

(No Model.)

R. S. WARING.  
MANDREL FOR CABLE PRESSES.

No. 294,539.

Patented Mar. 4, 1884.

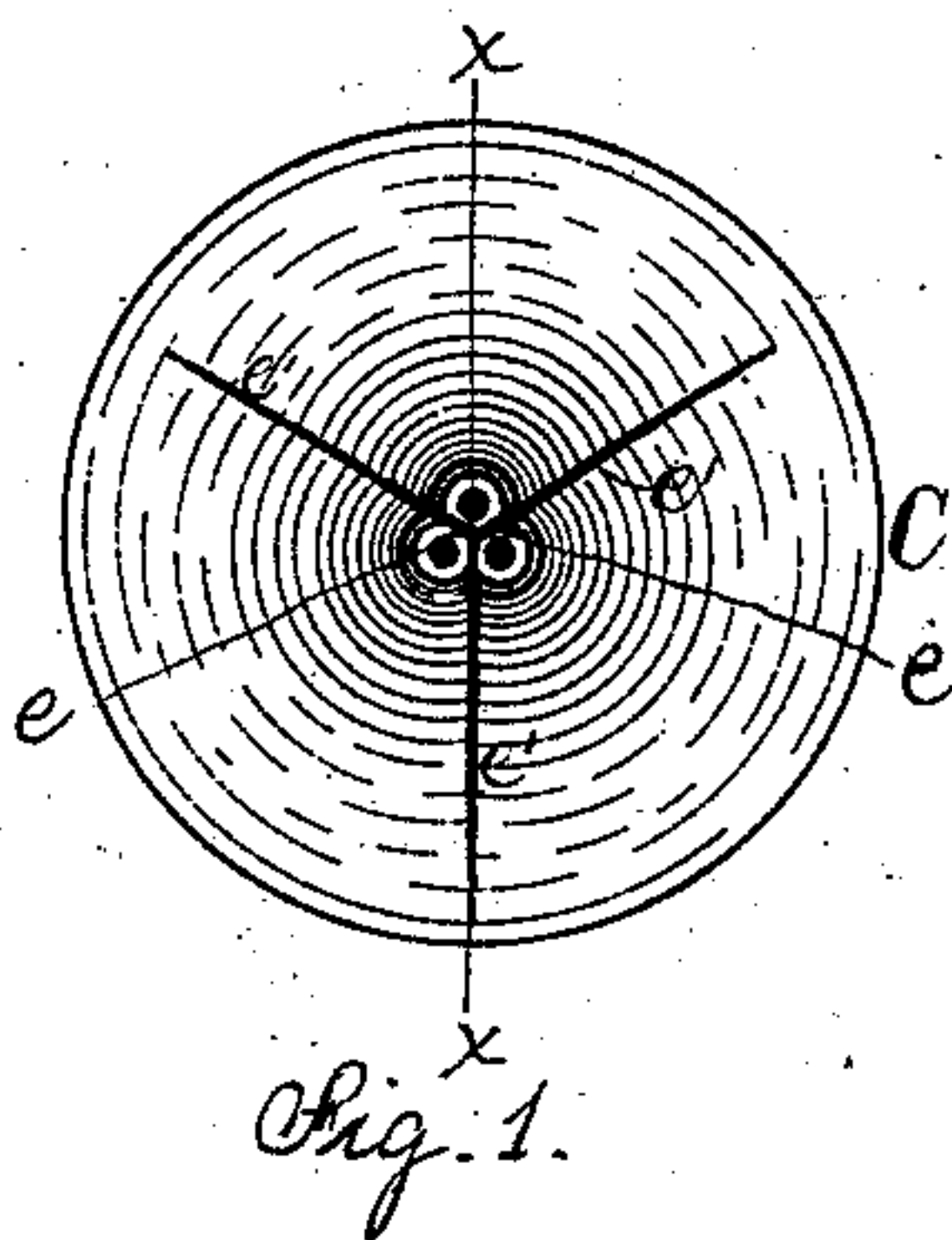


Fig. 1.

