

(No Model.)

4 Sheets—Sheet 1.

H. T. GILES.  
EXPANSIBLE MANDREL.

No. 509,159.

Patented Nov. 21, 1893.

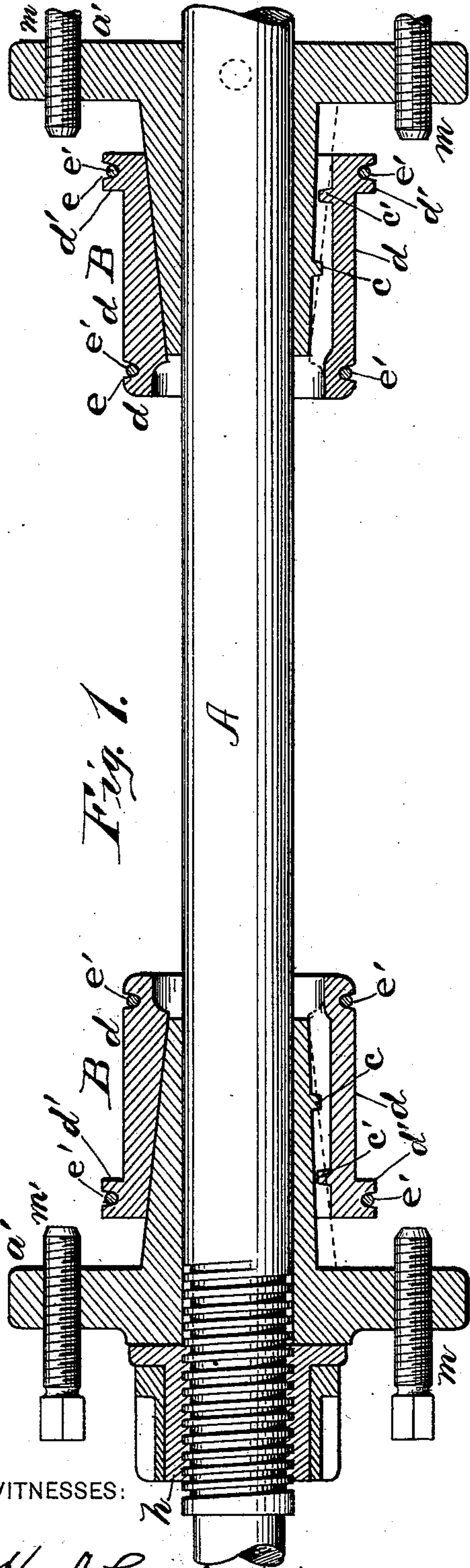


Fig. 1.

Fig. 11.

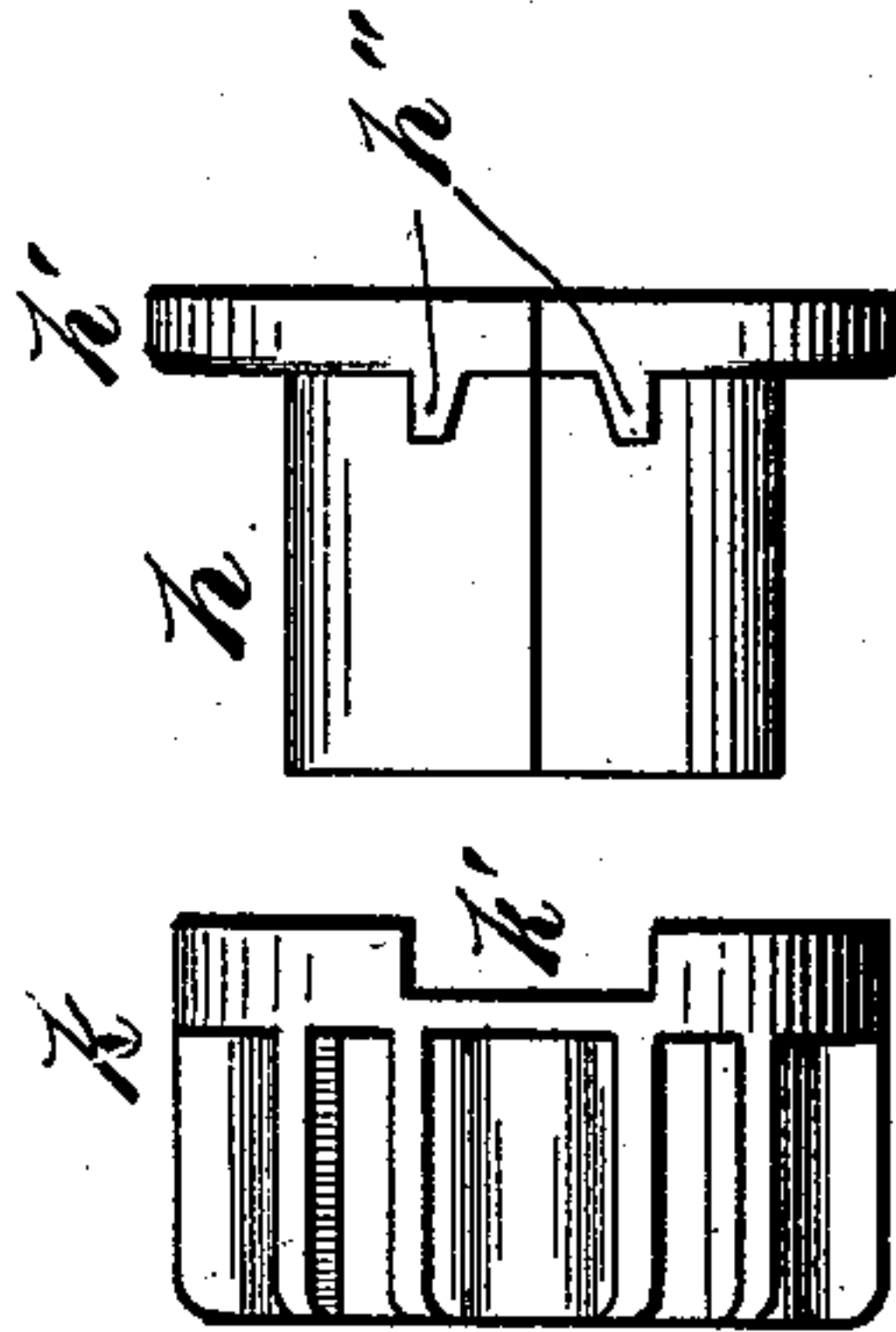


Fig. 12.

