

No. 607,202.

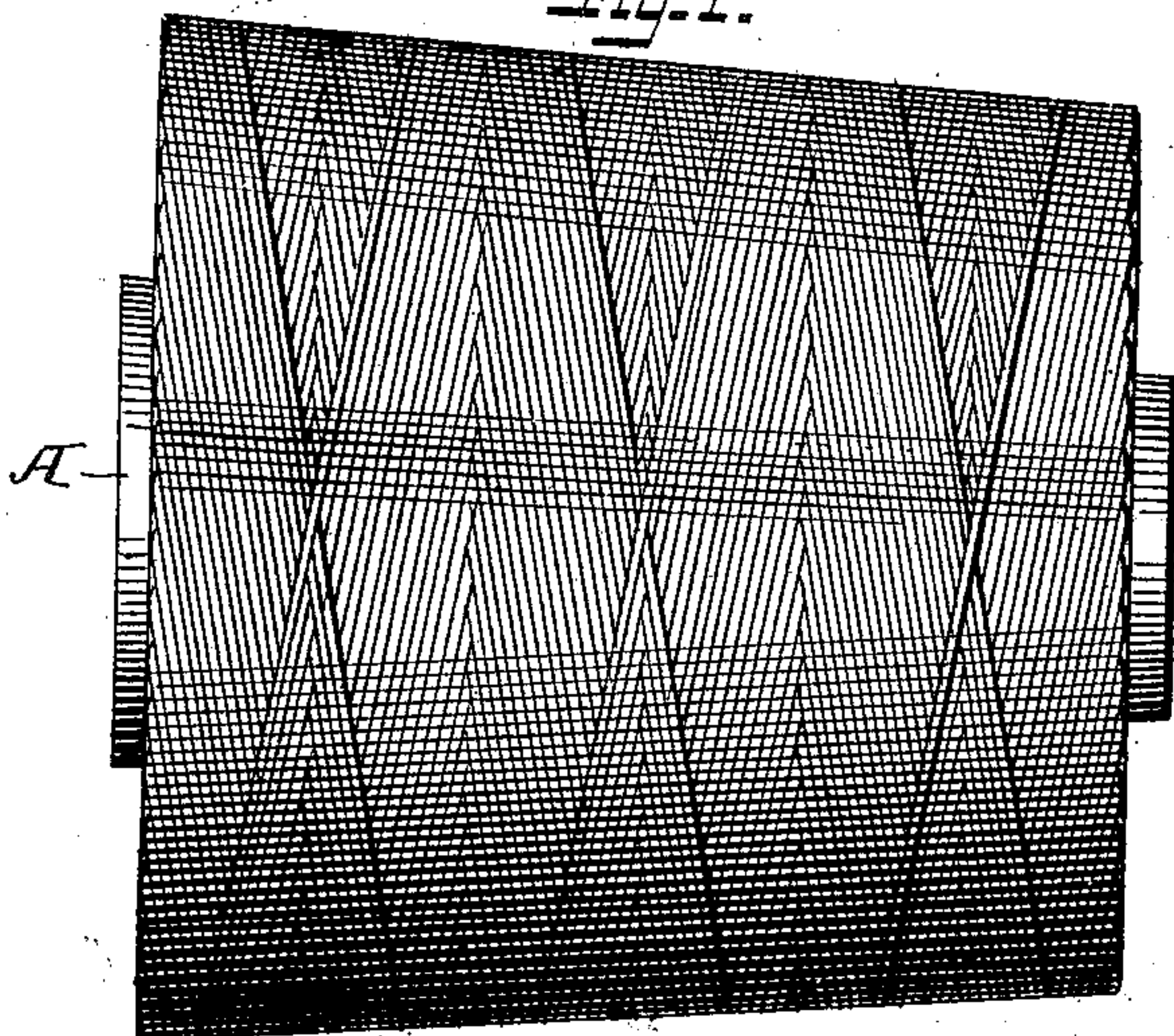
S. W. WARDWELL, JR.  
COP.

Patented July 12, 1898.

