

975,546.

Patented Nov. 15, 1910.

3 SHEETS—SHEET 1.

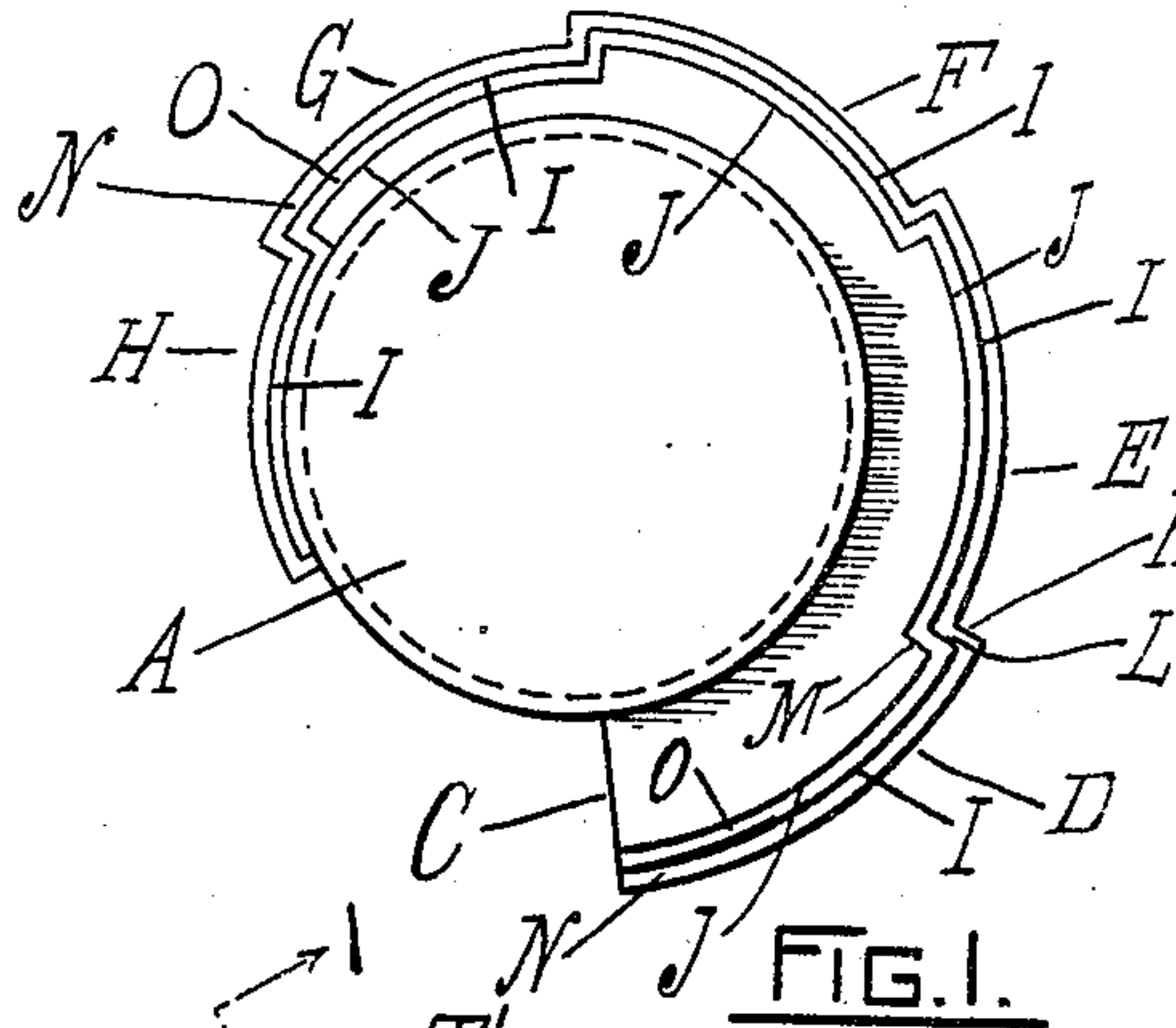


FIG. 1.

