(No Model.) 2 Sheets—Sheet 1.

G. H. & K. C. GILLETTE.

TUBE OR CONDUIT.

No. 401,154. Patented Apr. 9, 1889.

Fig. 1.

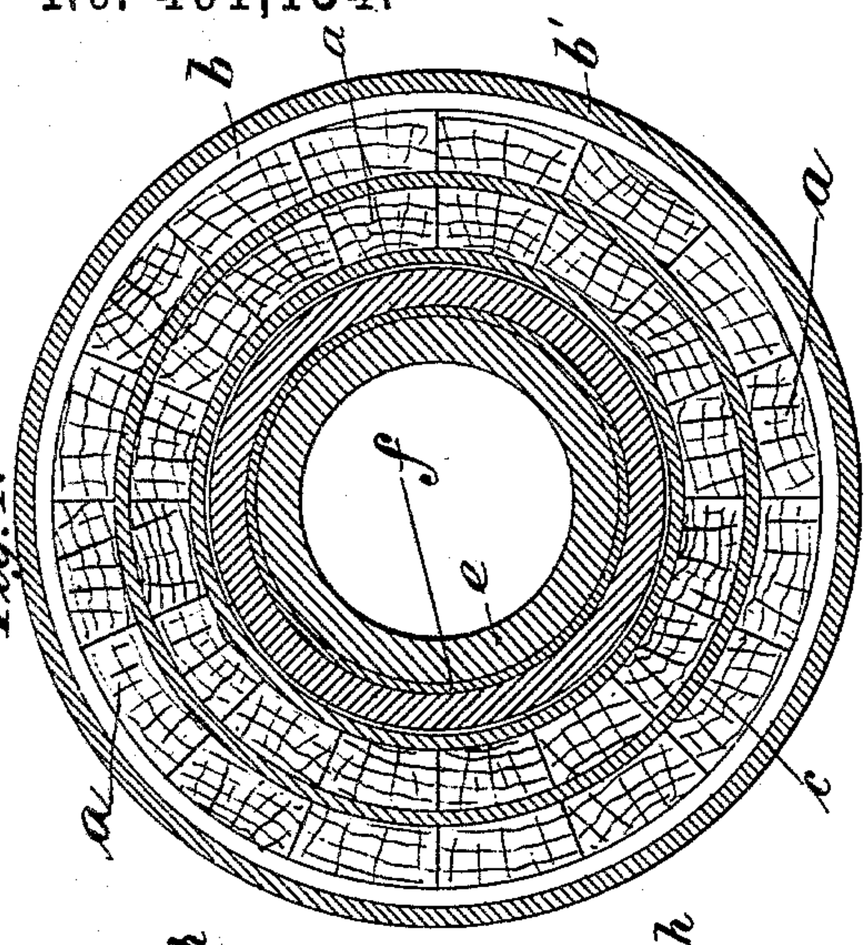


Fig. 2.

