

(No Model.)

G. D. CLARKE.
ELECTRO MAGNET.

Patented Apr. 1, 1890.

No. 424,703.

Fig 1

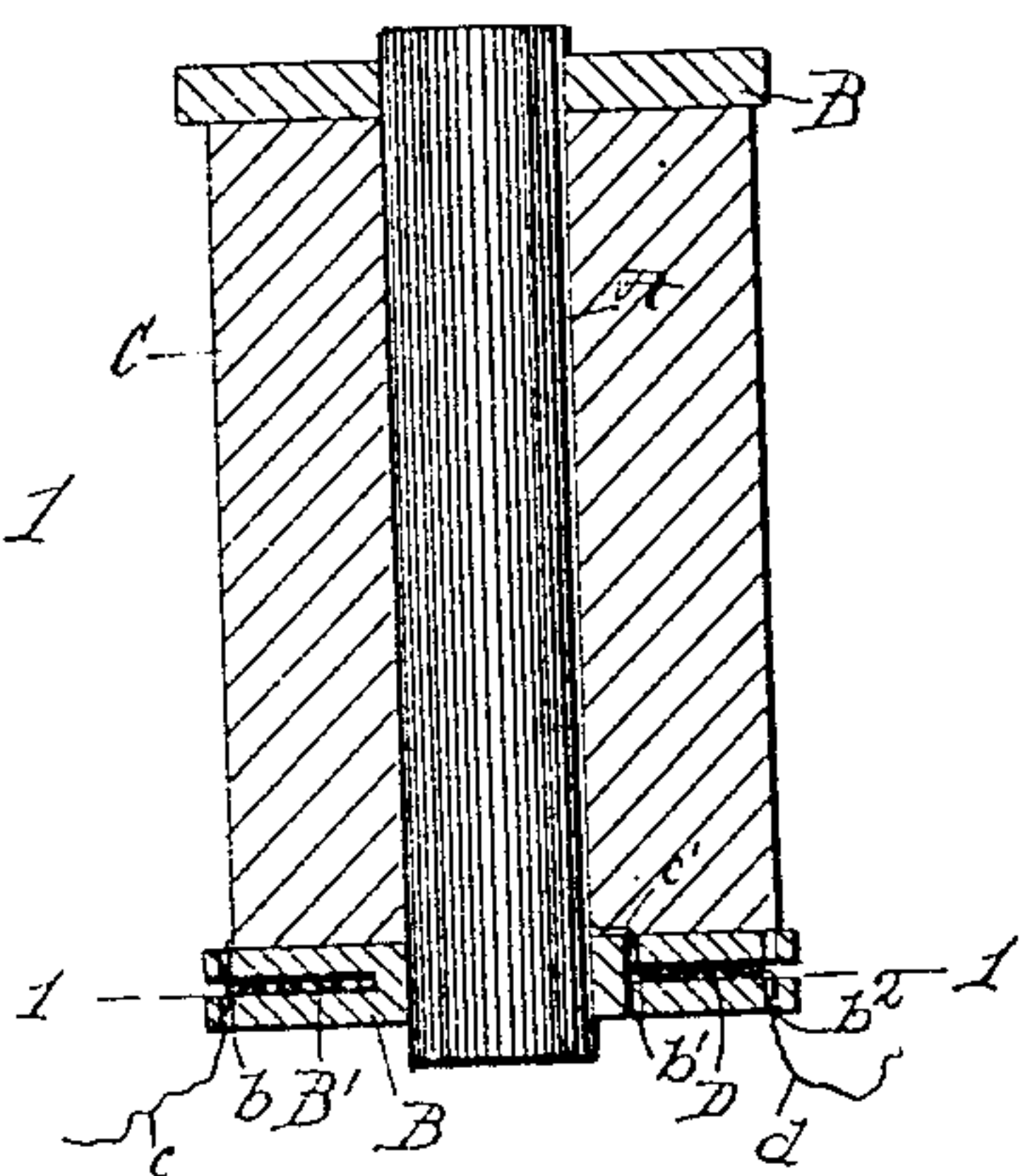


Fig 3