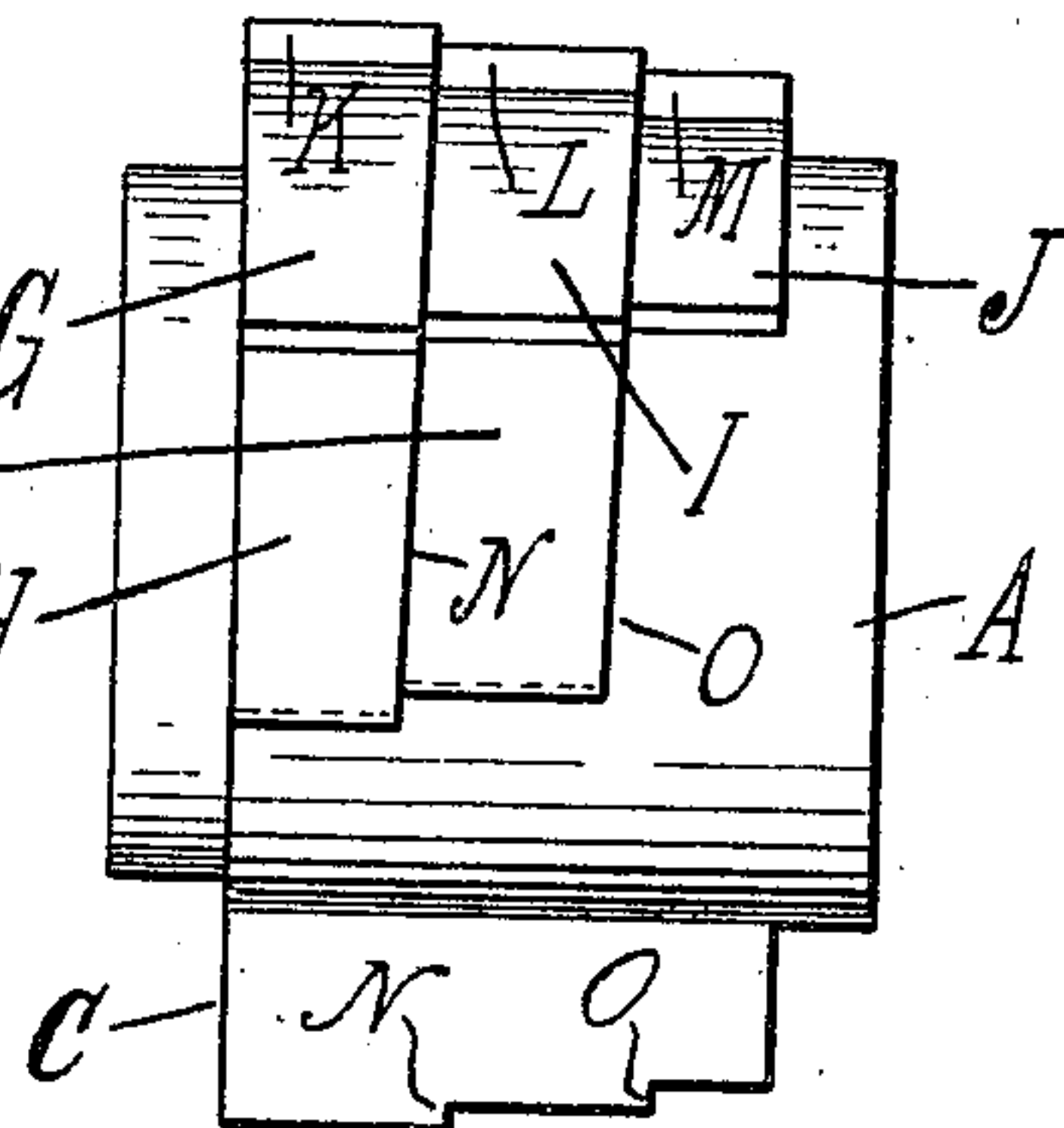


FIG. 2.

