

(No Model.)

2 Sheets—Sheet 1.

B. DAY.

TUBULAR INTERCHANGEABLE PRINTER'S ROLLER.

No. 563,572.

Patented July 7, 1896.

Fig. 1,

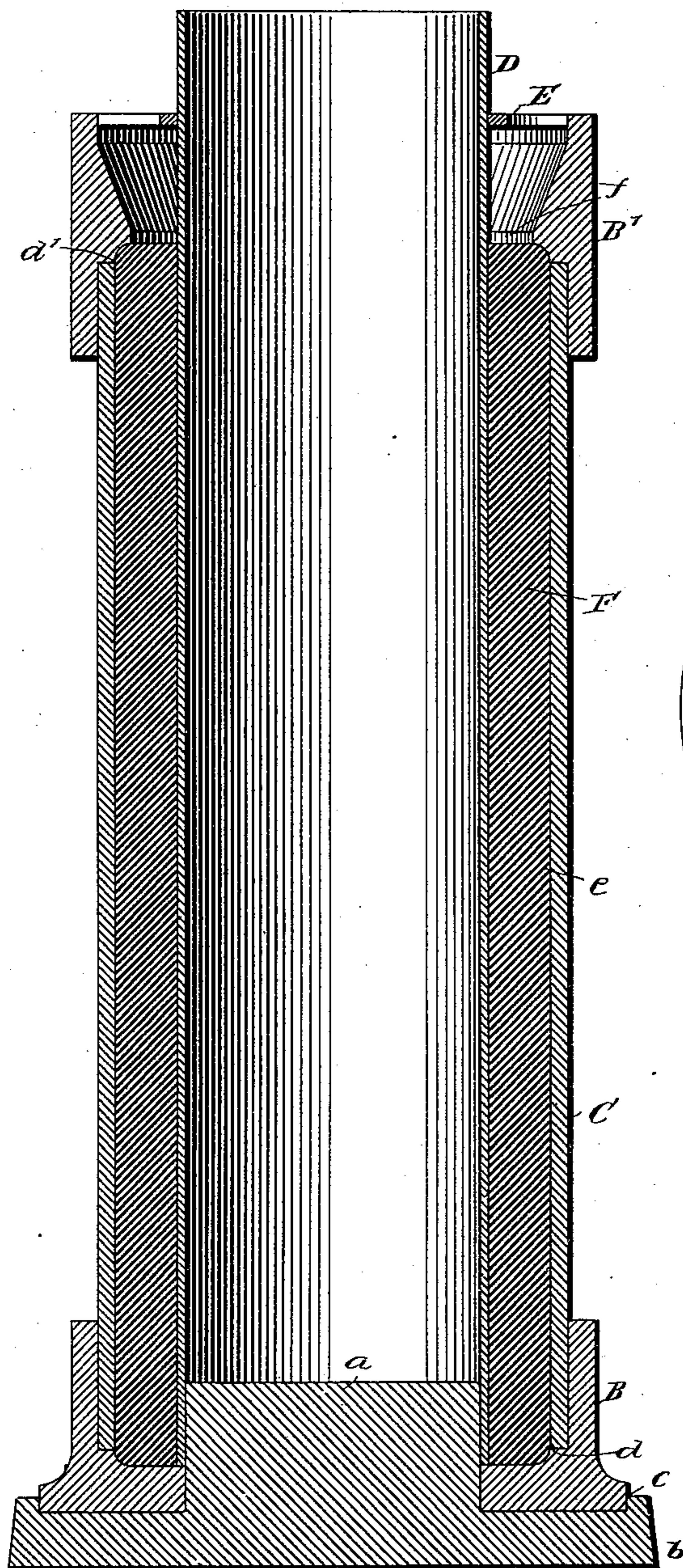
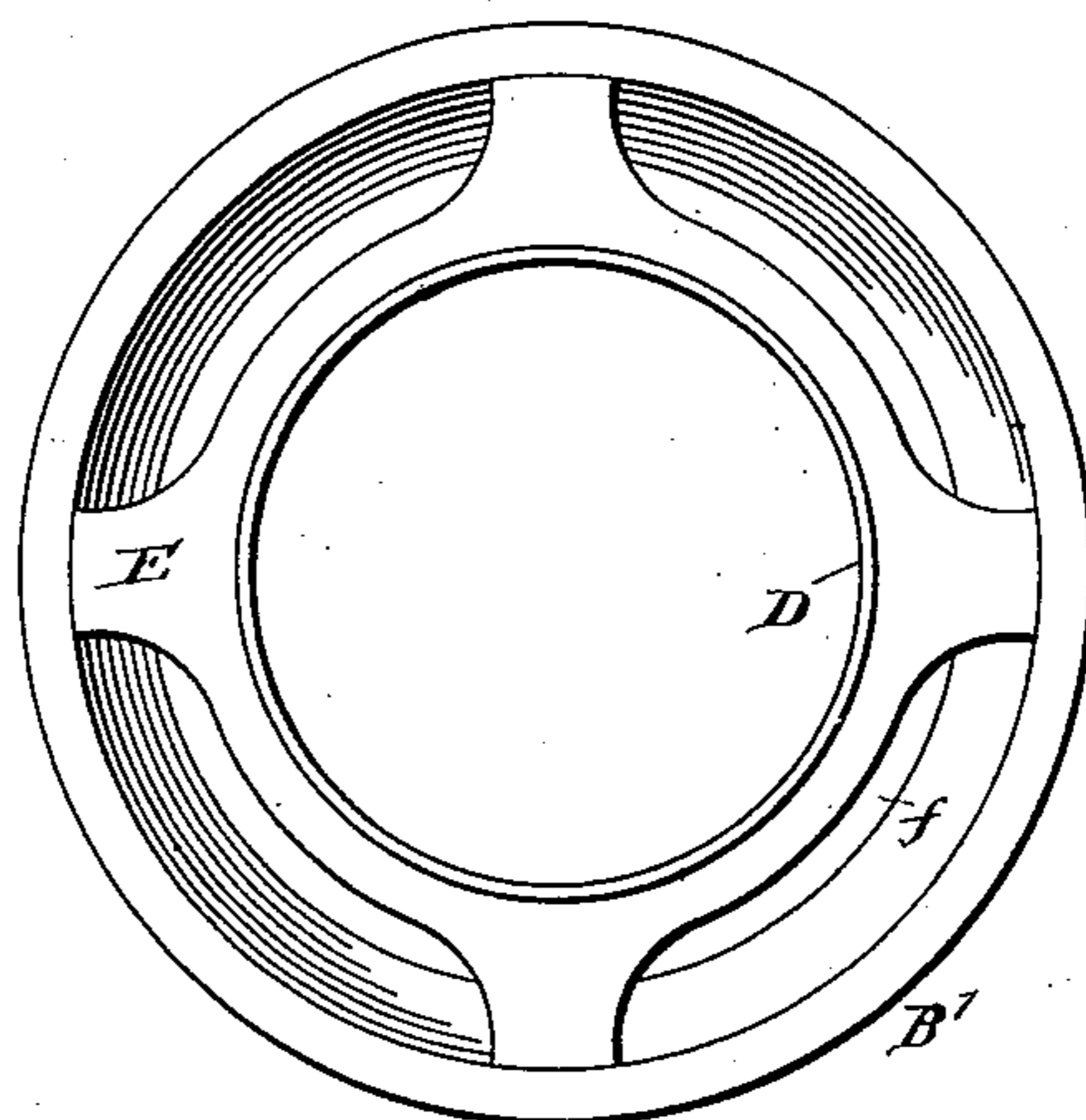