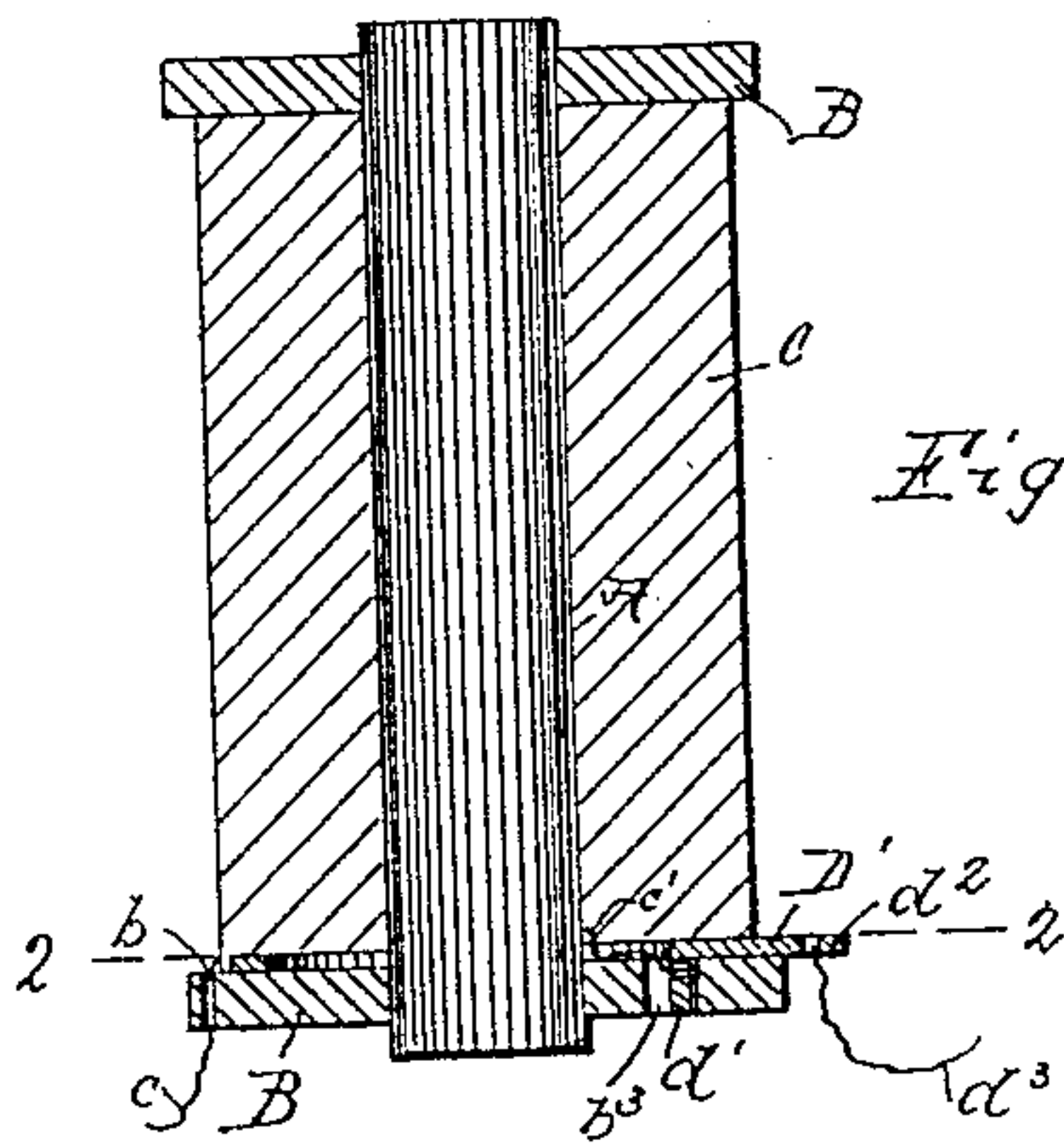


Fig 2

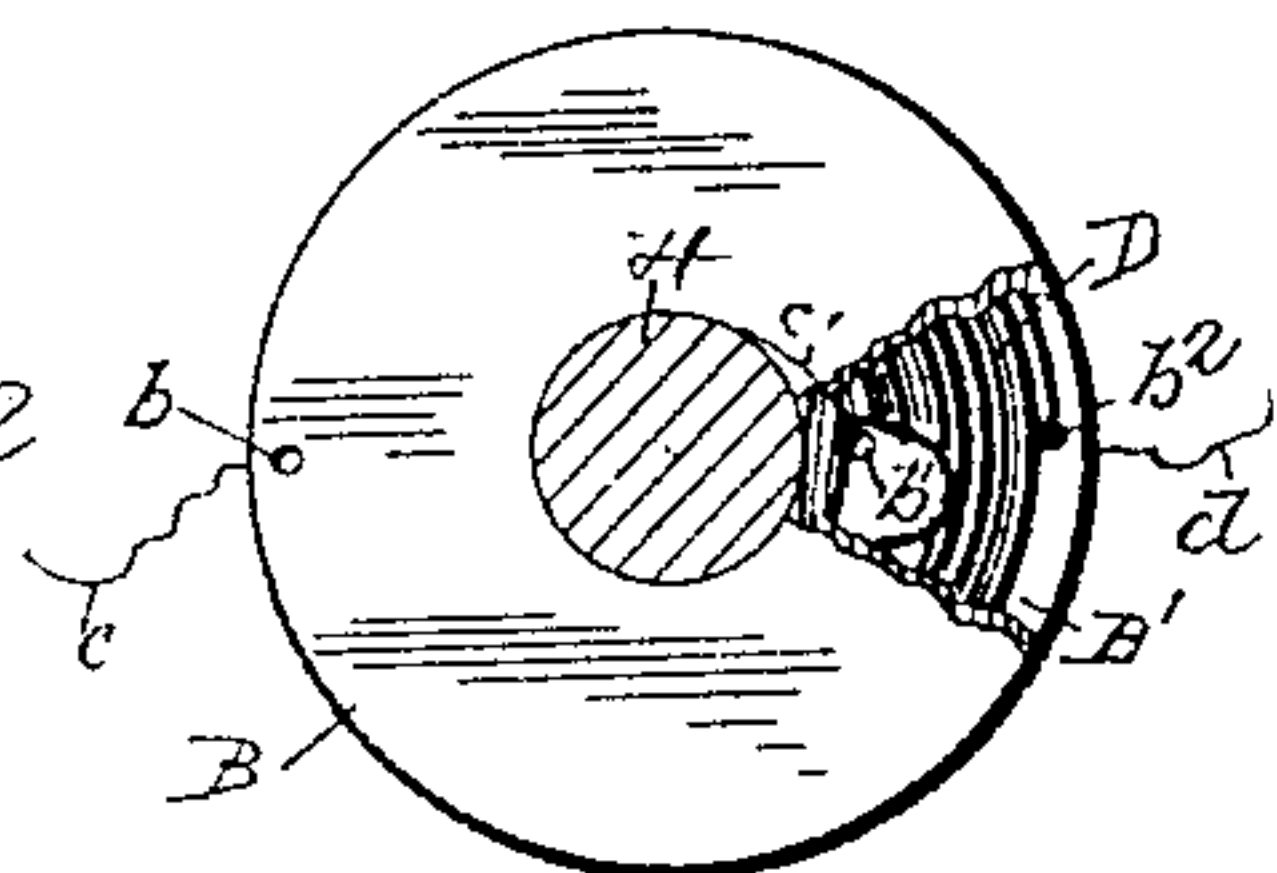