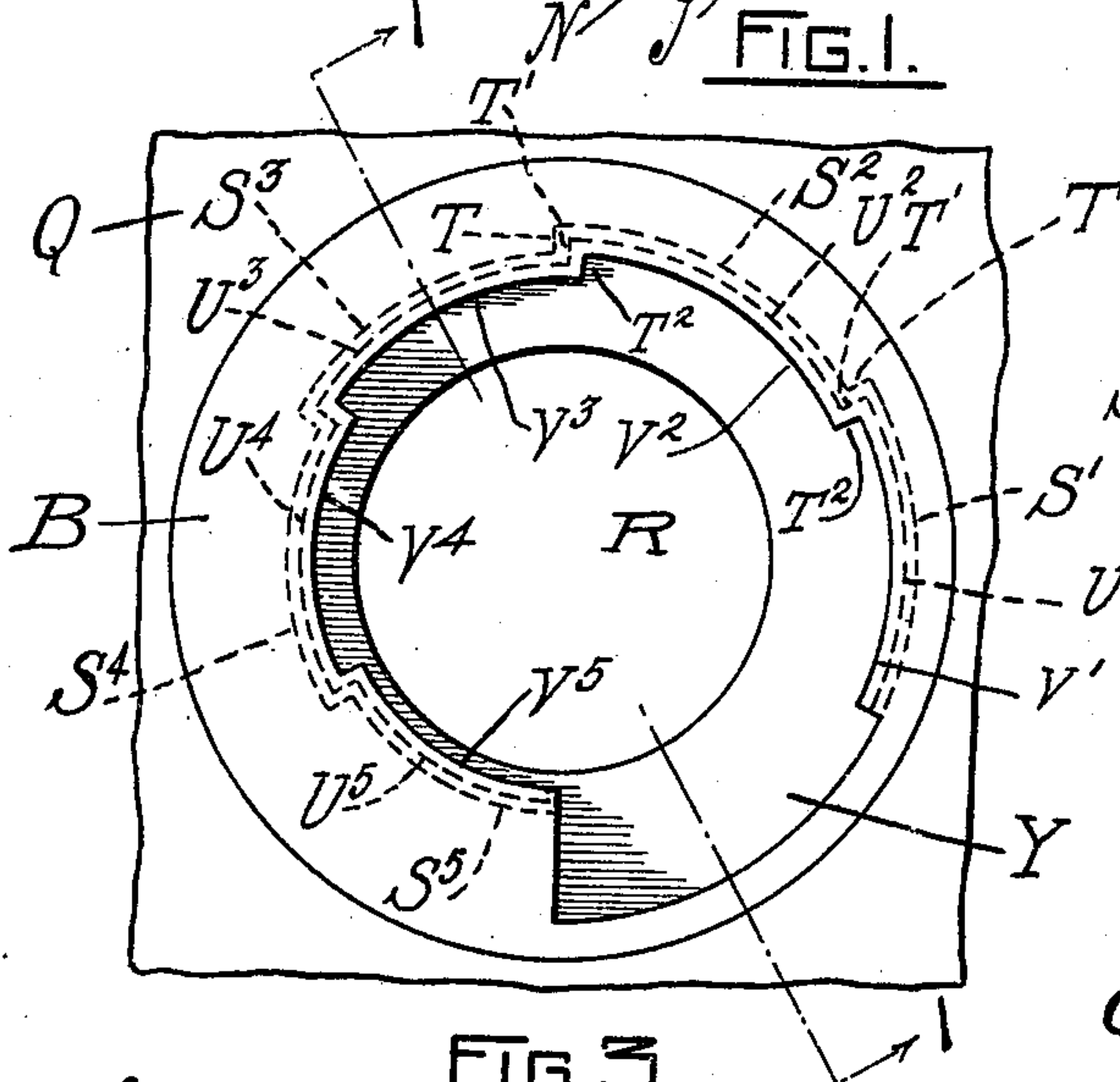


FIG. 3.