Fig. 2,



WITNESSES:

Edward Thorpe.
G. M. Hopkins.

INVENTOR

B. Day
BY J. Munn & Co.

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

B. DAY.

TUBULAR INTERCHANGEABLE PRINTER'S ROLLER.

No. 563,572.

Patented July 7, 1896.

Fig. 3,

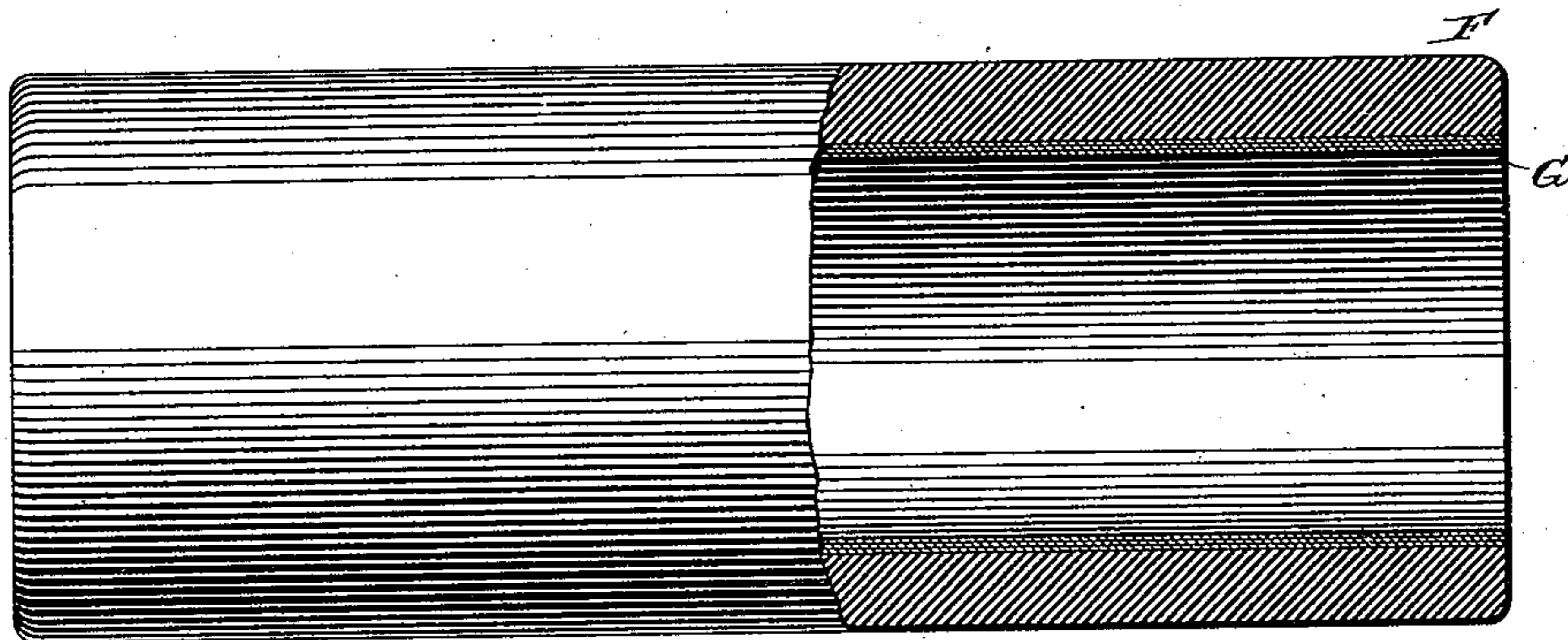
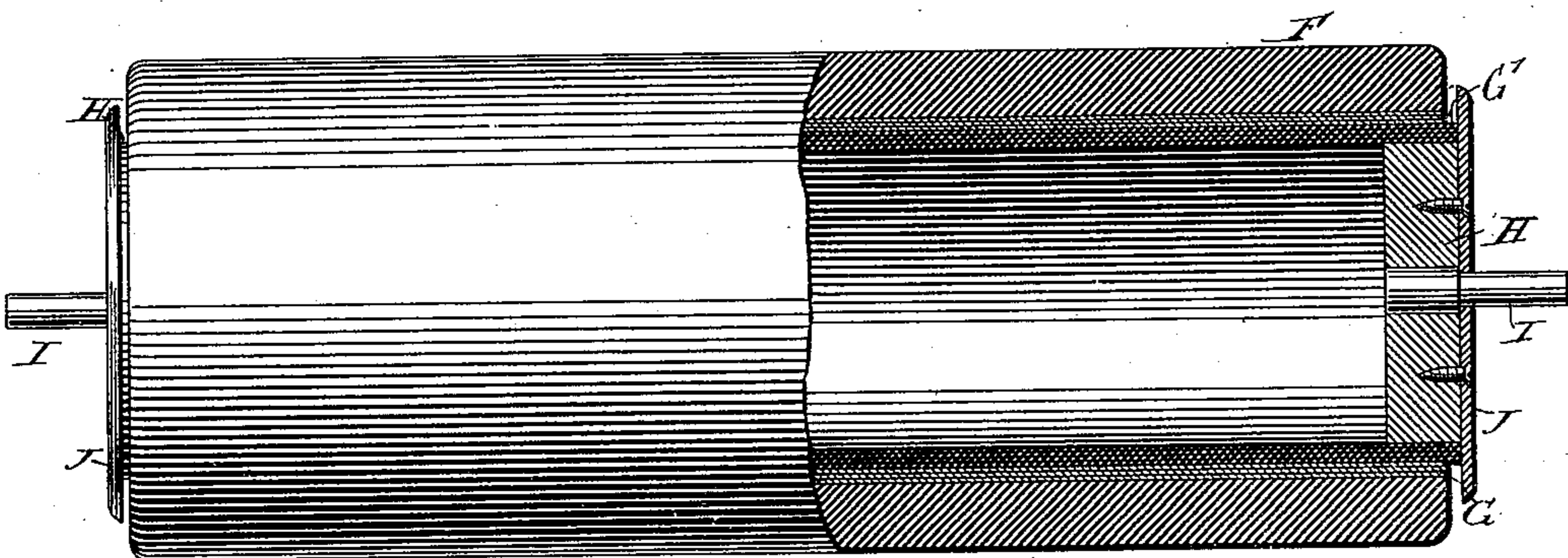