Fig 4

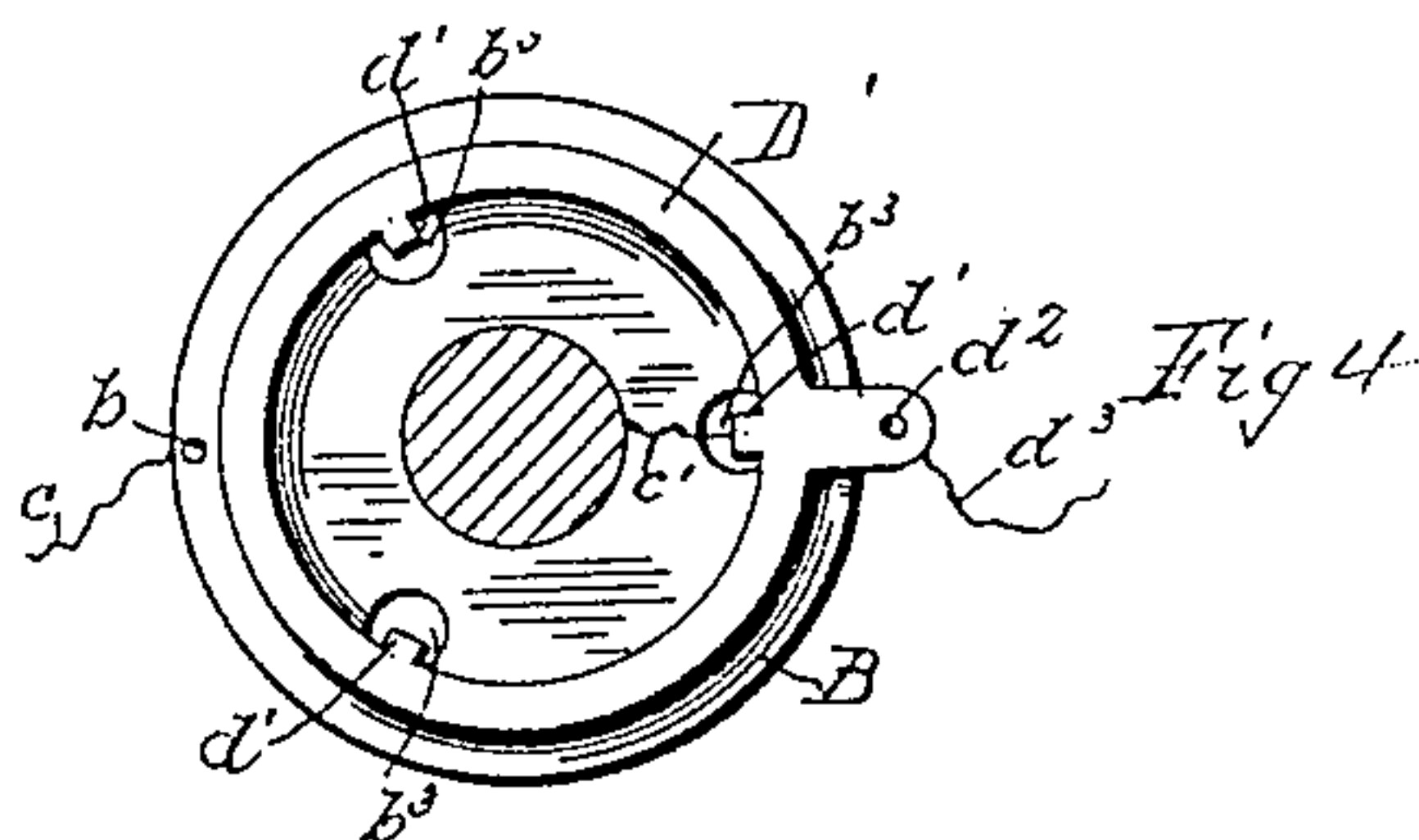


Fig 5

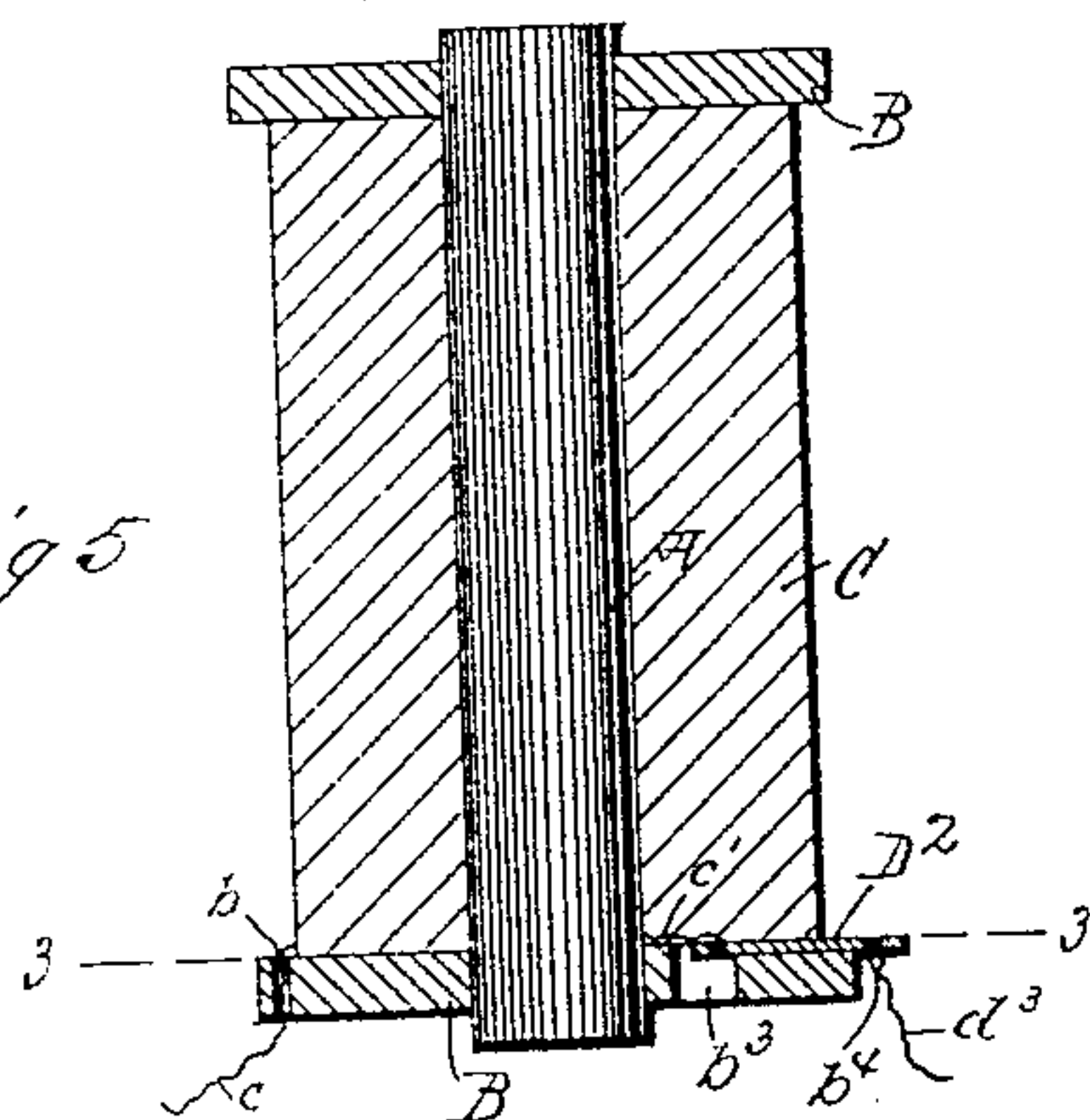