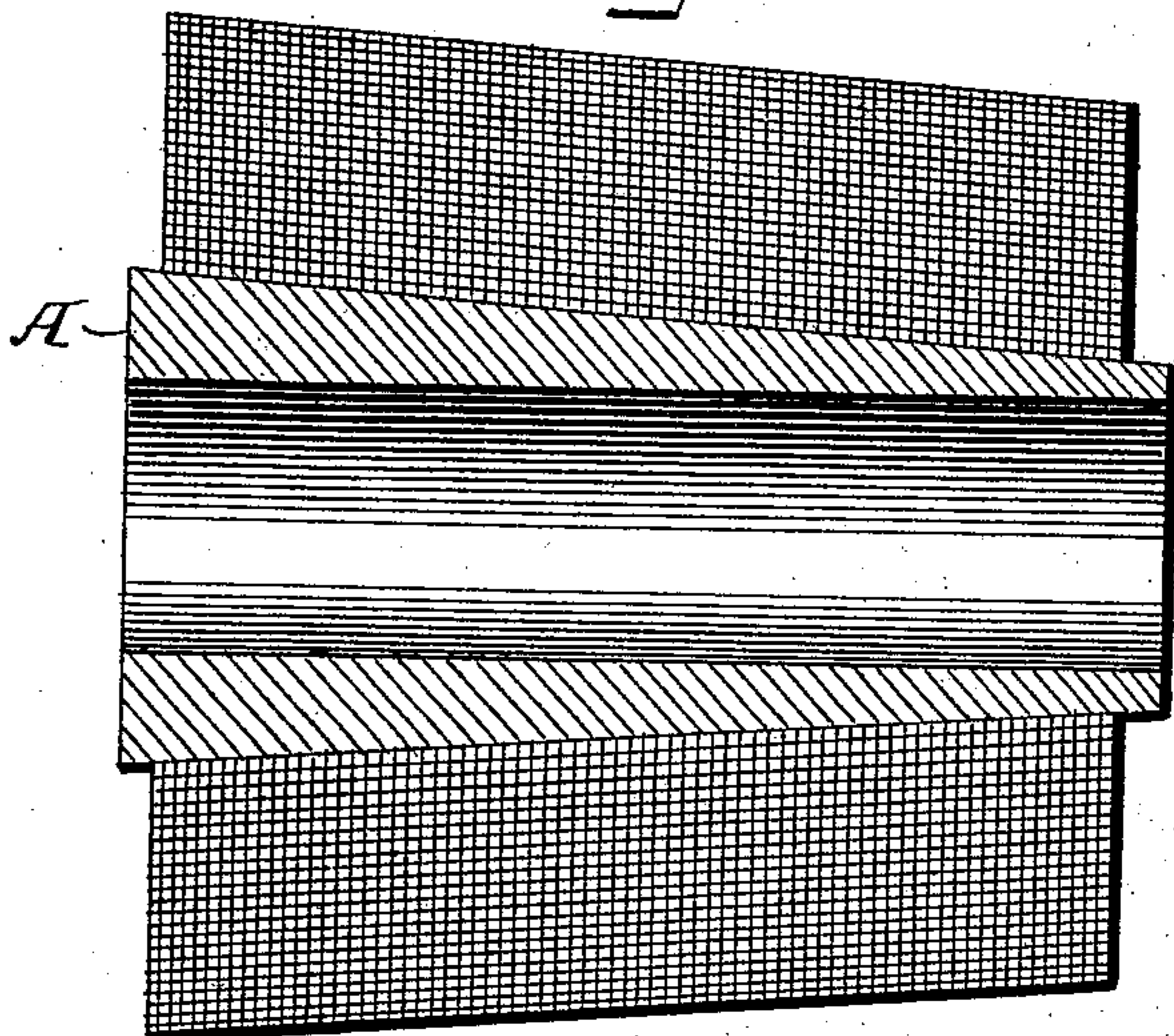
(Application filed Mar. 20, 1893.)

(No Model.)