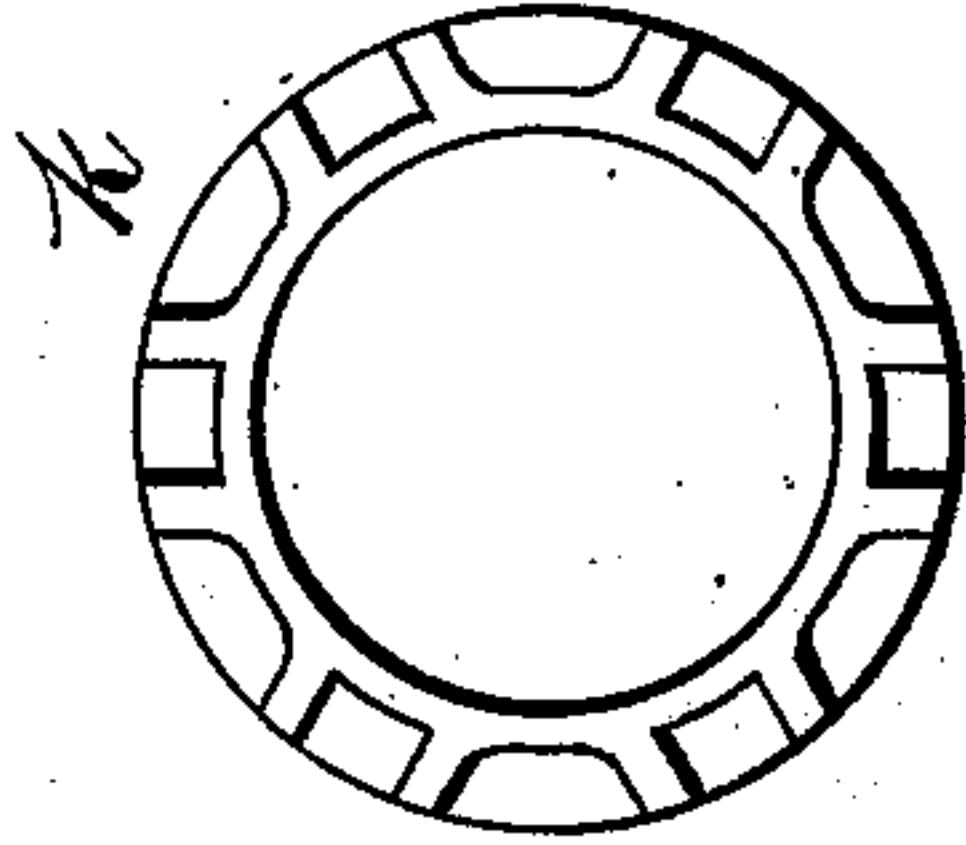
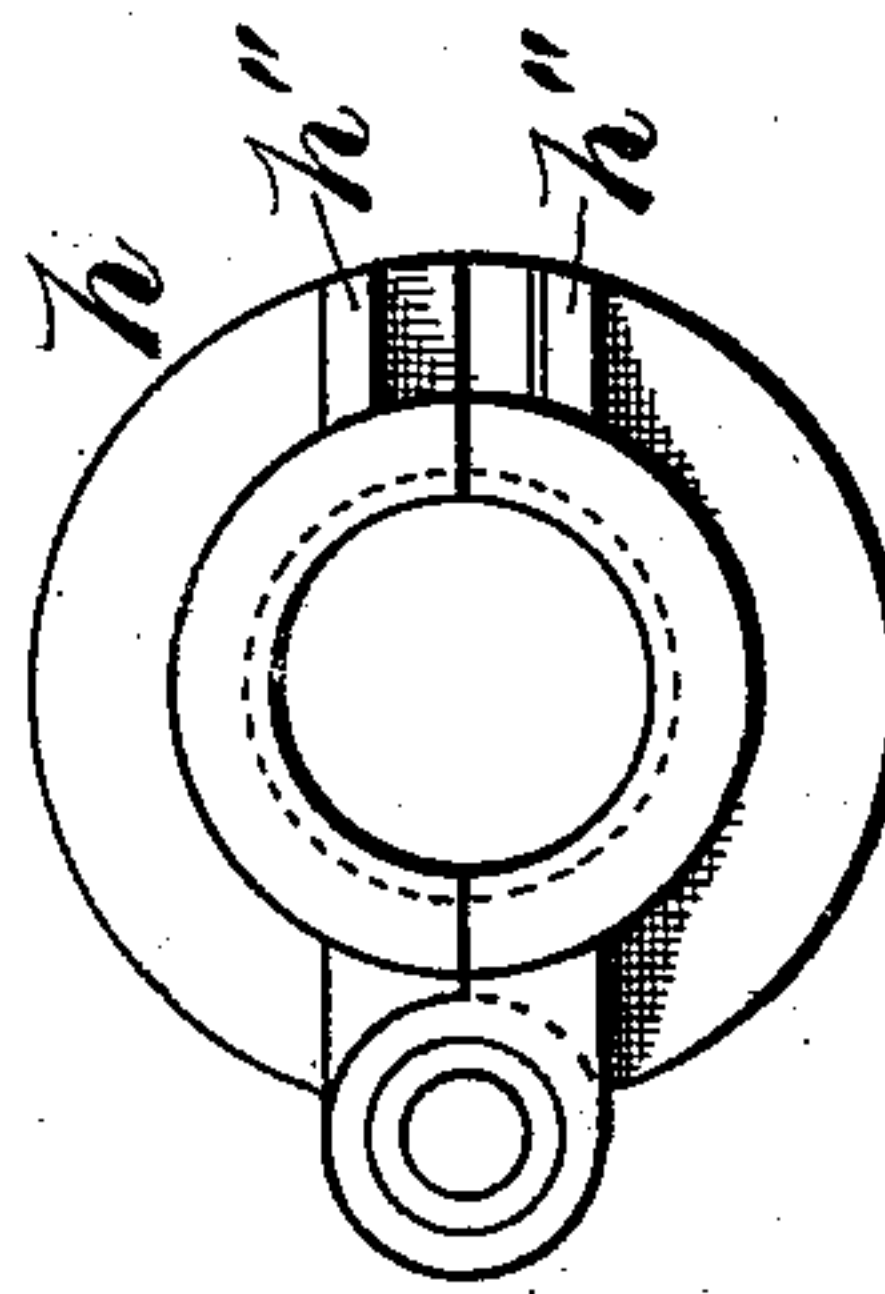


Fig. 13.



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H. A. Carhart,  
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INVENTOR