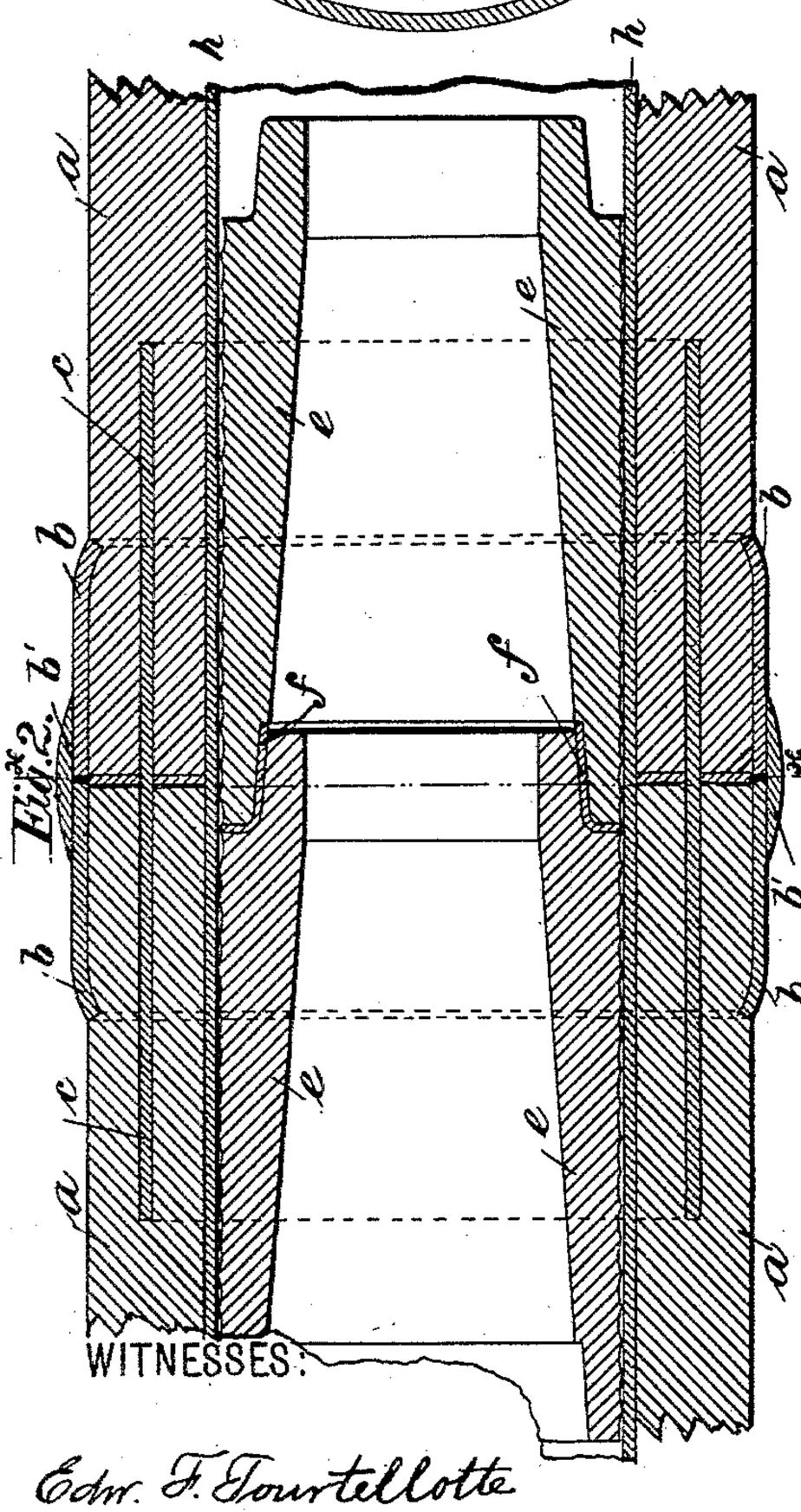