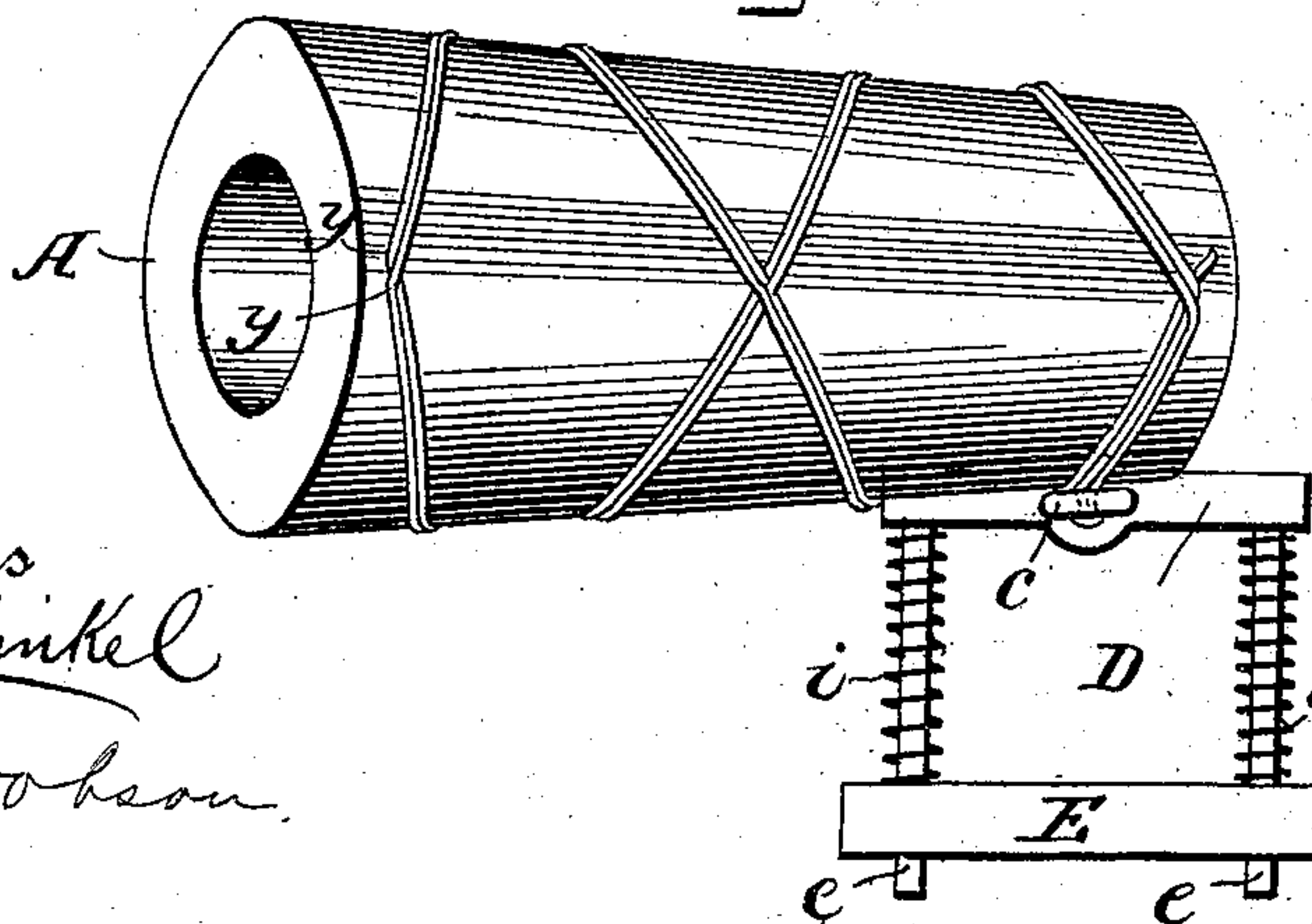
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses  
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# UNITED STATES PATENT OFFICE.

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THE UNIVERSAL WINDING COMPANY, OF PORTLAND, MAINE.

## COP.

SPECIFICATION forming part of Letters Patent No. 607,202, dated July 12, 1898.

Application filed March 20, 1893. Serial No. 466,922. (No model.)

*To all whom it may concern:*

Be it known that I, SIMON W. WARDWELL, Jr., a citizen of the United States, residing in Boston, Suffolk county, Massachusetts, have  
5 invented certain new and useful Improvements in Cops, of which the following is a specification.