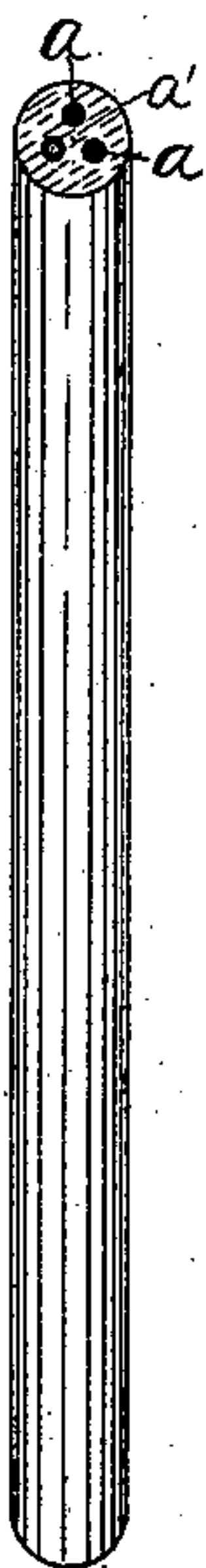


Fig. 5.

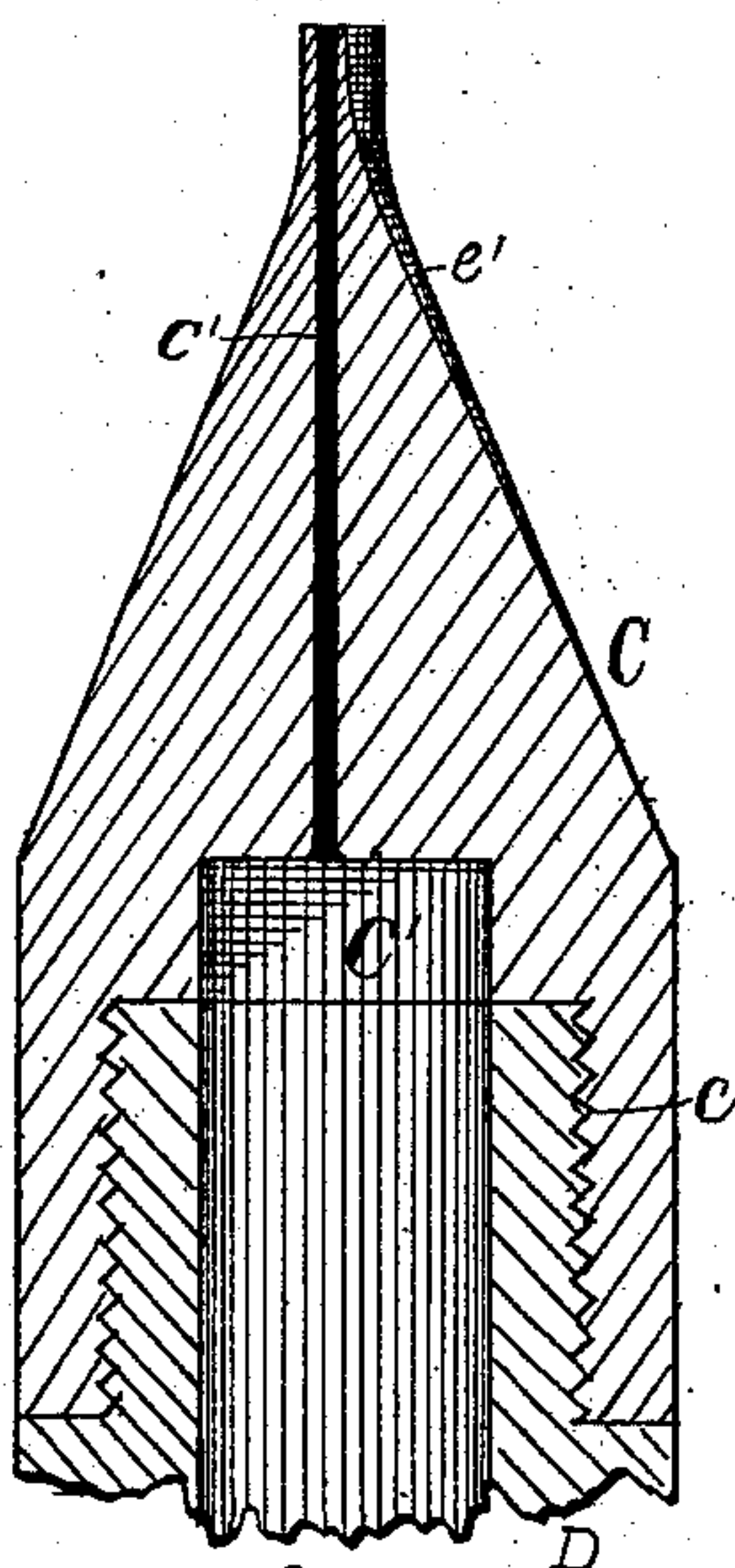


Fig. 2.