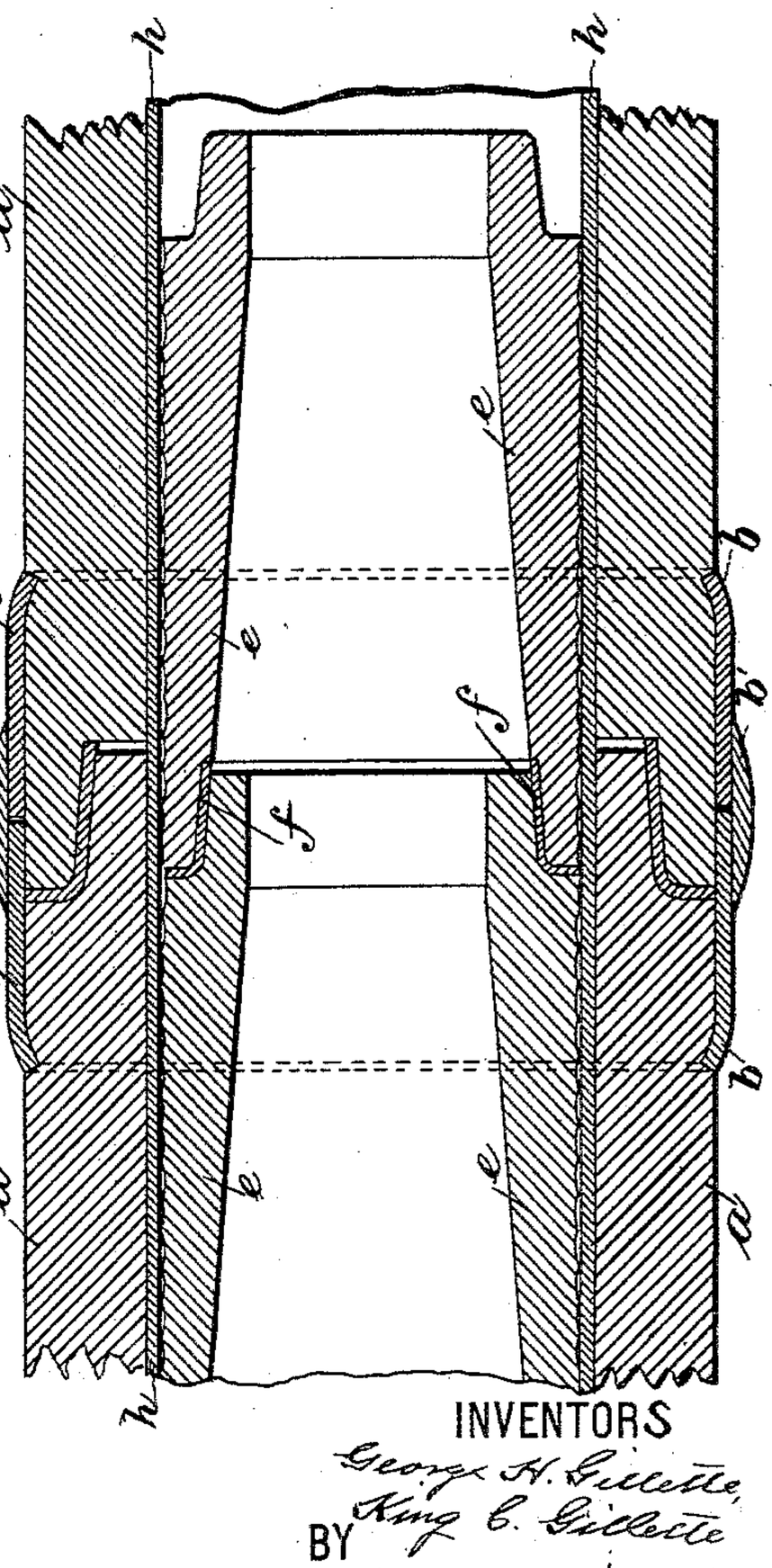