Fig 7

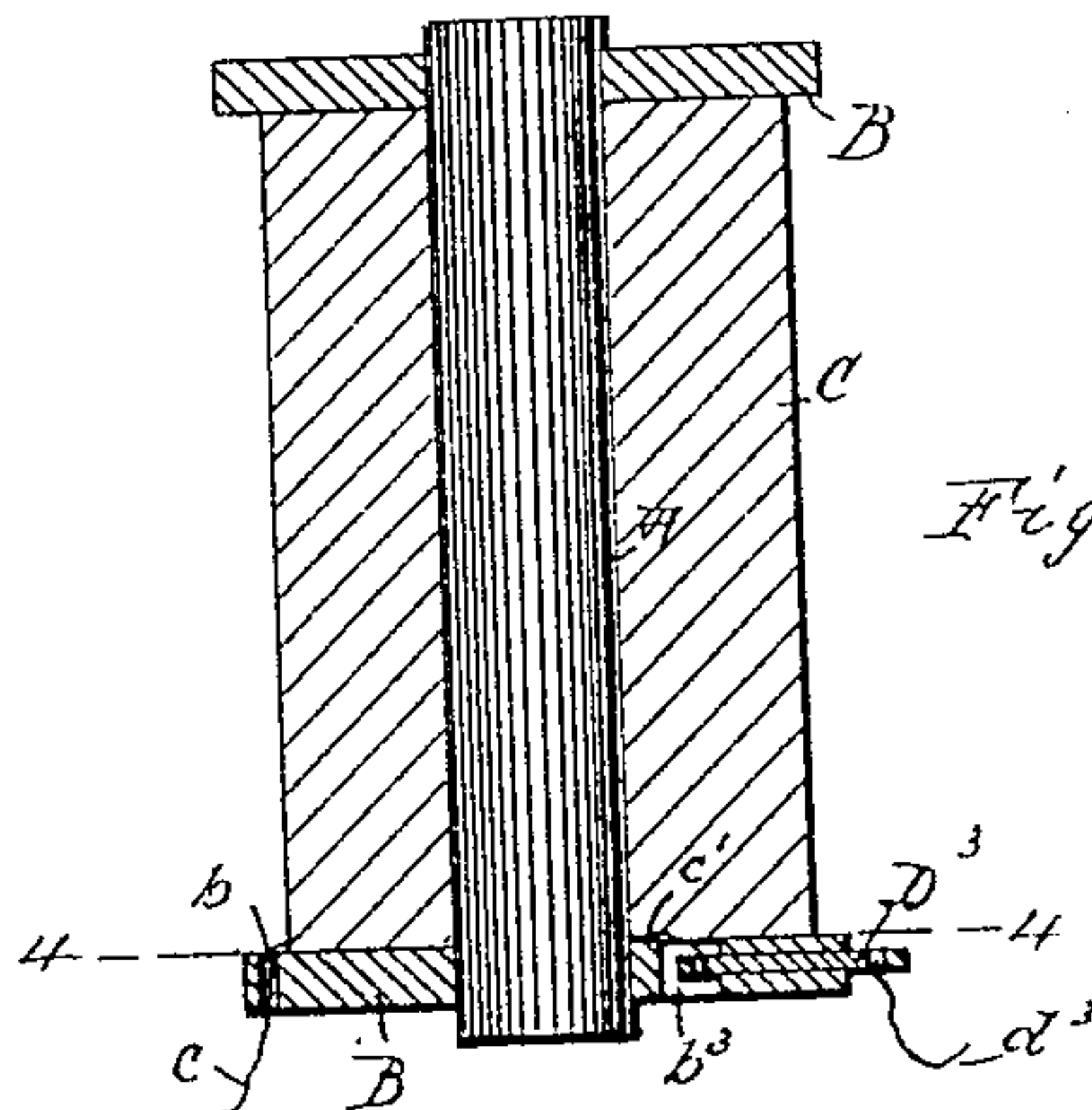


Fig 6