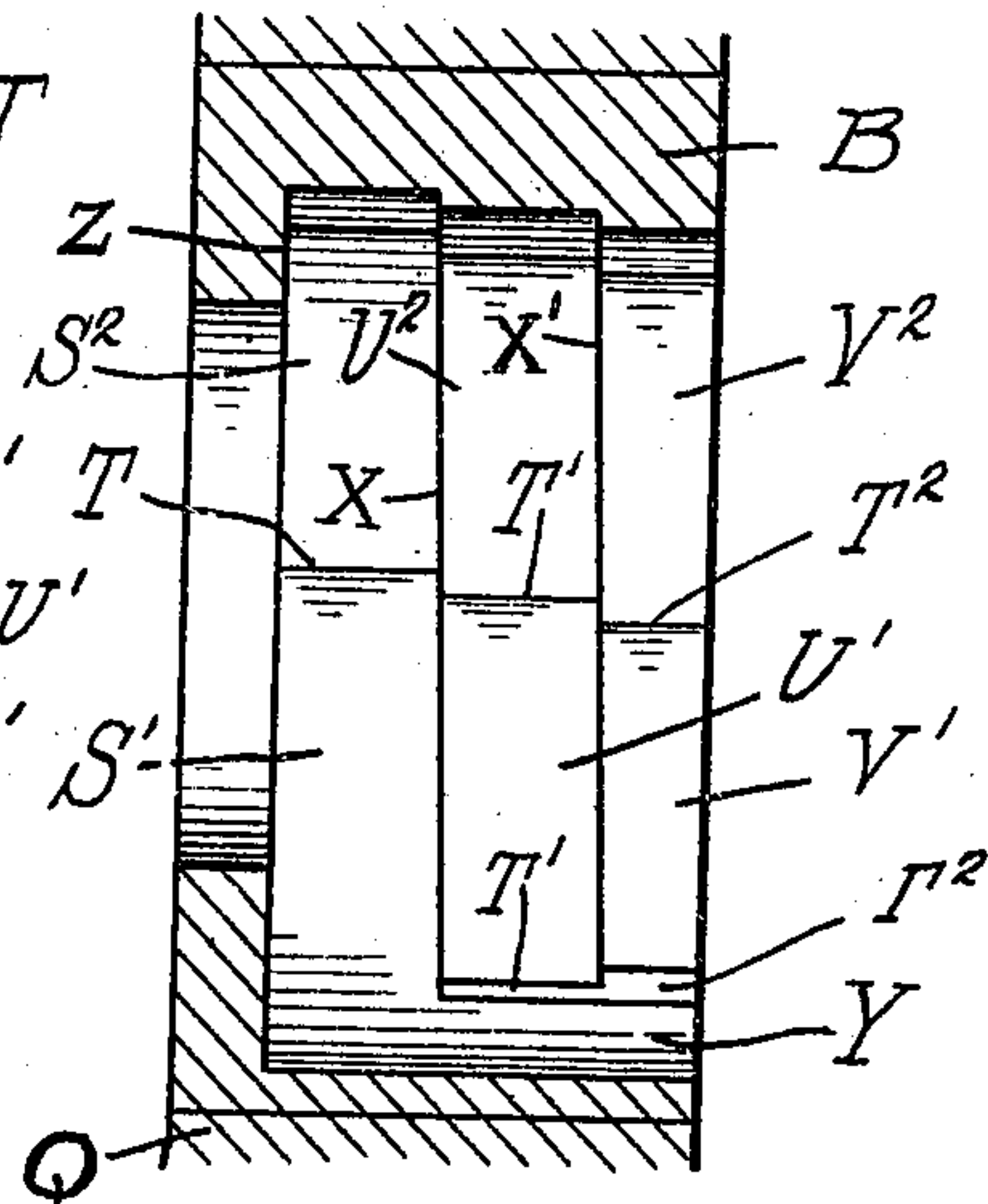


FIG. 4.