Fig. 3.



WITNESSES:

Edw. F. Tourtellotte

R. G. Monroe.

INVENTORS

George H. Gillette,

King C. Gillette

BY Hubert A. Banning

ATTORNEY

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Fig. 4.

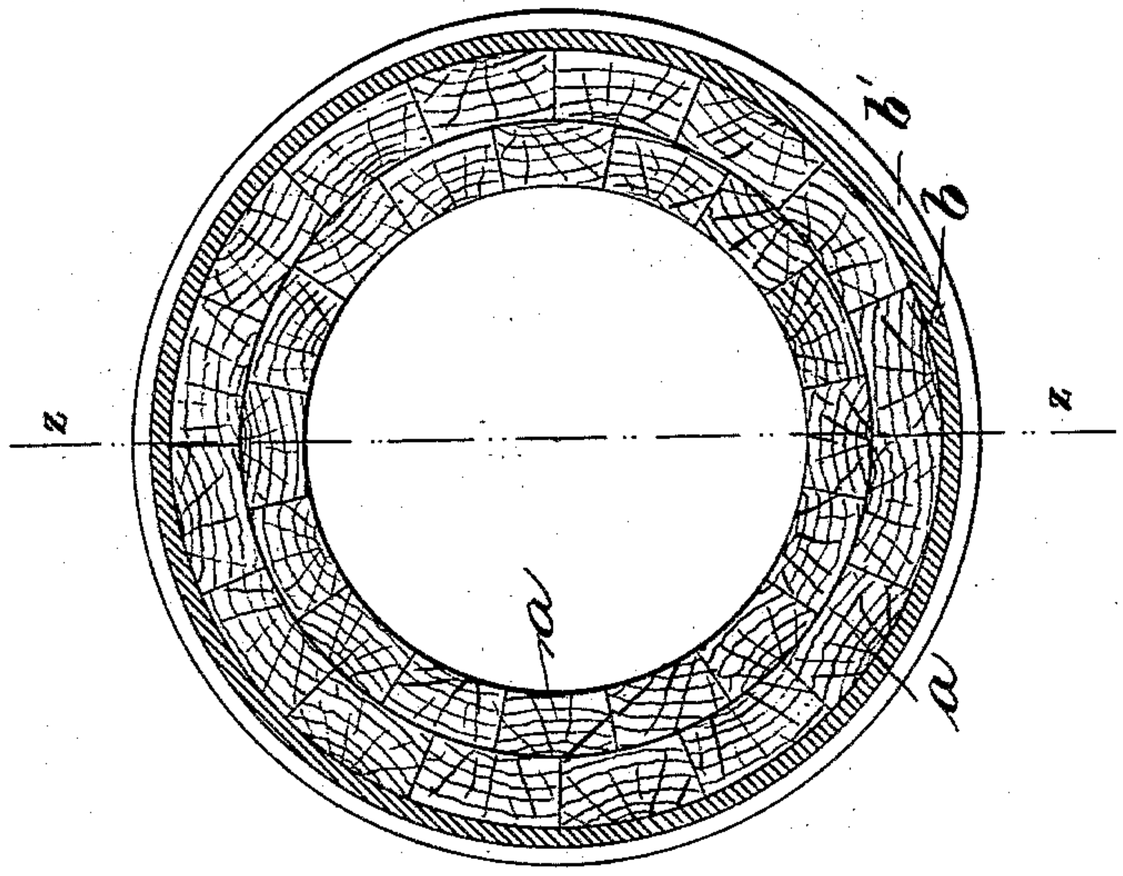
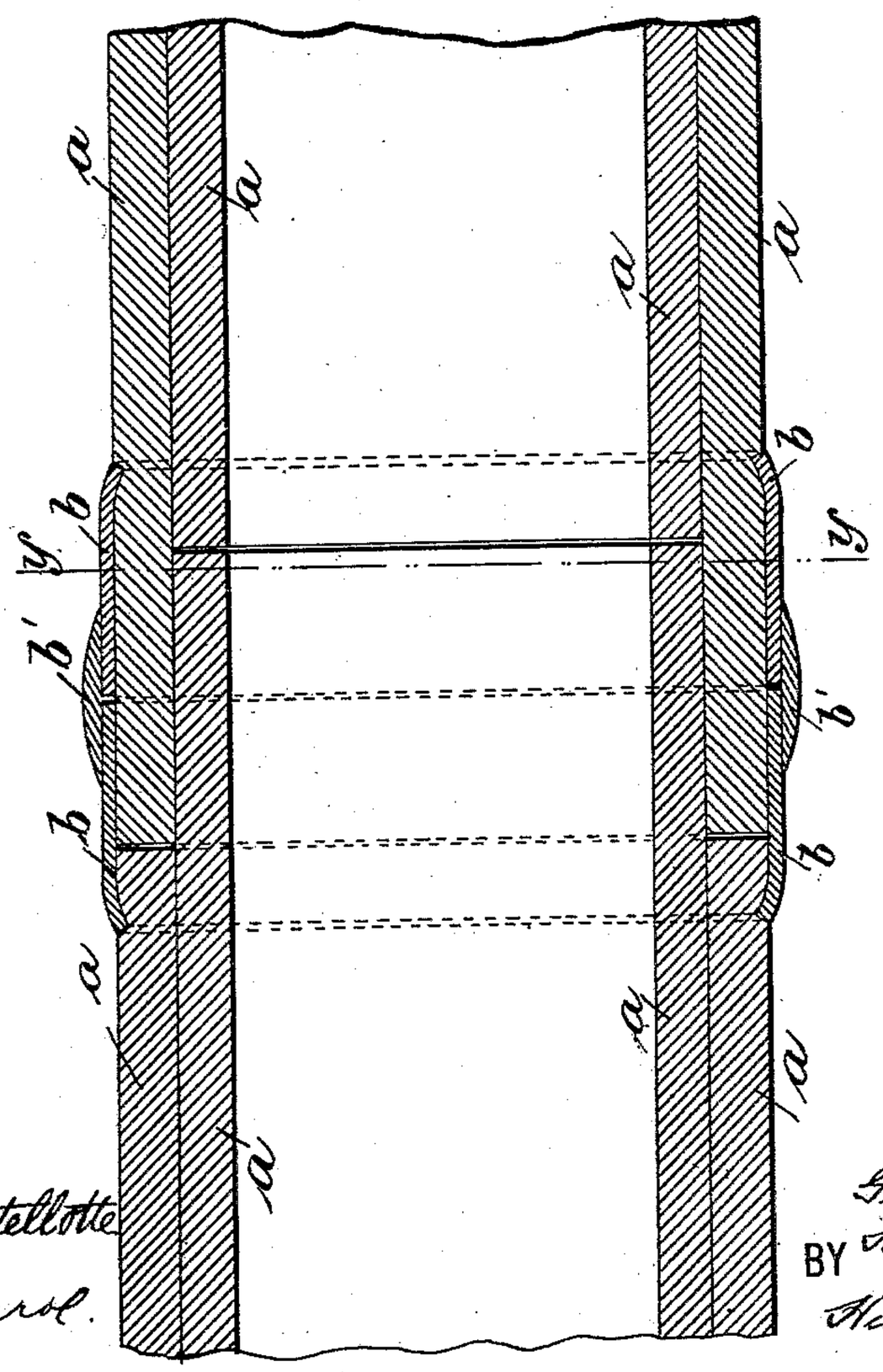