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Smith & Denison  
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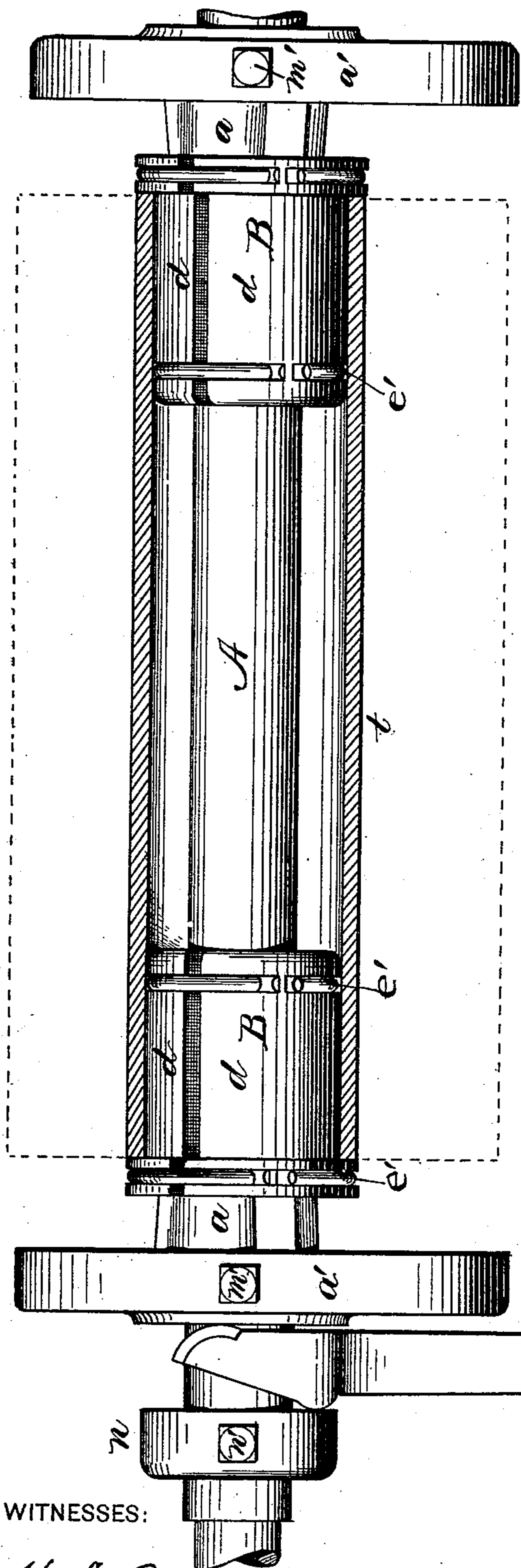
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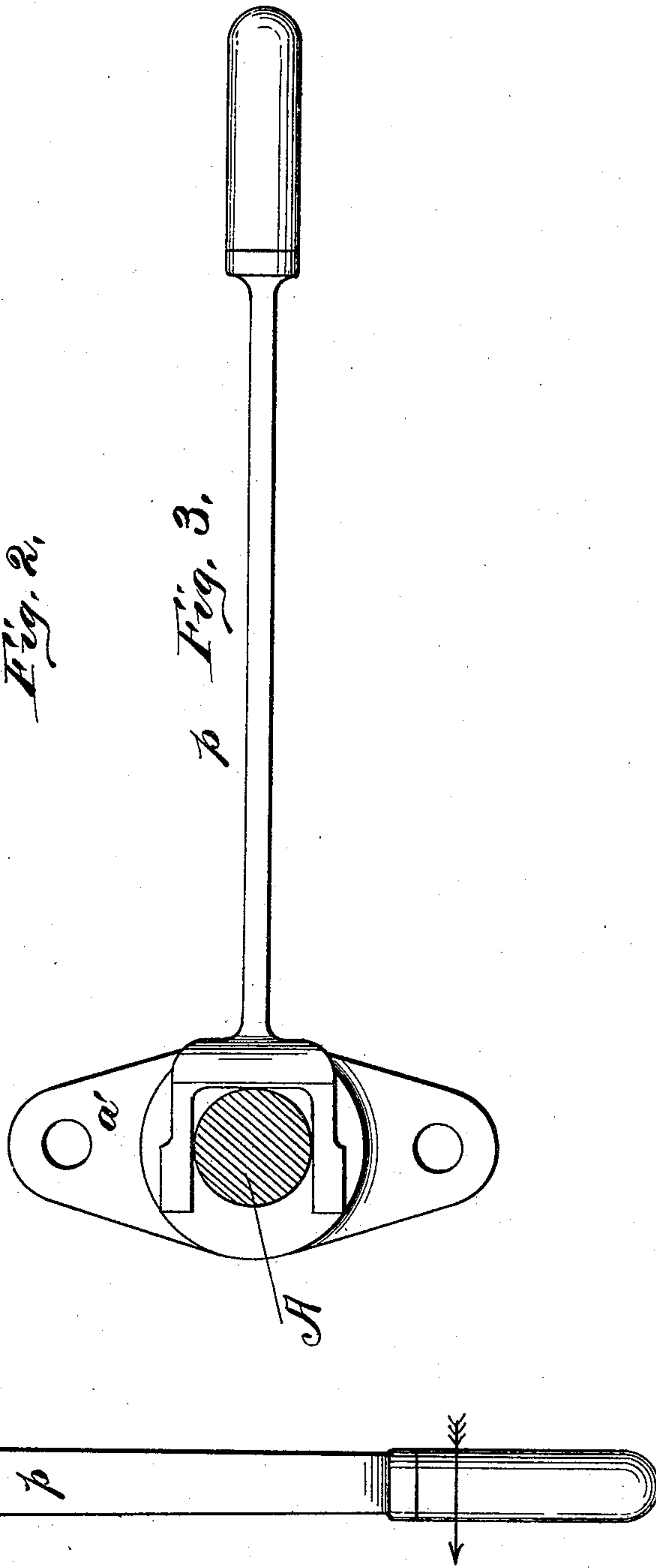
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*Fig. 2.*