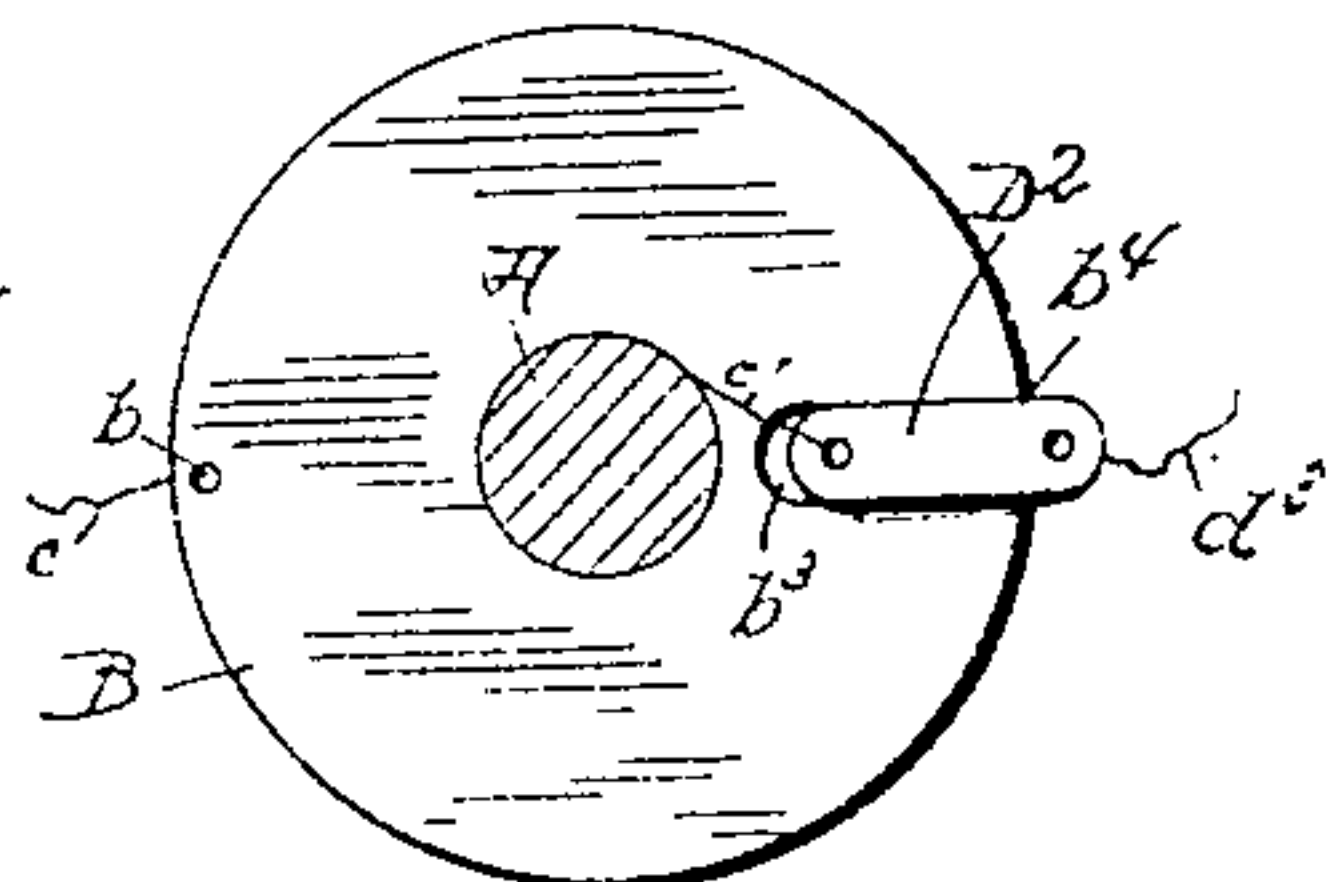
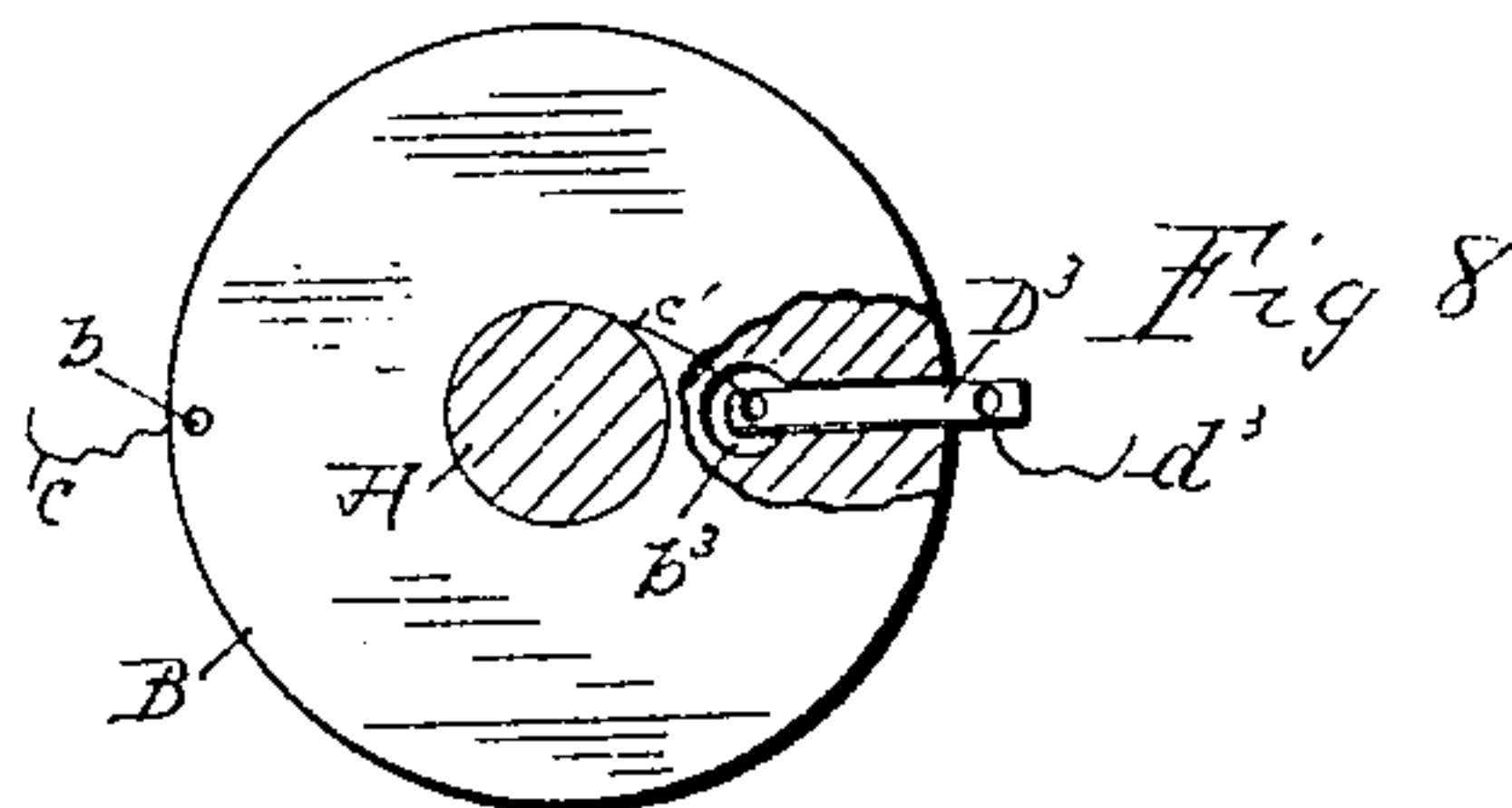