Fig. 5.



WITNESSES:
Edw. F. Tourtellotte
R. F. Mowrey.

INVENTORS.
George H. Gillette,
King C. Gillette,
BY Hubert A. Banning
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE H. GILLETTE AND KING C. GILLETTE, OF NEW YORK, N. Y.

TUBE OR CONDUIT.

SPECIFICATION forming part of Letters Patent No. 401,154, dated April 9, 1889.

Application filed January 17, 1889. Serial No. 296,637. (No model.)

To all whom it may concern:

Be it known that we, GEORGE H. GILLETTE and KING C. GILLETTE, citizens of the United States, residing in the city of New York, county and State of New York, have invented certain new and useful Improvements in Tubes or Conduits, of which the following is such a full, clear, concise, and exact description as will enable others skilled in the art to which our invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of our invention is to construct a tube or conduit which will be strong and durable, not liable to be cracked or broken by sudden shocks or concussions, remain impervious to moisture, and sealed against atmospheric influences, and one which will be adapted to use in various ways, but more especially for containing electrical conductors and for pneumatic purposes. To accomplish this object we form the tube or conduit in sections, composed of wooden staves or strips compressed together either so as to form a tube of one thickness or as a casing about a similarly-formed inner wooden tube or about a tube or core of glass or other material provided with a suitable duct or ducts, the said wooden staves being held together when compressed by bands and hoops, and the sections joined end to end by suitable joints; and the invention consists in the construction and arrangement of the various parts, as herein described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in cross-section of tube or conduit embodying our improvement, and showing compressed wooden casing about inner glass core provided with one large central duct, and is taken on the line *x x* of Fig. 2, which is a central longitudinal section of the same, showing water-tight connecting-joint. Fig. 3 is a longitudinal section of conduit, showing another form of joint. Fig. 4 is a view in cross-section on line *y y* of Fig. 5, and shows outer wooden tube compressed about a similarly-compressed inner tube; and Fig. 5 is a central longitudinal section of the same on line *z z* of Fig. 4.