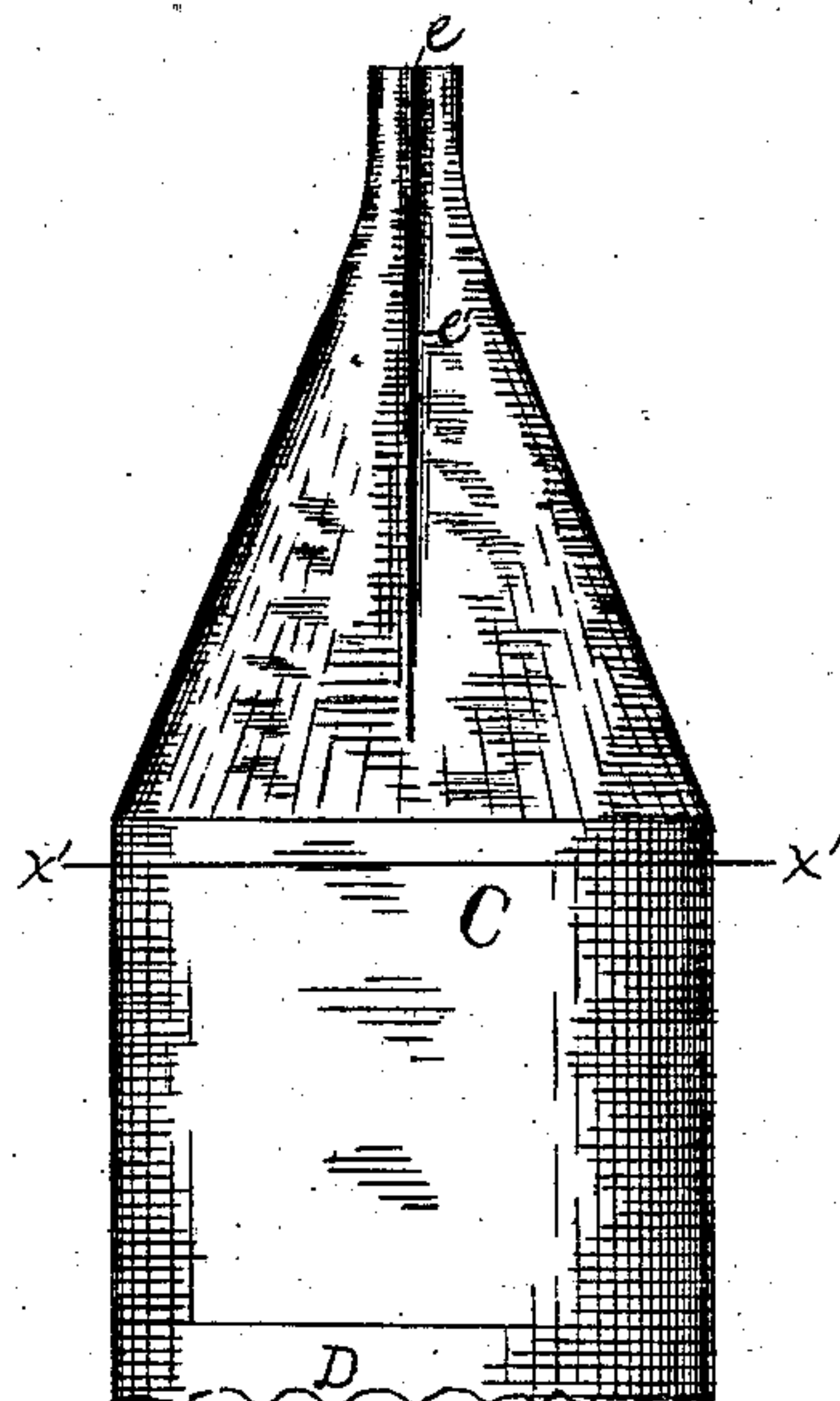


Fig. 4.