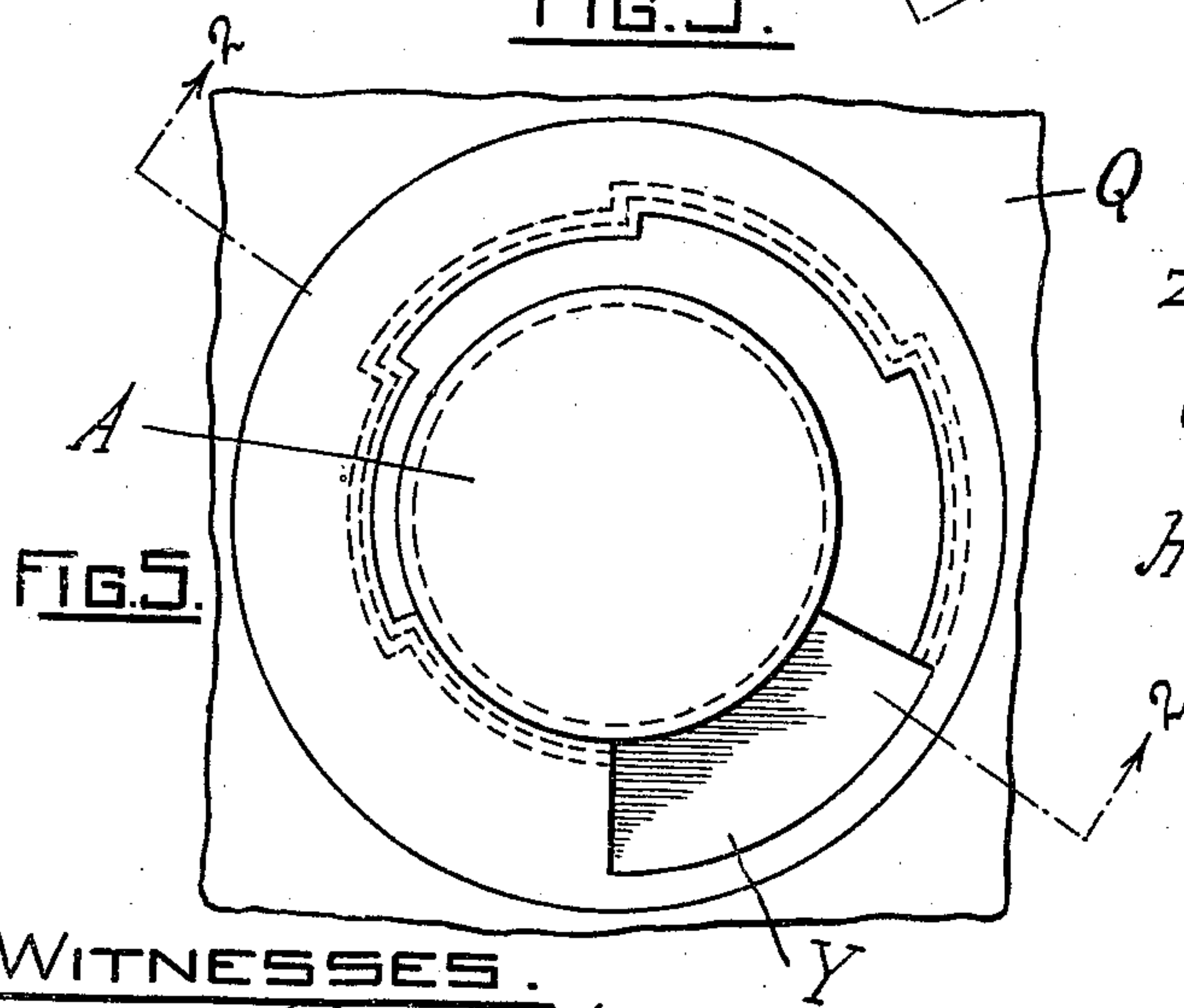


FIG. 5.