Fig. 4.



WITNESSES:

Edward Thorpe.
G. M. Hopkins,

INVENTOR

B. Day
BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

BENJAMIN DAY, OF WEST HOBOKEN, NEW JERSEY.

TUBULAR INTERCHANGEABLE PRINTER'S ROLLER.

SPECIFICATION forming part of Letters Patent No. 563,572, dated July 7, 1896.

Application filed March 9, 1895. Serial No. 541,098. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN DAY, of West Hoboken, in the county of Hudson and State of New Jersey, have invented a new and Improved Tubular Interchangeable Printer's Roller, of which the following is a full, clear, and exact description.

The object of the invention is to provide a convenient and economical method of making non-shrinkable printers' rollers, so as to permit of quickly replacing them and at the same time obviating the necessity of sending the stock to the roller-maker when a roller is needed, and, further, to provide a method and means whereby reliable, flexible, well-seasoned, non-shrinkable rollers having good ink-taking qualities may be readily produced.

My invention consists in a tubular printer's roller constructed in the manner hereinafter described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a vertical transverse section of the mold with the tubular roller cast therein. Fig. 2 is a plan view. Fig. 3 is a side elevation, partly in section, of a tubular roll and roll-support made according to my improvement; and Fig. 4 is a side elevation, partly in section, of the tubular roller and stock for the same.

The mold used in casting the tubular printers' rollers is furnished with a heavy metallic base A, having a boss *a* and the flange *b*, provided with a shallow annular recess *c*. To this recess is fitted the collar B, which encircles the lower portion of the base A and is bored to fit the outside of the metal tube C, forming the outer wall of the mold, and which is provided with a shoulder *d*, having a width equal to the thickness of the tube C. Adjoining the shoulder *d* the upper surface of the inner portion of the collar is concaved to give a convex form to the outer portion of the roller formed in the mold.

To the boss *a* is fitted the metallic tube D, forming the inner wall of the mold, and between which and the tube C there is an annular space *e* for receiving the composition of which the roller is formed. To the outer surface of the upper end of the tube C is fitted

a collar B', having a shoulder *d'*, which rests on the upper end of the tube C. Inside the shoulder *d'* the collar B' is concaved to impart a convex form to the outer portion of the upper end of the roller. Between the collar B' and the tube D there is an annular space *f*, through which the roller composition is poured into the mold, and above the concave, joining the shoulder *d'*, the opening of the collar is flared to facilitate pouring the composition. At the upper edge of the collar B' the opening thereof is cylindrical, and to this portion of the collar is fitted a spider E, which receives the upper end of the tube D, thus keeping the inner tube D and the outer tube C concentric. The parts of the mold which come into contact with the roller composition are preferably made of brass or other non-corrosive metal, while the base A may be made of cast-iron.

In the manufacture of these rolls I may employ the ordinary roller composition, which is poured into the molds after the surfaces with which the composition contacts are thoroughly oiled. As soon as the composition cools and becomes jellied I remove the mold from the base and withdraw the inner tube D and allow cool air to circulate through the interior of the mold, thereby drying the tubular roller, causing it to shrink at the inner surface and withdraw itself from the outer tube C, when it may be removed from the said tube and mounted in a manner presently to be described.