*Fig. 3.*

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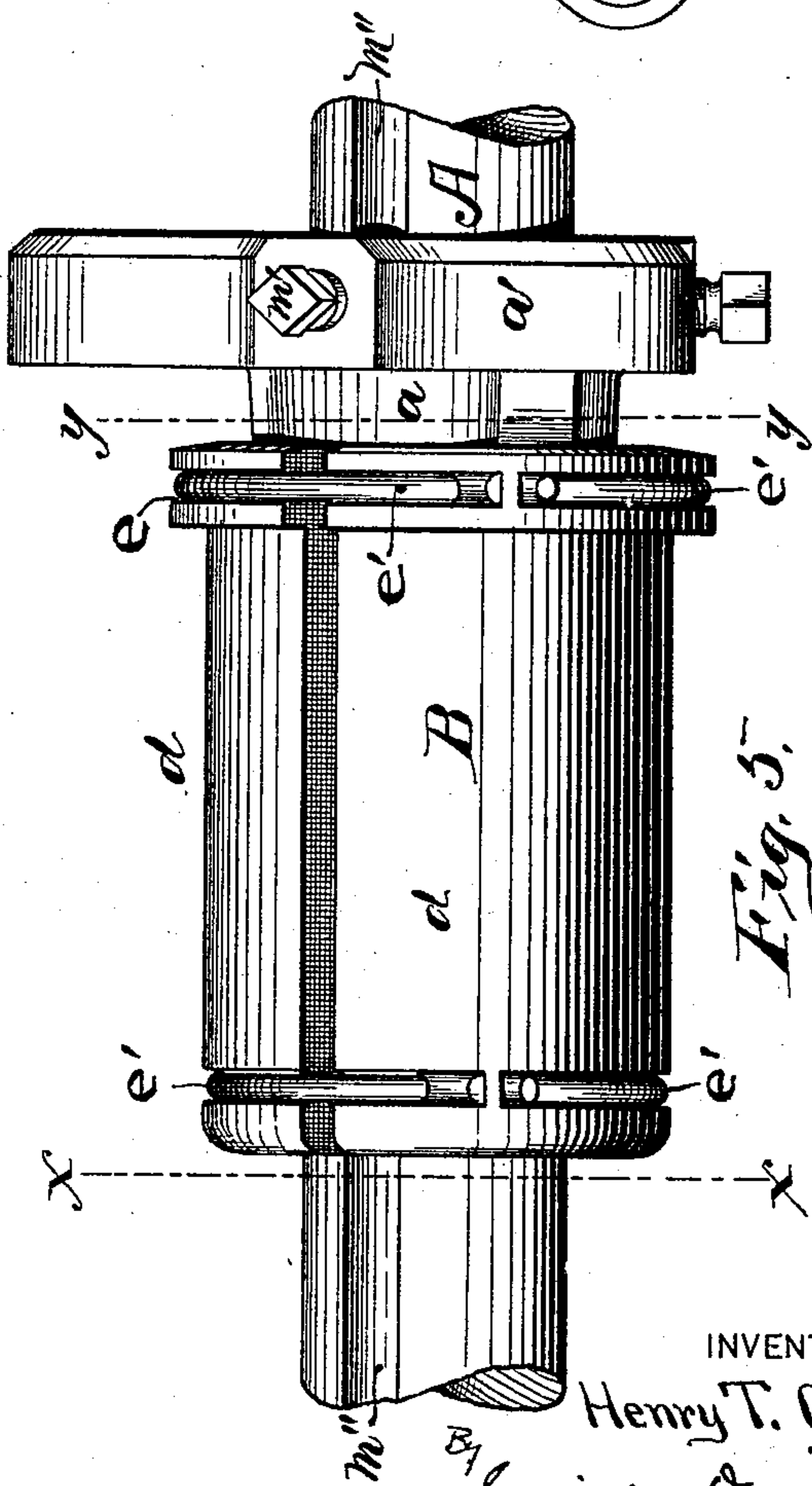
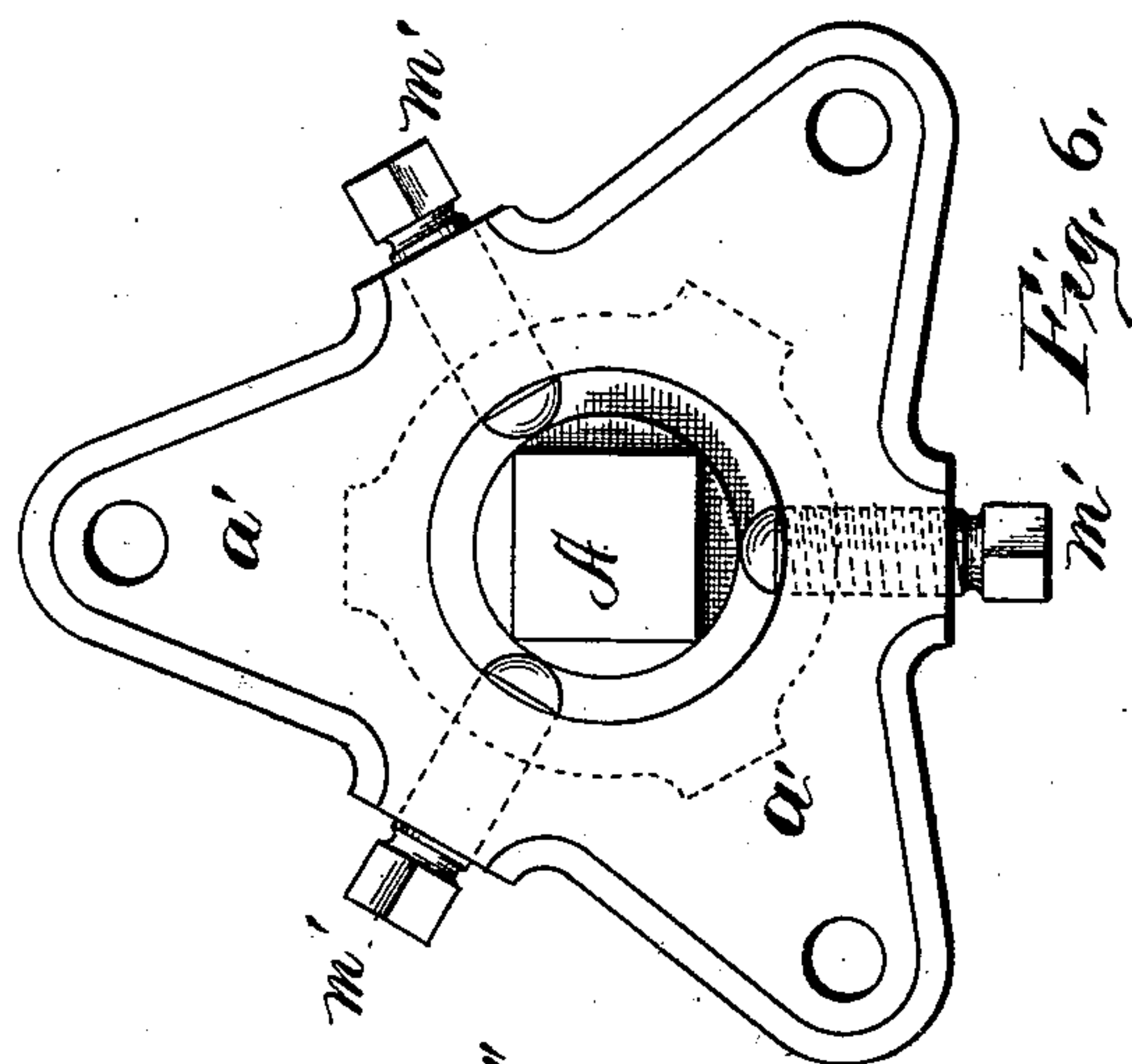
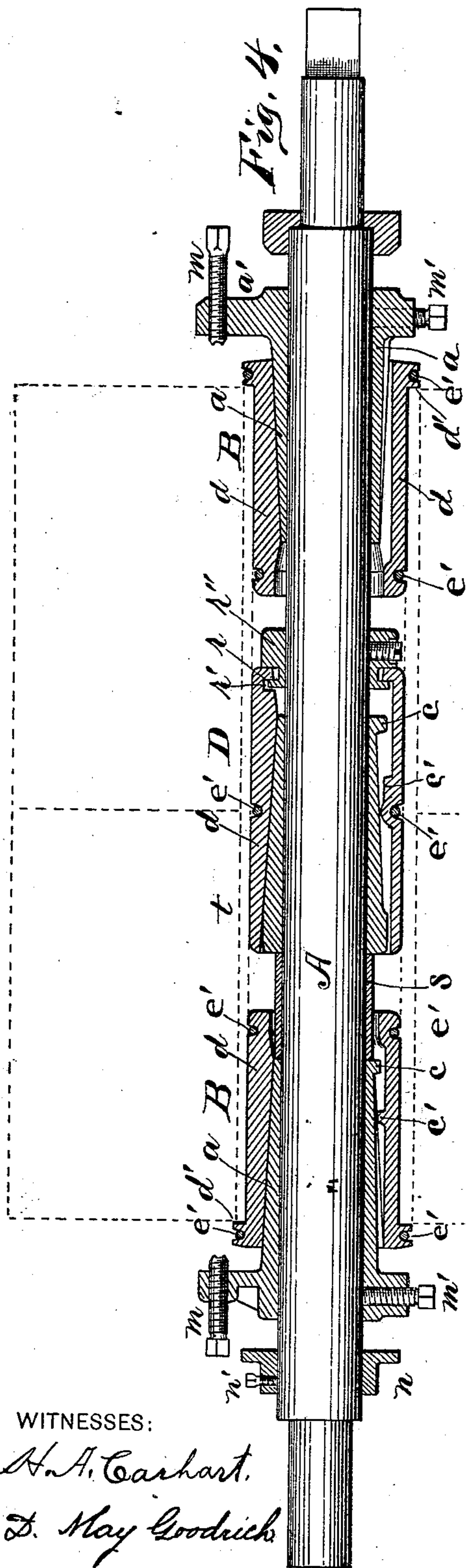
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H. T. GILES.  
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(No Model.)

