of the Queen of Great Britain, residing at The Swifts, Yardley, near the city of Birmingham, England, have invented certain new and useful Improvements in Tubing, of which the following is a specification.

This invention has relation to brass and other metal-cased tubings employed in the construction of bedstead-framings and also in stair-rods, cornice-poles, ornamental tubing, and the like.

The present invention has for its object the production of a new article of manufacture—viz., a light yet strong tube consisting of brass or other ductile metal drawn onto a non-metallic foundation or base formed of paper, paper-pulp, cardboard, wood-pulp, or the like.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, wherein like letters of reference indicate corresponding parts throughout the several views, and in which—

Figure 1 is a side elevation, partly in longitudinal section, of a tube. Fig. 2 is a cross-sectional view thereof. Fig. 3 is a side elevation, partly in longitudinal section, of a length of paper rolled upon a suitable support. Fig. 4 is a cross-sectional view thereof. Fig. 5 is a side elevation, partly in longitudinal section, of a tube of ductile metal for incasing said rolled paper. Fig. 6 is a cross-sectional view thereof. Fig. 7 is a side elevation, partly in longitudinal section, of the rolled paper and metallic tube drawn together by a mandrel. Fig. 8 is a side elevation of a corrugated tube substantially square in contour. Fig. 9 is a cross-sectional view thereof. Fig. 10 is a view similar to Fig. 8 substantially cylindrical in contour. Fig. 11 is a view similar to Fig. 9. Fig. 12 is a side elevation, partly in longitudinal section, of a corrugated tube. Fig. 13 is a cross-sectional view thereof.

In carrying out my invention as applied to the production of a plain thin-sheet-metal-cased paper tube or tubular length such as is represented in the accompanying drawings—partly in elevation and partly in longitudinal vertical section in Fig. 1 and in cross-section in Fig. 2—I first take a length of suitably-

prepared paper, and after gluing or pasting the surface I roll or fashion the same upon a suitable internal but removable support into a hollow tube of the desired thickness, such as shown in longitudinal section and side elevation in Fig. 3 and cross-section in Fig. 4. This support upon which the paper is rolled may be in the form of a mandrel; but when it is fashioned upon any other internal support or mold then it is removed therefrom and placed upon a suitable bar, headed or other mandrel, and drawn through a die or dies or subjected to the action of rolls or other tools for compacting or consolidating the same. Onto the solid paper foundation-tube thereby formed a casing or sheath of thin sheet-brass or other ductile metal, preferably in the form of a tube, such as represented in side elevation and longitudinal section in Fig. 5 and in cross-section in Fig. 6, is slipped or drawn, and finally both the casing *a* and foundation-tube *b* are drawn down together, after being placed on a mandrel, such as *c*, as shown in Fig. 7, thereby producing an extremely light yet strong and rigid or stiff composite tube capable of being applied to any of the purposes hereinbefore enumerated.

According to another form of my invention I may mold or fashion the foundation-tube from paper-pulp or wood-pulp by any suitable well-known process, and which said tube is then incased with a sheet-metal covering and the whole drawn together, as previously described, in connection with a tube having a rolled or wrapped paper base.

In the production of ornamental tubular lengths I produce a composite tube by either of the processes previously described and then impress the desired patterns upon the sheet-brass, and by the paper foundation readily conforming to the action of the impressing-tools the said patterns are clearly defined, and there is no tendency to rupture or burst the metal when thin sheet-brass, copper, or the like is employed.

The invention is also equally applicable to tubes having corrugated or other complicated cross-sections. Thus Figs. 8 and 9 represent a square tube, the whole of the sides of which are corrugated, while Figs. 10 and 11 show a form of longitudinally-corrugated round tube, the solid paper or like foundation be-

ing marked *b* and the ductile casing metal *a*, and in each case the outer surface of the foundation is made to conform to the configuration which is imparted to the casing metal by suitable dies or tools, but the inner surface *b'* is plain. In some cases, however, the foundation of the tube may be so formed or drawn that both the outer and inner surfaces conform approximately to the corrugated shape or section of the outer casing. Fig. 12 represents such a tube, partly in elevation and partly in longitudinal vertical section, and Fig. 13 is a cross-section thereof. The corrugated foundation-tube *b* and the metal casing *a* thereof are drawn down collectively into the finished shape desired upon a mandrel having the same shape as the interior of the tube and through a die corresponding to the outside shape.

The invention is also applicable to tubes and tubular articles, triangular and other polygonal sections, and to oval or elliptical shapes, whether with flat, plain, corrugated, beaded, ribbed, or other surfaces.

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

1. A composite tube consisting of compressed fiber and a seamless metallic covering therefor drawn therewith.

2. A composite tube, consisting of com-

pressed fiber and a seamless covering of ductile metal drawn therewith.

3. A composite tube consisting of a non-metallic foundation with a seamless covering of metallic material drawn therewith.

4. A composite tube, consisting of a non-metallic foundation with a seamless covering of ductile metal drawn therewith.

5. A composite tube, consisting of an inner section of paper and a seamless outer section of metallic material drawn therewith.

6. A composite tube, consisting of an inner section of paper and a seamless outer section of ductile metallic material drawn therewith.

7. A composite tube consisting of compressed pulp and a seamless covering of metallic material drawn therewith.

8. A composite tube consisting of compressed pulp and a seamless covering of ductile material drawn therewith.

9. A composite tube consisting of compressed fiber and a seamless covering of thin metallic material drawn therewith.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES HARVEY.

Witnesses:

HY. SKERRETT,

ARTHUR T. SADLER.