Where the roller is designed for fine work or work requiring the very cleanest inking, I make a composition of the finest gelatin and glycerin in the proportion of one part of gelatin to two parts of glycerin. I first soak the gelatin in water until it is softened throughout, then squeeze out all the surplus water and then melt it, afterward adding the glycerin. I then cook it thoroughly at a temperature of 200° Fahrenheit, for about two hours. I then pour it out into convenient-sized pans and allow it to jelly. I then dry it until the sheets are transparent, or until the greater part of the water has left the composition. This takes from one to two weeks, according to the thickness of the sheets.

After the sheets of the composition are dried in the manner described, they are broken up and remelted without the addition of water,

by subjecting the composition to a temperature of 212° Fahrenheit for a long time. When the composition is to be poured into the mold, I tap the vessel containing the composition at the bottom, allowing it to flow from the lower part of the vessel into the mold. When the composition is cold, I withdraw the inner tube D in the manner hereinbefore described, and allow the tubular roller F to dry from the inner surface until it contracts sufficiently to be readily taken from the outer portion of the mold. The time required for drying the roller in this manner is from one to two days. Another day's drying after the roller has been removed from the outer surface of the mold suffices to complete the drying. After the tubular roller is formed in the manner already described, I prepare a series of paper tubes by coating firm, hard Manila paper with two coats of shellac varnish, or any other varnish containing a fusible gum which will melt at a temperature which will not burn the paper. After the varnished paper is dried, I take suitable lengths of the paper and wind it around a mandrel of suitable size between hot rollers, which cause the resin in the varnish to melt, thus cementing the different layers of paper together, causing them to adhere firmly, and thereby forming a paper tube that is unaffected by moisture or atmospheric changes. The tube G thus formed fits into the tubular roller F, made of roller composition, and forms a rigid unchangeable support for the same. In the manner already described, I form another paper tube G', preferably of greater thickness, which will fit into the paper tube G, and I fit heads H to the ends of the tube G', which have been slightly tapered to cause them to fit snugly into their places. The centers of these heads are provided with arbors I, forming the bearings of the rollers, and to the heads are secured perforated plates or flanges J, which project beyond the paper tube and hold the tubular roller in its place. The inner tube with the heads, arbors, and flanges, forms the stock to which the tubular rollers F may be readily applied, and from which they may be easily removed when it is required to shift the roller.

In some cases I mix with the gelatinous material one of the well-known oxidizing agents such as the bichromate of potash, which renders the roller insoluble after exposure to light, but I prefer to treat the surface of the roller with an oxidizing solution such as bichromate of potash, thereby rendering the inner and outer surfaces only insoluble, leaving the inclosed and more flexible portion of the roller in its original state, with an insol-

uble skin upon the outer and inner surfaces of the roller.

It will be obvious that a roller made in the form of a tube, in the manner described, removes as far as possible all the water necessary to incorporate the ingredients of which it is composed, and that the drying of the composition in the various stages of the manufacture gives a resultant roller of a tubular shape that is subject to no further serious shrinkage. Furthermore, the roller being dried in its mold, with its inner or core surface exposed first to the air, will dry without distortion; the resultant roller will keep its shape and the inking or outer surface will retain without distortion the level given it by the shape of the outer mold. Again, in the ordinary printer's roller, the composition is cemented to the stock by the act of casting and the homogeneity of the composition is disturbed by being incorporated with the cotton wick wound around the stock to insure the adherence of the composition thereto. The result is, that when the composition commences to shrink, it shrinks first on the outside where it is exposed to the air, with the result of distorting the rolling-surface of the roller. The inside that in contact with the stock is unaffected by the air and material being flexible, the contraction of the parts exposed to the air results in distorting the outer surface.

It is obvious that my improvement in printers' rollers not only insures a more perfect article, but it also effects a great saving in material.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A flexible tube-form printer's roller of gelatinous material having toughened surfaces inside and outside, which imprison and protect the soluble flexible material in the body of the roller from the effects of moisture and air, substantially as specified.

2. The herein-described method of drying, shrinking, and treating a tube-form printer's roller before mounting and using the same, to prevent the distortion of its outer surface by reason of unequal exposure of its inner and outer surfaces to the air after being mounted, which consists in exposing the inner surface of the tube-form roller to the air for a time, before exposing the outer surface of the roller to the air.

BENJAMIN DAY.

Witnesses:

C. SEDGWICK,
F. W. HANAFORD.