4 Sheets—Sheet 4.

H. T. GILES.  
EXPANSIBLE MANDREL.

No. 509,159.

Patented Nov. 21, 1893.

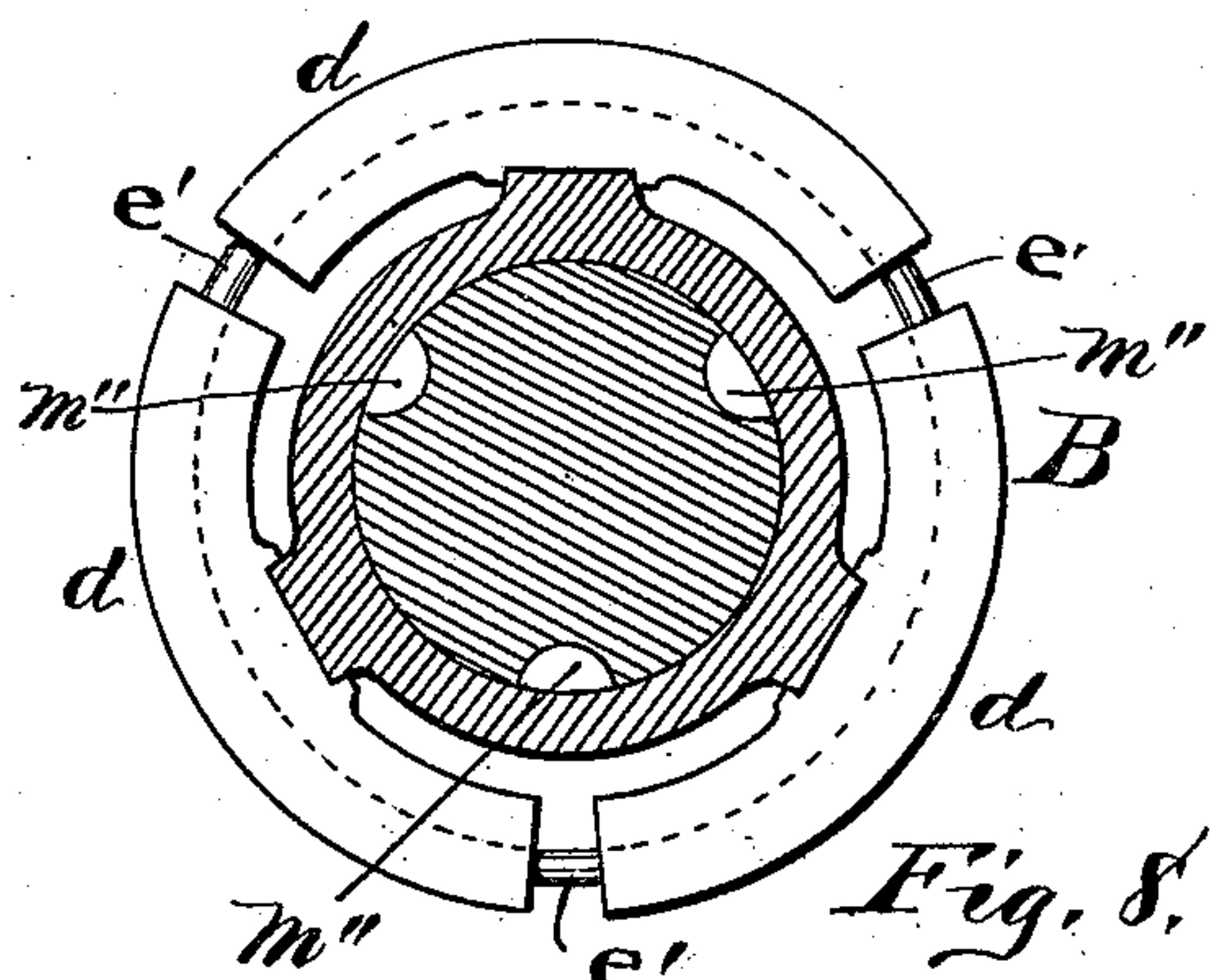
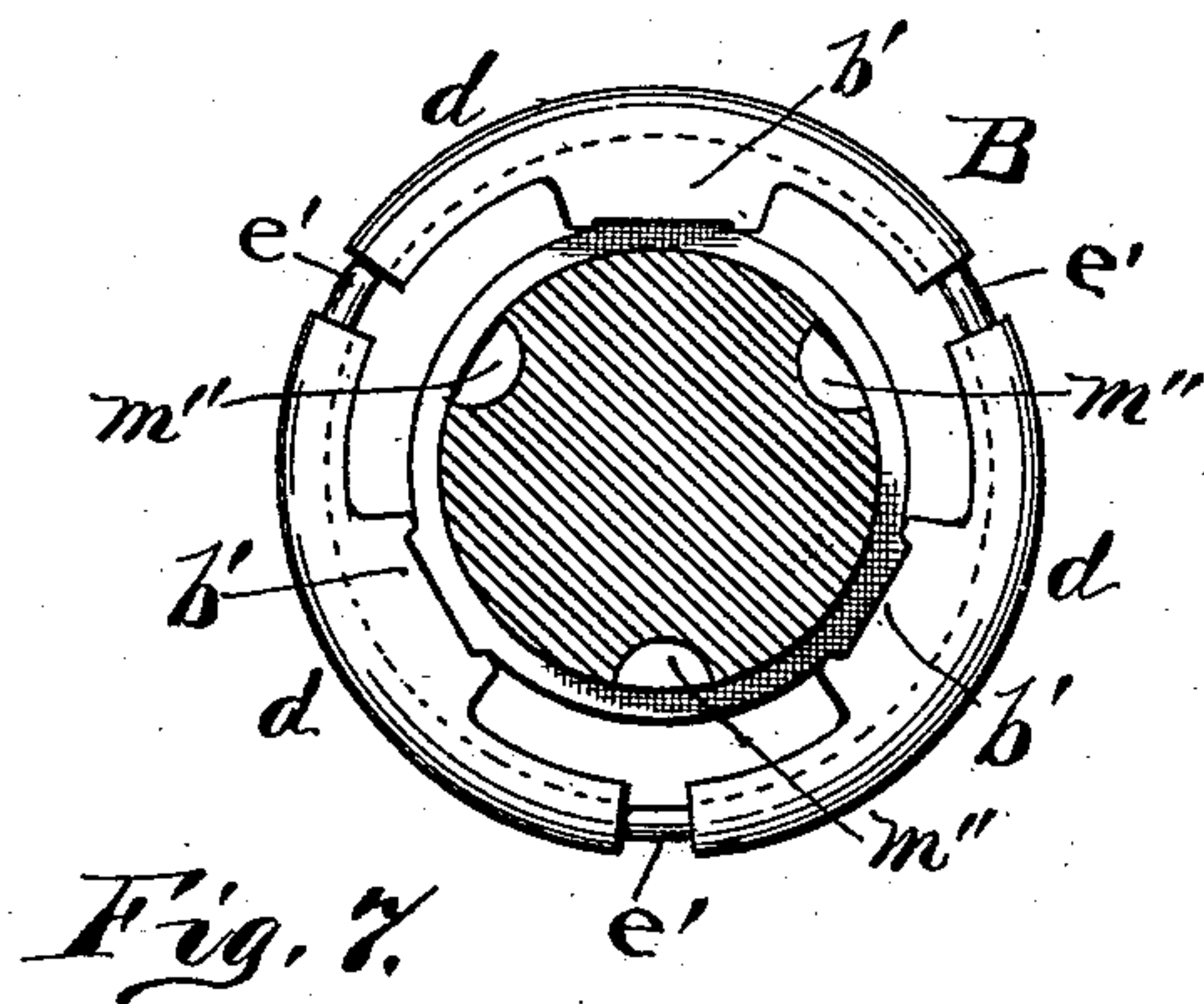