Fig 8



Witnesses

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ELECTRO-MAGNET.

SPECIFICATION forming part of Letters Patent No. 424,703, dated April 1, 1890.

Application filed March 30, 1889. Serial No. 305,461. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. CLARKE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electro-Magnets, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of a construction embodying my invention; Fig. 2, a plan section of the same, taken on the line 1 1 of Fig. 1; Fig. 3, a view similar to Fig. 1, illustrating a modified form of my invention; Fig. 4, a plan section of the same, taken on the line 2 2 of Fig. 3; Fig. 5, a view similar to Fig. 1, illustrating a second modification of my invention; Fig. 6, a sectional view of the same, taken on the line 3 3 of Fig. 5; Fig. 7, a view similar to Fig. 1, illustrating a third modification; and Fig. 8, a sectional view taken on the line 4 4 of Fig. 7.

Like letters refer to like parts in all the figures of the drawings.

My invention relates to electro-magnets, and more particularly to the winding of the same, or, in other words, to that portion commonly known as the "spool." In such spools as generally constructed the essential elements are a core, a disk or head near each end of the core, and a wrapping or coil of continuous wire wound around the core, so as to occupy the space between the disks or heads. This wire of course presents two ends, the inner one of which is immediately adjacent to the core and the outer one on the outer surface of the coil, and these ends are passed through one of the disks or heads, which is provided with suitable perforations for this purpose, the said ends projecting sufficiently to permit of their being readily connected to other wires, as desired. These projecting ends frequently break off at the point where they leave the disk or head, owing to their being frequently bent in different directions at these points. If the outside end breaks, it is a comparatively simple matter to unwind one turn of the wire from the exterior of the coil and pass the slack thus obtained through the aperture in the disk, thus obtaining a new end; but if the inside end breaks it will

be at once seen that this course cannot be pursued, owing to the inaccessibility of the inner turns, and it has heretofore been necessary in such cases to entirely unwind and rewind the spool in order to obtain a new end with sufficient slack to make the necessary connections.