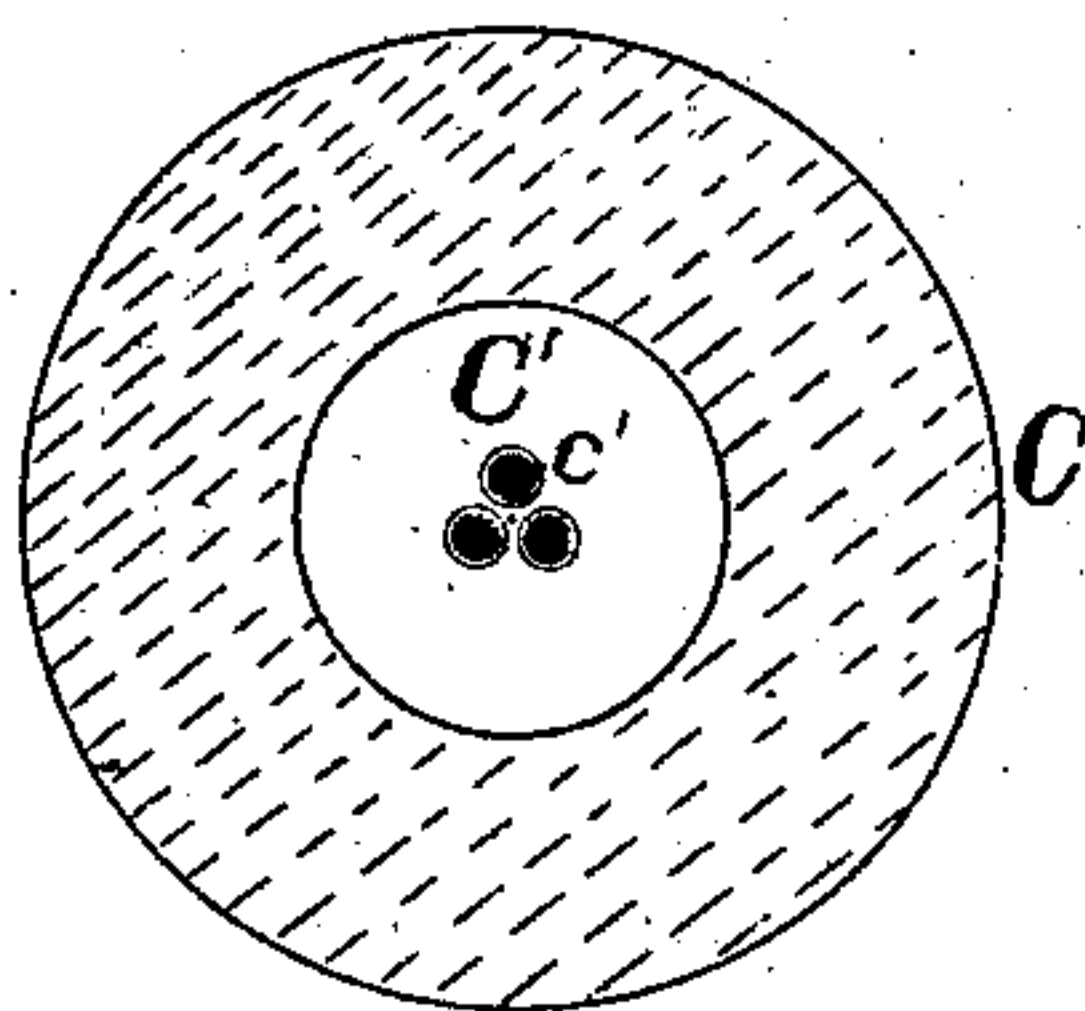


Fig. 3.

Witnesses—  
C. L. Parker  
R. H. Whittlesey

Inventor—  
Richard S. Waring  
by George H. Christy  
His Attorney



# UNITED STATES PATENT OFFICE.

RICHARD S. WARING, OF PITTSBURG, PENNSYLVANIA.

## MANDREL FOR CABLE-PRESSES.

SPECIFICATION forming part of Letters Patent No. 294,539, dated March 4, 1884.

Application filed August 9, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD S. WARING, a citizen of the United States, residing at Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Mandrels for Cable-Presses; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is an end view of my improved mandrel, looking upon the nipples or point of the same. Fig. 2 is a longitudinal sectional view, the plane of section being indicated by the line  $x x$ , Fig. 1. Fig. 3 is a transverse sectional view taken in the plane of line  $x' x'$ . Fig. 4 is an elevation. Fig. 5 is a perspective view of a lead-covered cable, illustrative of the conditions or requirements served by my improved mandrel.