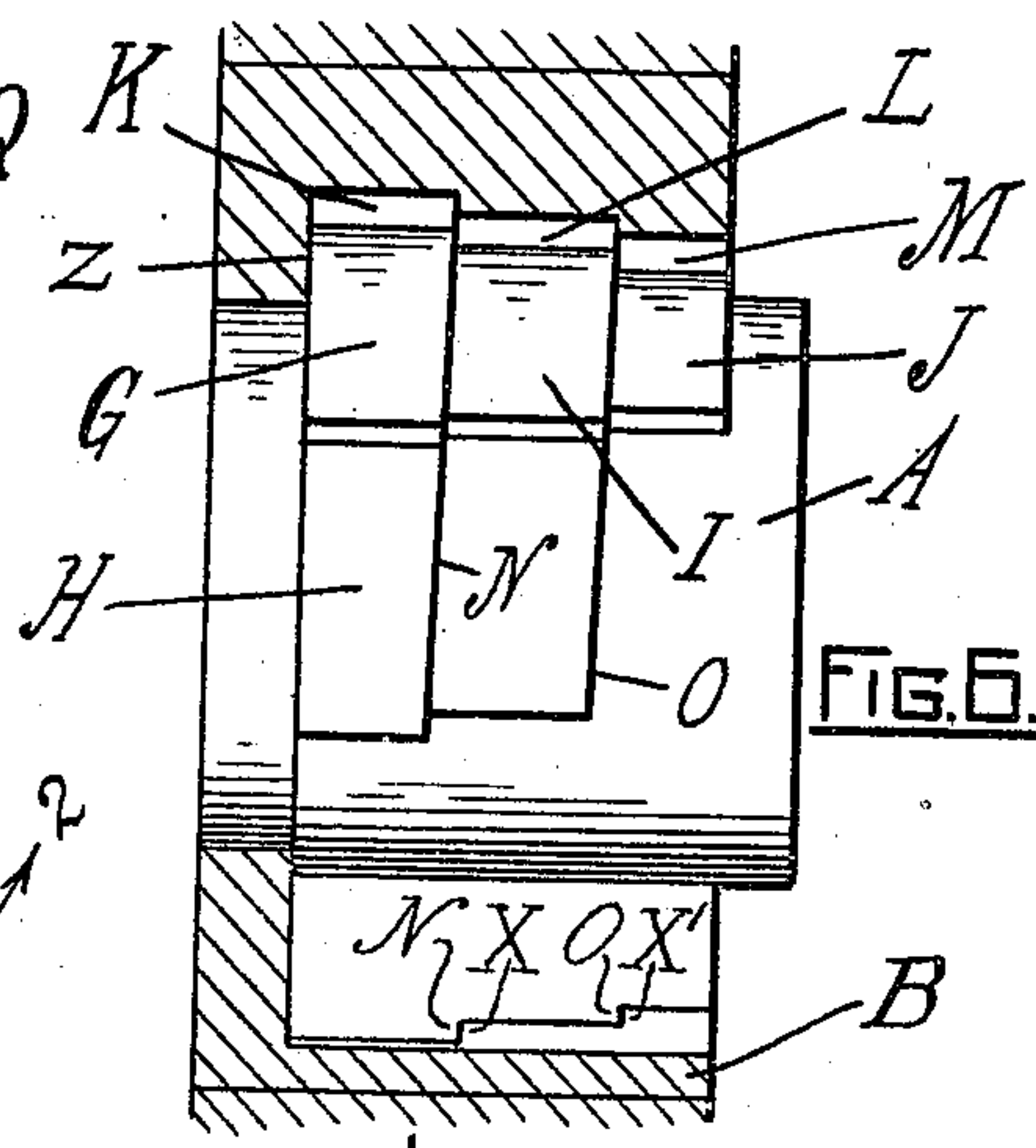


FIG. 6.

WITNESSES.  
Albert G. Piezenthowski.  
George H. McLaughlin

INVENTOR.  
Carl J. Ljunggren  
By Noratio E. Bellows  
ATTY.

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C. J. LJUNGGREN.  
CLOSURE LOCKING MEANS.  
APPLICATION FILED MAR. 21, 1910.

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3 SHEETS—SHEET 2.