In practice the wooden strips *a a* are cut into convenient lengths of suitable width, and may, if desired, be tongued and grooved. These strips are narrowed by compression, being preferably put under hydraulic pressure. The pressure may be applied to the wood either in dies or under or between rollers, the extent of the compression being within the limit of the elasticity of the wood. The strips may be either narrowed or compressed individually and then assembled and secured together before material expansion takes place, or they may be first assembled together and put under pressure circumferentially of the tube, the hoops, bands, or rings *b b* being preferably secured about the same before the pressure is relieved. Sections so formed are then placed end to end and connected by lap-joints, as indicated in Fig. 3; or they may be joined together by outer metal sleeves or in any other suitable manner; but we prefer the joint shown in Fig. 2, in which the connecting-sleeve *c* extends for a portion of its width into the adjoining ends of two connecting sections, narrow circular grooves to receive the same being cut in the wood. Such grooves can readily be made by means of a cylindrical or drum saw after the strips are assembled and compressed. The joint may be further sealed by a band of solder, *b'*, about the adjacent ends of the two end hoops, *b b*. When the tube or conduit is formed as shown in Fig. 3, a secure joint can be made by having a portion of outer tubing at the end of one section extend over a projecting portion of the inner tubing of an adjacent section.

In Figs. 1, 2, and 3 the wooden strips *a a* are compressed together about an inner tube consisting of short glass cylinders *e e*, with intermediary washers, *f f*, the sections *e e* being provided with tapering longitudinal openings, forming a continuous duct of expanded and contracted diameter—a construction more fully described in our application for a patent entitled "improvement in conduits for electrical conductors, &c.," filed January 19, 1889, Serial No. 296,638. The form of the inner tubing may, however, be varied. The longitudinal openings may be straight instead of tapering; or, instead of a tube with a single continuous duct, the wooden strips may be compressed about a core of

glass disks or cylinders having a number of openings forming as many ducts; or other suitable insulating material may be substituted for glass. The outer rounded surfaces of the cylinders *e e* are preferably roughened, as shown in Fig. 2, to insure against any danger of their slipping after the casing has been compressed about them, and the inner tubing or core may be provided with a wrapping, *h*, of paraffined paper or any suitable insulating and protective material before it is surrounded by the compressed wooden casing.

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

1. A tube or casing for a conduit, consisting of a series of sections formed of compressed wooden strips having grooved or slitted ends, as described, suitable retaining-bands, and connecting-sleeves, said section being disposed end to end and the said sleeves extended into the adjoining slits or grooves of the several connecting sections.

2. A tube or conduit consisting of a series of sections formed of compressed wooden strips, as described, suitable retaining-bands, and an inner tube or core, said sections being disposed end to end and united one to another.

3. A tube or conduit consisting of a series of sections formed of compressed wooden strips having grooved or slitted ends, as described, suitable retaining-bands, connecting-sleeves, and an inner tube or core, said sections being disposed end to end and said sleeves extended into the adjoining slits or grooves of the several connecting sections.

4. A tube or conduit consisting of a series of sections formed of compressed wooden strips, as described, suitable retaining-bands, and an inner core composed of a series of short cylinders of insulating material, as glass, provided with connecting longitudinal openings, said sections being disposed end to end and united one to another.

5. A tube or conduit consisting of a series of sections formed of compressed wooden strips, as described, suitable retaining-bands; an inner core composed of short cylinders of insulating material, as glass, provided with one or more connecting longitudinal openings, and washers or packings interposed between said cylinders, said sections being disposed end to end and united one to another.

GEORGE H. GILLETTE.
KING C. GILLETTE.

Witnesses:
R. G. MONROE,
L. T. GRIFFITH.