Fig. 9.

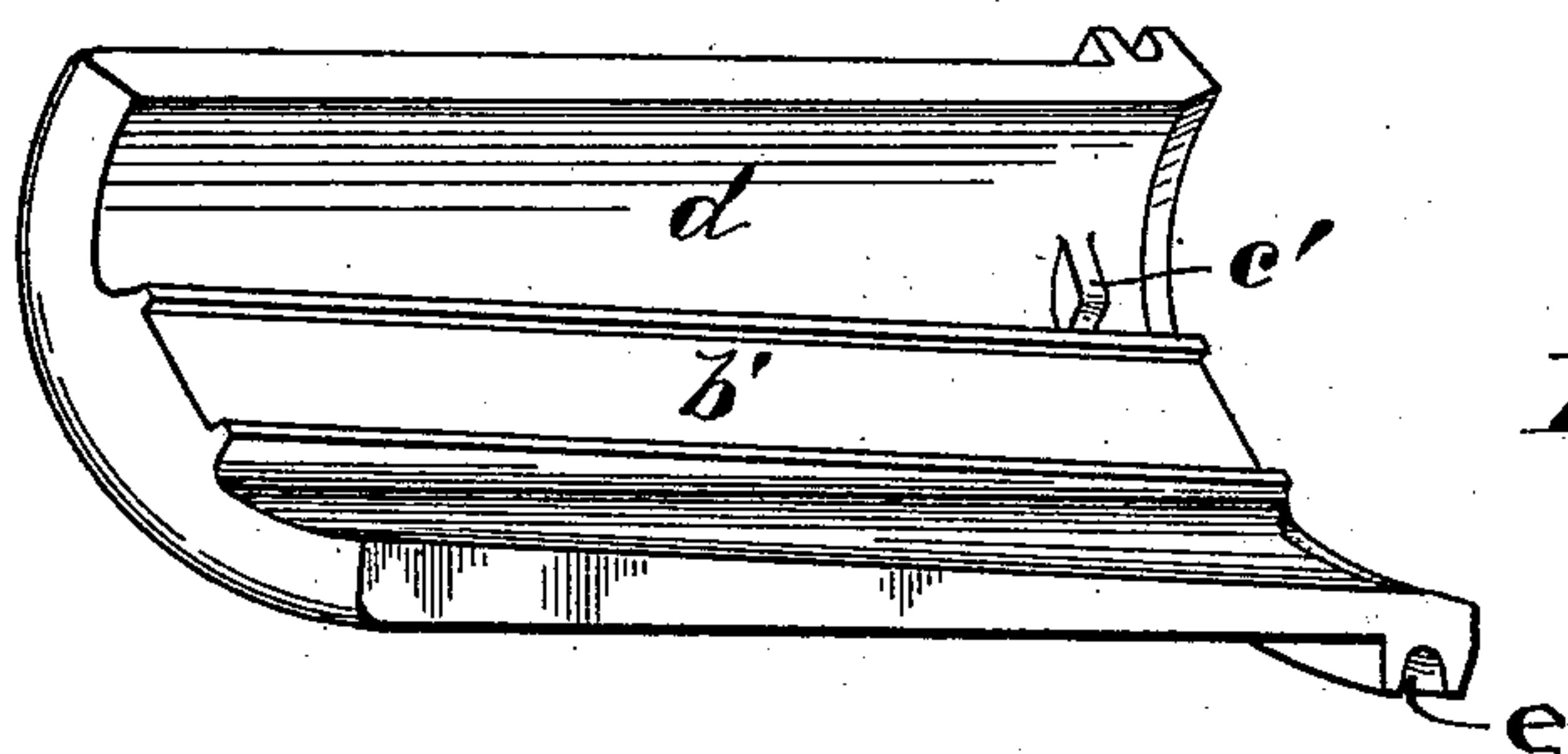
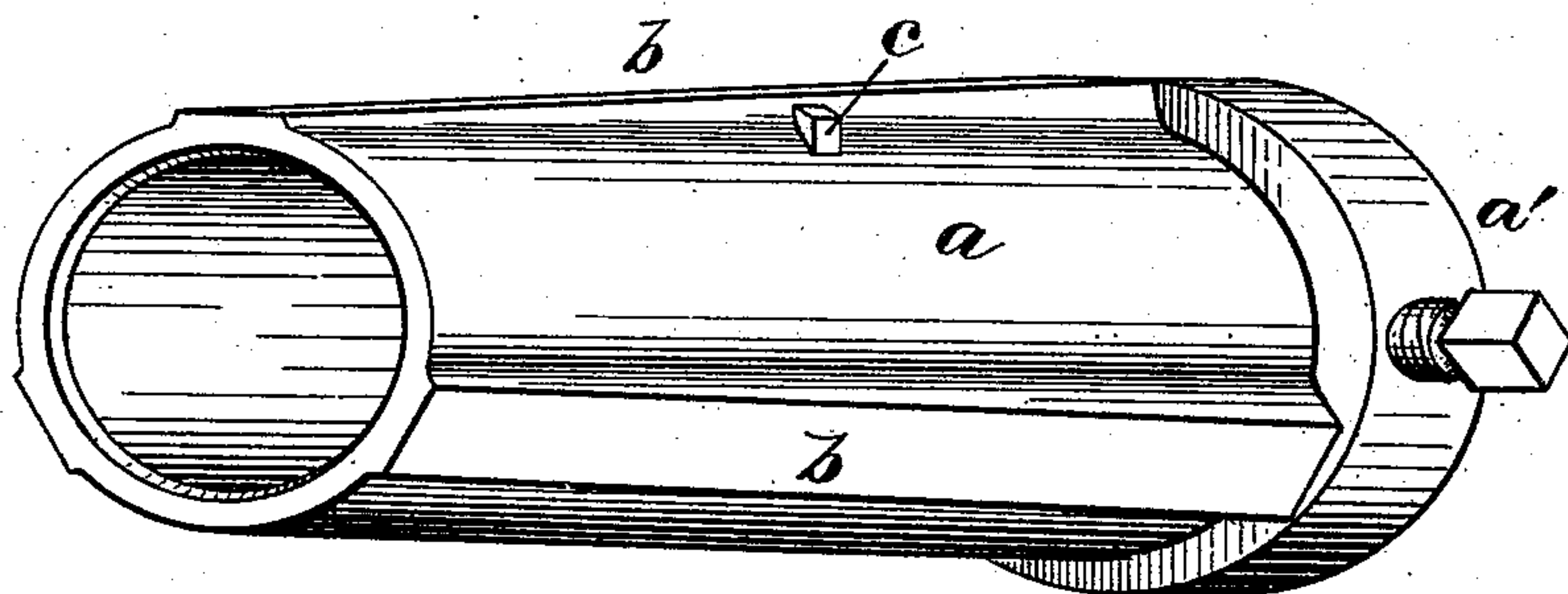
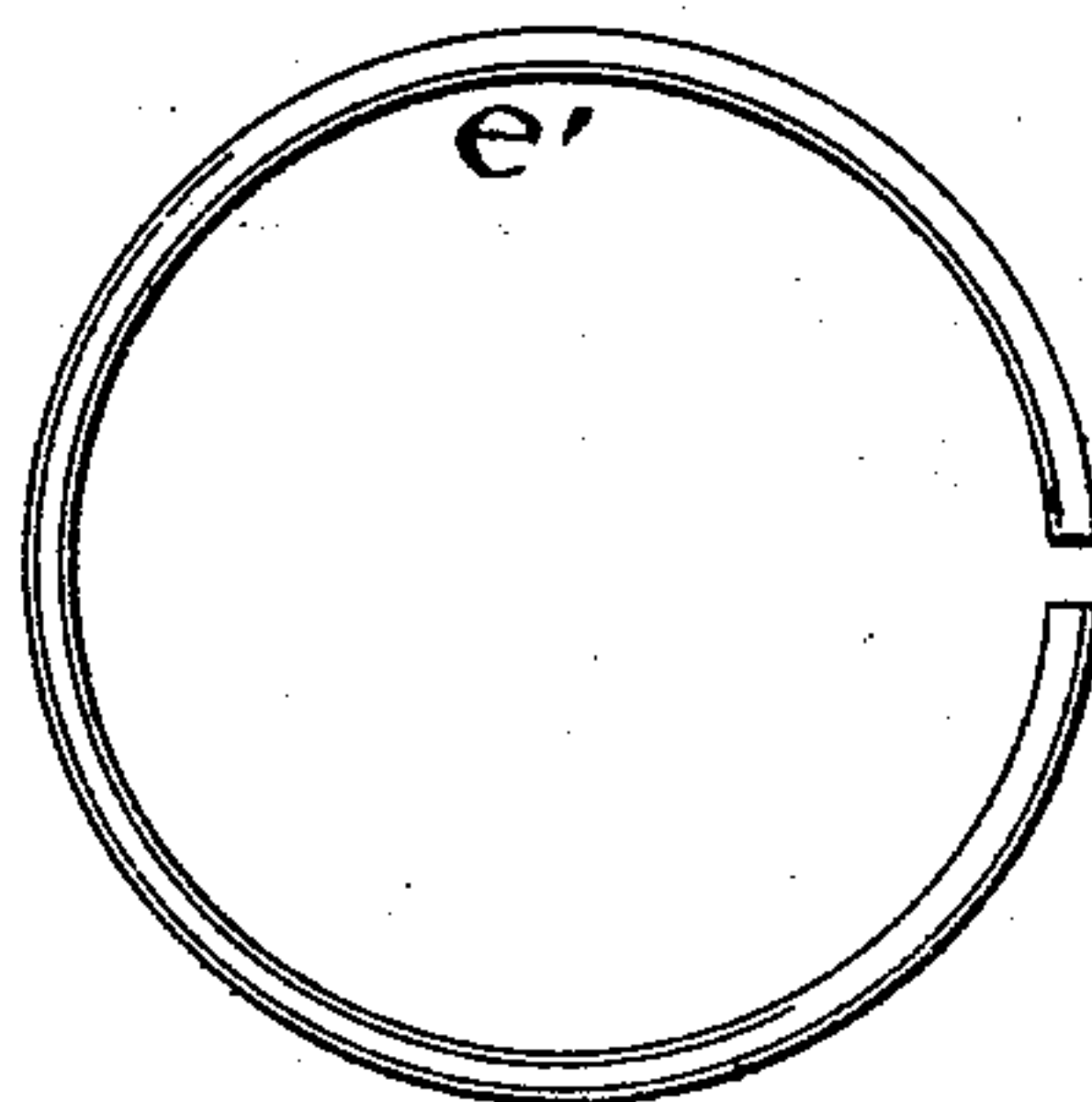


Fig. 10.

Fig. 11.



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# UNITED STATES PATENT OFFICE.

HENRY T. GILES, OF WATERTOWN, NEW YORK, ASSIGNOR TO ALFRED D. REMINGTON, OF SAME PLACE.

## EXPANSIBLE MANDREL.

SPECIFICATION forming part of Letters Patent No. 509,159, dated November 21, 1893.

Application filed March 27, 1893. Serial No. 467,686. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY T. GILES, of Watertown, in the county of Jefferson, in the State of New York, have invented new and useful Improvements in Expansible Mandrels, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to expansible mandrels, for holding the tubular spools onto which paper rolls are wound or for the unwinding of paper from the spool, as for newspapers printed from a large roll of continuous paper.

My object is to provide a durable, efficient means for holding the paper rolls for unwinding, or the tubular spools for winding the paper, adjustable to spools of varying diameter, in which a central shaft is provided with sectional expansible heads, forced outwardly into engagement with the interior of the spool, with sufficient frictional contact with its interior to hold it securely so as to rotate with or to be rotated by the mandrel shaft, each of said heads consisting of segments of a cylinder yieldingly held together by means of spring clasps, and a tapered core adapted to be forced into the head and thereby expand it to the degree desired, said core being guided in its reciprocating movements by means of ways in each of said sections, and ribs or tongues upon the exterior of said core, the joints being like or analogous to "tongue and groove joints," whereby each section is forced outward in equal degree with all of the others; and said sections are always maintained in the same relation to each other and to the core, aided by the clasp-  
ing springs; said springs also operating to retract, when the mandrel is to be removed from or inserted into a spool; said apparatus being also adapted to be used in winding two or more short spools simultaneously; and stops being also provided which control the outward movements of said core, or its withdrawal from the sections.