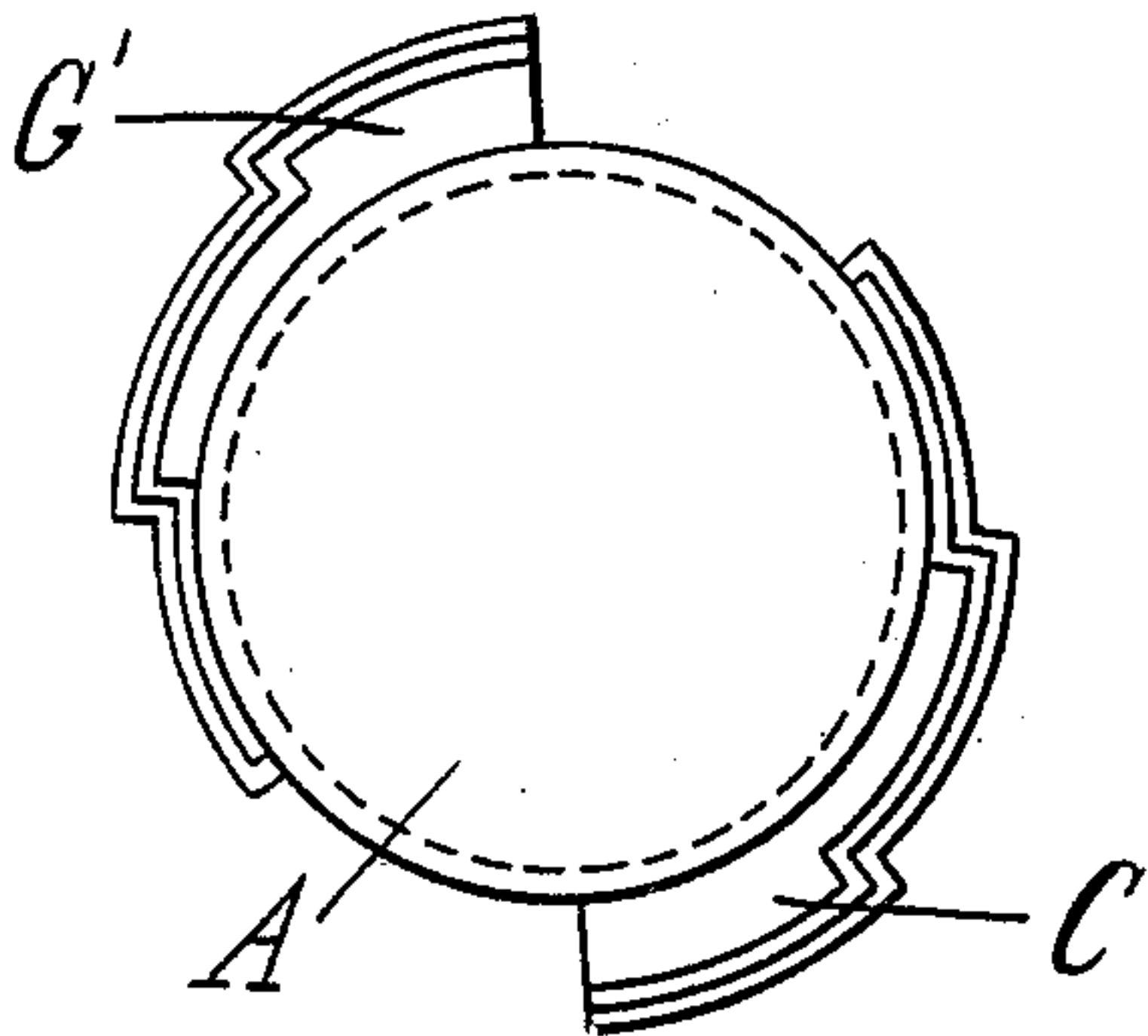


FIG. 7.

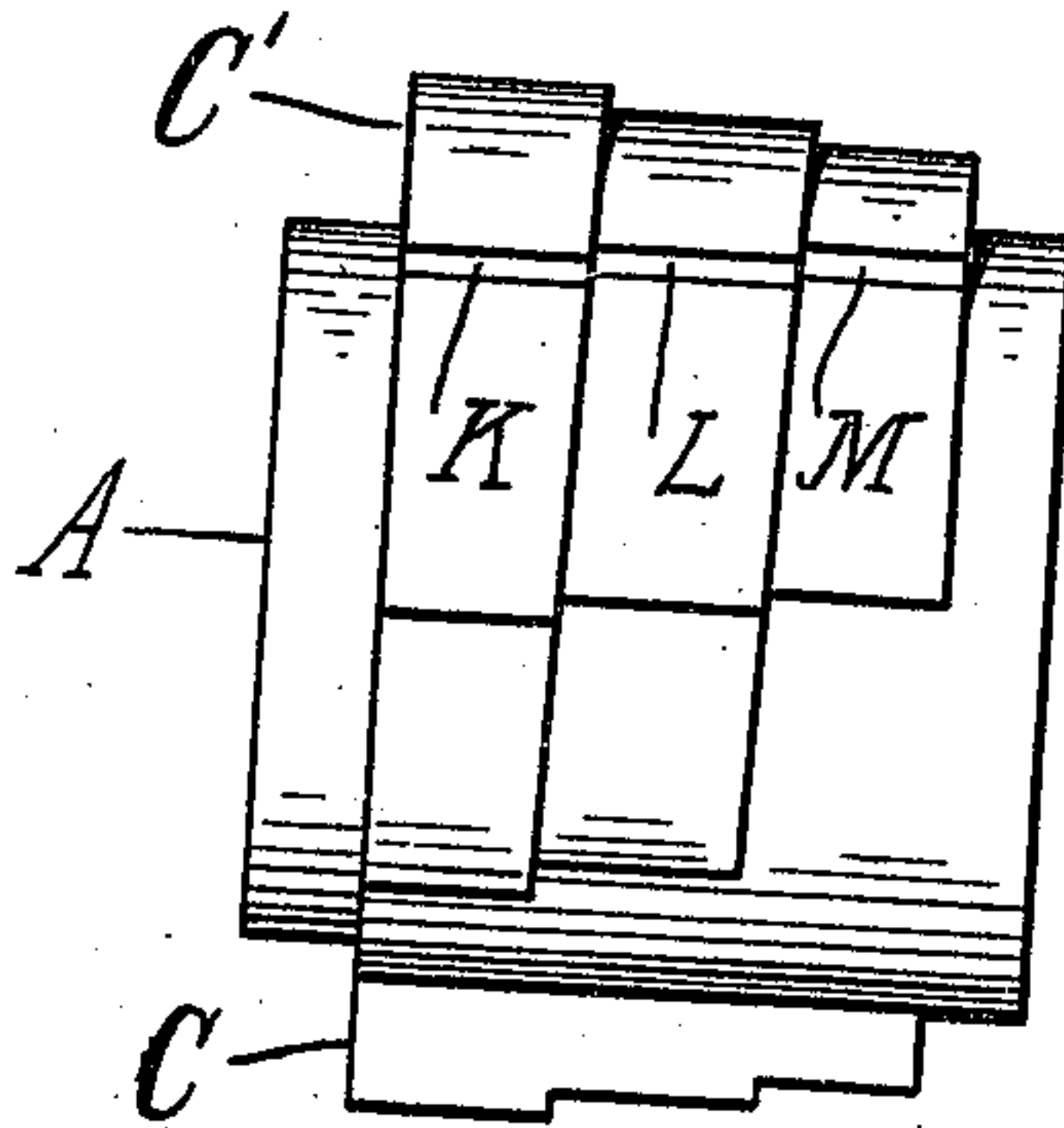


FIG. 8.