Electric cables of the class to which the present invention relates are composed of a body of soft metal, lead being preferred for this purpose, through which are a number of small passages, inclosing the insulated conducting-wires. It is an essential condition in this class of cables that each wire should be enveloped by close-fitting continuous or intact walls of lead covering, in order not only to neutralize or prevent the evil effects of electrical induction in companion wires, but also to completely seal each wire and prevent access thereto, or to its insulating-covering, of moisture, or other injurious agencies. These results, alone considered, may be secured by comparatively light lead walls, dividing one wire from another, as shown at  $a'$ , between the wires  $a$ , Fig. 5; but in order to afford requisite protection from other external injuries, and obtain sufficient body of metal covering to make the cable durable, it is important that the exterior wall or body of covering should be of considerably greater thickness than is required for the inner walls between wires.

The purpose of my present invention is to provide for making a cable having such features of construction; and, in general terms, it consists of a mandrel having wire-passages through the same, with longitudinal grooves

in the outer face between wires, extending to the point, with narrow passages or channels cut across the point, between passage-openings, as hereinafter more fully described and claimed.

I have shown in the drawings a mandrel designed to make a three-wire cable, Fig. 5, certain features of advantage being secured thereby, which make such form and number preferable. My invention may, however, be applied, in part at least, to mandrels providing for a greater number of wires, and therefore I do not wish to limit its application to the specific form and number shown.

My improved mandrel is formed of a tapering body of iron, steel, or other suitable metal, C, having in its base end a threaded socket,  $c$ , for making attachment to the tubular core-bar D of the press. Within or beneath the socket  $c$  is an axial chamber,  $C'$ , registering with the tubular passage in the core-bar. From the base of this chamber to the tapered point of the mandrel-body are drilled three separate holes or passages,  $c'$ , the relative positions of which correspond to the angles of an equilateral triangle. Along the tapering exterior sides of the body C are formed grooves  $e'$ , which extend to the point along the lines between wire-passages  $c'$ ; also, at the extreme point, narrow and comparatively shallow channels  $e$  are cut across the end, connecting the points or extremities of opposite grooves,  $e'$ , between the openings to the wire-passages. The grooves  $e'$  direct the flow of lead into the space between wires, and the channels  $e$  afford openings into which the lead passes laterally from each groove  $e'$  and unites, forming complete pipe-like inclosures for each wire before or as the lead leaves the mandrel-point and comes in direct contact with the wires. It will be observed that the relative positions of the three wires, combined with the exterior side grooves,  $e'$ , afford exposure of almost the entire surface of the mandrel around each wire to direct contact and pressure of lead, as it is applied to or pressed upon the exterior surface, leaving but comparatively small amount of inner surface—that is, directly facing the companion passages; also, by the shallow cuts or channels  $e$  provision is made for forming the lead into tube-like inclosures before it leaves



the mandrel, thereby preventing undue pressure of lead upon the wire, which, if too great, would cause injury by stripping off or injuring the insulating-covering of the wires; also, by these features of construction the wire-passages  $c'$  may emerge at the point of the mandrel in close proximity, the walls surrounding the passage-openings being light or thin, and supported as against pressure, except at the extreme point. The wires may therefore be placed in close proximity in the cable A, Fig. 5, and still direct channels are afforded for filling in the metal  $a'$  between the wires.

The thickness of metal covering forming the exterior of the cable may be determined, in the usual way, by the size and adjustment of the die-opening, through which the wires pass on leaving the mandrel, and within which the lead is applied to the wires, as practiced in the art.

I make no claim herein to the form and construction of cable shown and described, the same being included in the subject-matter of another application for patent.

I do not claim herein a mandrel having tapered body having wire-passages therethrough, such passages emerging at the point, and having grooves formed longitudinally in the ex-

terior surface between the wire-passages, as this construction forms the subject-matter of another application filed November 12, 1883, and numbered 111,522.

I claim herein as my invention—

1. A mandrel, C, for a cable-press, having a tapered body with separate wire-passages therethrough, and longitudinal grooves  $c'$ , extending between the lines of wire-passages to the point, and having shallow cuts or channels  $c$  in the end, connecting the grooves between the openings of the wire-passages, substantially as set forth.

2. A tapering mandrel, C, for a cable-press, having three wire-passages therethrough, emerging at the point in close proximity, and in positions corresponding to the angles of a triangle, with longitudinal grooves  $c'$ , extending along the exterior surface of the mandrel between wire-passages to the point, and cuts or channels  $c$ , crossing the point between the passage-openings, substantially as set forth.

In testimony whereof I have hereunto set my hand.

RICHARD S. WARING.

Witnesses:

R. H. WHITTLESEY,  
C. L. PARKER.