My invention consists in the several novel features of construction and operation hereinafter described and which are specifically set forth in the claims hereunto annexed. It

is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1, is a longitudinal sectional elevation of the mandrel for winding rolls, without a center bearing in the spool. Fig. 2, is a like view of the same, with the spool secured thereon, except that the nut and screw tightening mechanism is omitted, and a hand lever substituted therefor. Fig. 3, is a sectional elevation of the shaft, the core head, and the hand lever. Fig. 4, is a longitudinal sectional elevation of the winder, for winding (or unwinding) long spools, with a center support for the spool, or for winding two short rolls simultaneously, the paper being slitted as it comes from the machine, the dotted lines indicating the spool or spools. Fig. 5, is a side elevation of part of the shaft and one of the expanders, enlarged. Fig. 6, is a front elevation of the mandrel shaft, and one of the core heads thereon and showing the means for adjustably securing it upon the shaft. Fig. 7, is a sectional elevation on line *x x*, in Fig. 5. Fig. 8, is a like view on line *y y*. Fig. 9, is a plan perspective of one of the expanding cores or sleeves. Fig. 10, is a like view of one of the sections of the expansible heads. Fig. 11, is a side elevation of the half-nut and the locking sleeve, detached from each other. Fig. 12, is a front elevation of the locking sleeve. Fig. 13, is a like view of the half-nut. Fig. 14, is a plan view of one of the spring clasps.

A, is the mandrel shaft, having a tapered expanding core —*a*— secured thereto, said core being provided with a flanged head —*a'*—, and its tapered body being provided with longitudinal ribs —*b*— (Fig. 9) and with a stop —*c*—.

B, is the tubular and longitudinally sectional expanding head, consisting of the sections —*d*— each provided interiorly with a tapered and grooved longitudinal rib —*b'*— and stop —*c'*—. Each head is also provided with circumferential grooves —*e*— adjacent to the ends of the sections to receive the spring clasps —*e'*— by which the sections are yieldingly held in position upon the core or sleeve, so that when said core is forced into the head, its sections are forced outwardly and



as the sections and core are both tapered as to their meeting surfaces, both ends of each section are forced outwardly in equal degree, and each section bears for its whole length against the interior of the tube, the end of the tube abutting against the shoulder —*d'*— upon each section. Upon the opposite end of the shaft a like expanding core is loosely mounted, and engages with a like expansible sectional head, and —*h*— is a sectional nut mounted upon the thread on said shaft, consisting of two longitudinal sections hinged together on one side, and provided with a circumferential flange —*h'*— and with a lug or lugs —*h''*— projecting therefrom; and —*k*— is a lockingsleeve, adapted to fit onto the body of said nut, and provided with a transverse groove or recess —*k'*— adapted to receive said lug or lugs and lock said sleeve and nut together, part of the body of said sleeve being exteriorly adapted to fit a spanner, or other wrench, so that when said nut is tightened both cores are forced into said heads and they are expanded.

To remove the mandrel, the nut is unscrewed, loosening the cores and heads, the sleeve is removed from the nut, the nut opened, the core and head on that end are removed from the shaft, and then the other core and head and the shaft are removed. This operation is reversed when the mandrel is inserted into a spool onto which a roll has been wound, for unwinding the paper thereon.

Each core head or flange is provided with the ordinary set screws —*m*— by which the edge trimmer (not shown, but of any ordinary construction) is set so as to both trim and to cause the ends of the roll to be true; and also slits the rolls to make two or more rolls on the same mandrel. Set screws —*m'*— are also in some instances provided by which the cores can be adjusted and secured at any point.

In Figs. 5, 7 and 8, the shaft is shown as provided with longitudinal grooves —*m''*— which receive the inner ends of said screws. In Fig. 2 I show the same construction except that the tightening nut is omitted, and a collar —*n*— is adjustably secured upon the shaft by means of the set screw —*n'*—, and then by means of the lever —*p*— inserted between said collar and core, both of the cores are forced into the expanding heads. The mandrel is removed by taking off the collar, core and head from that end of the shaft. In Fig. 4 I show the same construction particularly adapted for winding and unwinding long spools (or rolls) or for winding two short rolls, in which a central bearing or support —*D*— is provided consisting of a tapered core —*a*— without any flange or outward projection, a sectional expansible head, omitting the exterior flange, but providing the sections with extensions —*r*— grooved interiorly to fit onto the flange —*r'*— upon the collar —*r''*— which is detachably secured upon the shaft by a set screw, as shown, which forms the connection of said sections to said shaft, holding them

from shifting longitudinally. A short sleeve —*s*— is inserted between the center core and the one on the left, so that when the latter is forced inwardly the other is also in like degree operated, and when the shaft is shifted to the right, the central expansion sections are drawn off from that core.

The spool —*t*— is simply a cylindrical tube, open at the ends and constructed from any material desired.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An expansible mandrel body comprising a tubular core provided with tapered longitudinal ribs, outwardly projecting, and an expansible head having its exterior surface parallel with the bore of the core, and consisting of longitudinal sections having interior ribs tapered and grooved, and receiving the core ribs, and grooved exteriorly to receive a spring retaining clasp holding said sections in yielding contact with the core, in combination.

2. An expansible mandrel body comprising a tubular core, provided with tapered longitudinal ribs, outwardly projecting, and an expansible head having its exterior surface parallel with the bore of the core, and consisting of longitudinal sections having interior ribs tapered and grooved, and receiving the core ribs, and grooved exteriorly to receive a spring-retaining clasp holding said sections in yielding contact with the core, and stops upon said core and head sections adapted to engage with each other, in combination.

3. The combination with the shaft, of an expansion core tapered longitudinally, secured thereon, a like core loose thereon, sectional expansible heads engaging with said cores, and means to force said loose core inwardly and simultaneously draw said shaft and the other core inwardly.

4. The combination with the shaft, the tapered cores, one secured and the other loose thereon, and the sectional expansible heads with which said cores engage, of a nut consisting of sections hinged together and in threaded engagement with said shaft, and provided with a flange and lugs projecting therefrom, and a sleeve removably fitted onto the body of said nut and recessed to receive said lugs.

5. The combination with the shaft and the tapered cores, one secured thereto and the other loose thereon, and the sectional expansible heads with which said cores engage, of a tapered core intermediate to the others, a sectional expansible head in engagement therewith and provided interiorly with a groove, a collar adjustably mounted upon said shaft and flanged to engage with the groove in said sections, and a sleeve upon said shaft between and connecting the central core to an end core.

6. The combination with a mandrel shaft, of a threaded nut thereon, consisting of sec-



tions hinged together and provided with lugs, and a sleeve fitting onto the body of said nut when closed, and recessed to receive said lugs.

5 7. The herein described threaded nut, comprising sections hinged together provided with lugs, and a sleeve recessed to receive said lugs.

In witness whereof I have hereunto set my hand this 21st day of March, 1893.

HENRY T. GILES.

In presence of—

C. W. SMITH,  
HOWARD P. DENISON.