In the manufacture or winding of conical truncated cops it has heretofore been customary in some classes of cops to impart the increased diameter to one end of the cop by increasing the mass of thread upon the tube or bobbin at that end, the numbers of layers of the winding being progressively decreased  
10 from the thick toward the smaller end, an operation which requires the employment of nice operating and somewhat complicated mechanism. For many styles of cops or bobbins it is not unusual to employ spools or  
15 cop-tubes which are tapering to a greater or less extent, the taper, however, having no relation to the external form of the cop. All modes of winding heretofore employed result in cops with rounded corners, the yarn being  
20 carried across the ends, so that in drawing it off longitudinally it catches and tends to tilt the cop. In order to obviate the objections incident to these ordinary methods of winding and to build up the cop without the employment of devices for reducing gradually  
25 the number of windings upon different portions of the cop, I make use of the methods and appliances hereinafter set forth, and illustrated in the accompanying drawings, in which—  
30

Figure 1 is an external view of a conical cop wound in accordance with my improvements. Fig. 2 is a longitudinal section. Fig. 3 is a perspective view illustrating the form  
40 of the cop-tube and the manner of laying the thread thereon.

In carrying out my invention I make use of a cop-tube or bobbin A, which is solid or hollow, as may be desired, but which externally  
45 tapers to the same degree as the cop which it is desired to wind. Upon this tube or bobbin I build up the cop by any suitable mechanism, taking care, however, to wind each layer of thread from end to end of the cop  
50 upon the layer beneath, so that at the termination of the operations there is precisely the

same number of layers at the thick end as at the smaller end of the cop. As a result of this method of laying the thread upon the tapering tube or bobbin I impart to the external form of the cop precisely the same taper as that of the tube upon which the cop is built, with substantially flat ends and sharp corners. In insuring accuracy in laying the threads in this manner upon the cop-tube it  
55 is necessary to make use of a thread-guide c, which travels in close bearing with the exterior of the cop as it increases in size, the guide c being suitably supported, so as to yield as the cop increases. Thus the said  
60 guide is supported by a frame D, which is carried by the carrier E and provided with guides e e, passing through the carrier, and with springs i, which force the frame toward the cop and maintain the guide c in contact  
65 with the exterior of the cop. As the carrier E moves back and forth transversely in the direction of the arrows the guide is carried along the cop and the springs i maintain the contact therewith. It is of course important  
70 in such case that the guide shall be parallel with the face of the cop, and I therefore set it at an angle, as shown, or preferably swivel it in the carrier D, so that it will accommodate itself to the angle of the cop-face. This  
75 structure constitutes the subject of a separate patent, No. 593,756, dated November 16, 1897.

I lay each layer of thread so that it will be parallel to one of the windings previously laid upon the cop, as set forth in my Letters Patent No. 480,157, care being taken to lay each  
80 thread as it arrives at each end of the cop so as to cross one of the threads previously laid and form a bend y, as shown in Fig. 3, thereby bringing all the bends of all the windings  
85 upon substantially a flat plane at the end of the cop. I have found that this is important in connection with a conically-wound cop, as there is in such case no tendency of the threads to slip one over the other toward the  
90 smaller end of the cop, as is the case in cops wound with rounded corners in the ordinary way, this tendency being overcome by the fact that each thread is so laid as to be alongside one of the threads of a previous coil,  
95 which locks it in place. This peculiar method of winding has also a special advantage in  
100

connection with a tapering cop, which in unwinding is set upon the base or larger end and from which the thread is drawn vertically toward the smaller end, inasmuch as  
5 all the bends  $\gamma$  are short bends and no portions of the threads are carried beneath other portions of the thread, whereby the upward draft prevents the thread from having any tendency to bear upon other threads and lift  
10 the cop.

Without limiting myself to the building up of the cop in the precise manner set forth, I claim as my invention—

15 A conical cop consisting of a series of concentric layers, each layer coinciding with the

face of a cone, and consisting of spiral coils crossing each other between the ends of the cop, and each coil bent back with abrupt bends at the ends of the cop, said bends at each end succeeding each other in regular order, and all at each end upon the same plane at right angles to the axis of the cop, substantially as described. 20

In testimony whereof I have signed my name to this specification in the presence of  
25 two subscribing witnesses.

SIMON W. WARDWELL, JR.

Witnesses:

ALBERT D. BOSSON,

CHARLES DYER CHASE.