The object of my present invention is to obviate this difficulty and prevent the necessity of unwinding and rewinding the spool; and to these ends my invention consists in certain novel features, which I will now proceed to describe, and will then particularly point out in the claim.

In Figs. 1 and 2 of the drawings I have shown a construction in which my invention is embodied in its preferred form. In this construction A represents the core, and B the end disks or heads, these latter being constructed of hard rubber or other suitable insulating material. C represents the insulated wire, which is coiled around the core A, between the disks or heads B, its outer end being represented at *c* and shown as passing through a perforation *b*, formed through one of the heads or disks B, near its margin, in the usual manner. *b'* indicates a second perforation, formed through the disk B at a point immediately adjacent to the core A, and through which in the ordinary construction the inner end *c'* of the wire C would be passed. B' represents a circumferential groove formed in the head B of a sufficient depth to communicate with the perforation *b'*. Within this groove there is coiled a wire D, the inner end of which is connected to the inner end *c'* of the wire C, while its outer end is passed through a perforation *b²*, formed through the head B, near the outer margin thereof, this projecting end *d* serving as a means of connection in the same manner as the projecting end *c*. Now, it will be seen that if the projecting end *d* breaks off at the point where it issues from the head B it is only necessary to unwrap the outer turn of the wire D, which is coiled within the groove B', and thus obtain sufficient slack to form a new end, which is passed through the aperture *b²* and will project sufficiently to admit of its connection to any desired wire or other object.

In Figs. 3 and 4 of the drawings I have

shown a modified form of my invention, in which D' represents a ring or annulus constructed of some suitable conducting material—such as brass—and provided with inwardly-projecting lugs d' , which may be bent downward to engage with perforations b^3 , formed in the head B, and thereby hold the ring D' in position. The inner end c' of the wire C, which forms the coil, is connected to one of these lugs, which is preferably perforated, as shown, to receive the end of said wire, said end being inserted in said perforation and secured by soldering. There projects outward from the ring D' a lug d^2 , which extends outward beyond the head of the spool and has connected to it a wire d^3 , which takes the place of the ordinary projecting inside end in the same manner as does the wire d in the construction shown in Figs. 1 and 2. This connection being an external one, it will be at once seen that any break at this point may be readily repaired without unwinding and rewinding the spool. In practice a layer of paraffine paper or other suitable insulating material will be interposed between the ring D' and the coil, in order to more thoroughly insulate the two.

In the construction shown in Figs. 5 and 6 I have shown a modification in which the head B is provided with an aperture b^3 and a groove b^4 , extending radially outward therefrom, in which groove is seated and retained a strip D^2 , of suitable conducting material—such as brass or the like—to the inner end of which the inner end c' of the wire C is connected, while to its outer projecting end the wire d^3 is connected.

In the construction shown in Figs. 7 and 8, which illustrates a further modification, a small hole is bored inward from the outer edge of the head B into the aperture b^3 , and a short rod D^3 is inserted through this hole, its inner end projecting into the aperture b^3 , where the inner end c' of the wire C is secured to it,

while its outer end projects beyond the head B and has secured to it the wire d^3 .

It will be observed that in each of the constructions described the head of the spool is provided with an intermediate connecting-piece of conducting material, to one end of which the inner end of the coil of wire is connected, while its other end provides a means for the connection of the coil to the line of wire or other object to which it is desired to connect it. In the form shown in Fig. 1 this intermediate connecting-piece may be in one piece with the coil of wire, if desired. It will also be observed that in case of the breaking of the wire at the point where it leaves the spool the break may be readily repaired without the necessity of unwinding and rewinding the spool.

It is obvious that various modifications in the details of construction may be made without departing from the principle of my invention, and I therefore do not wish to be understood as limiting myself strictly to the precise details hereinbefore described and shown in the drawings.

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

The combination, with the coil C, having outer end c and inner end c' , of the spool composed of the core A and heads B, one of said heads being provided with suitable apertures for the ends of the coil and having a circumferential groove B' , and the wire D, coiled in said groove and having its inner end connected to the inner end c' of the coil C and its outer end led through one of the apertures in the head, substantially as and for the purposes specified.

GEORGE D. CLARKE.

Witnesses:

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