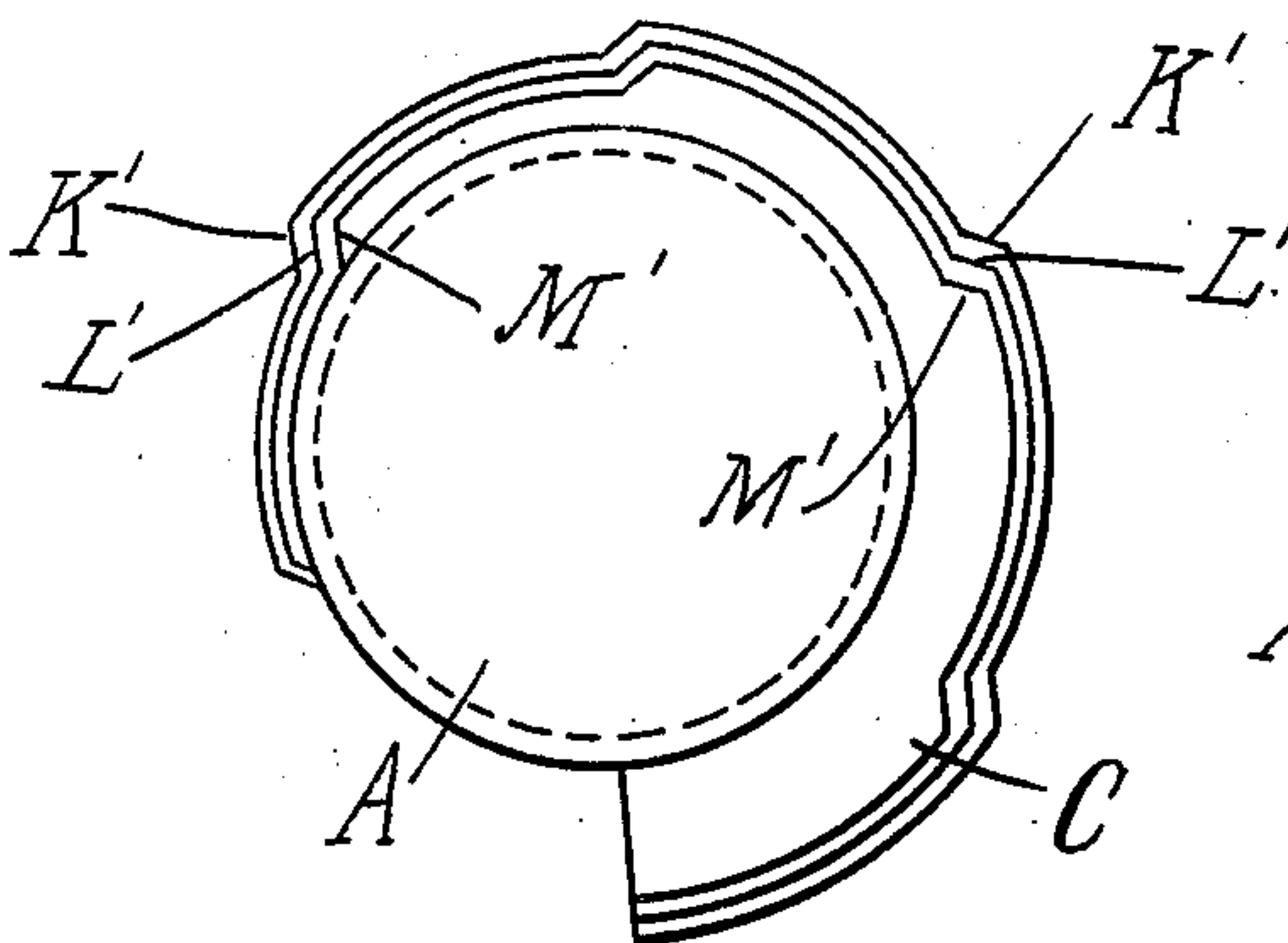


FIG. 9.

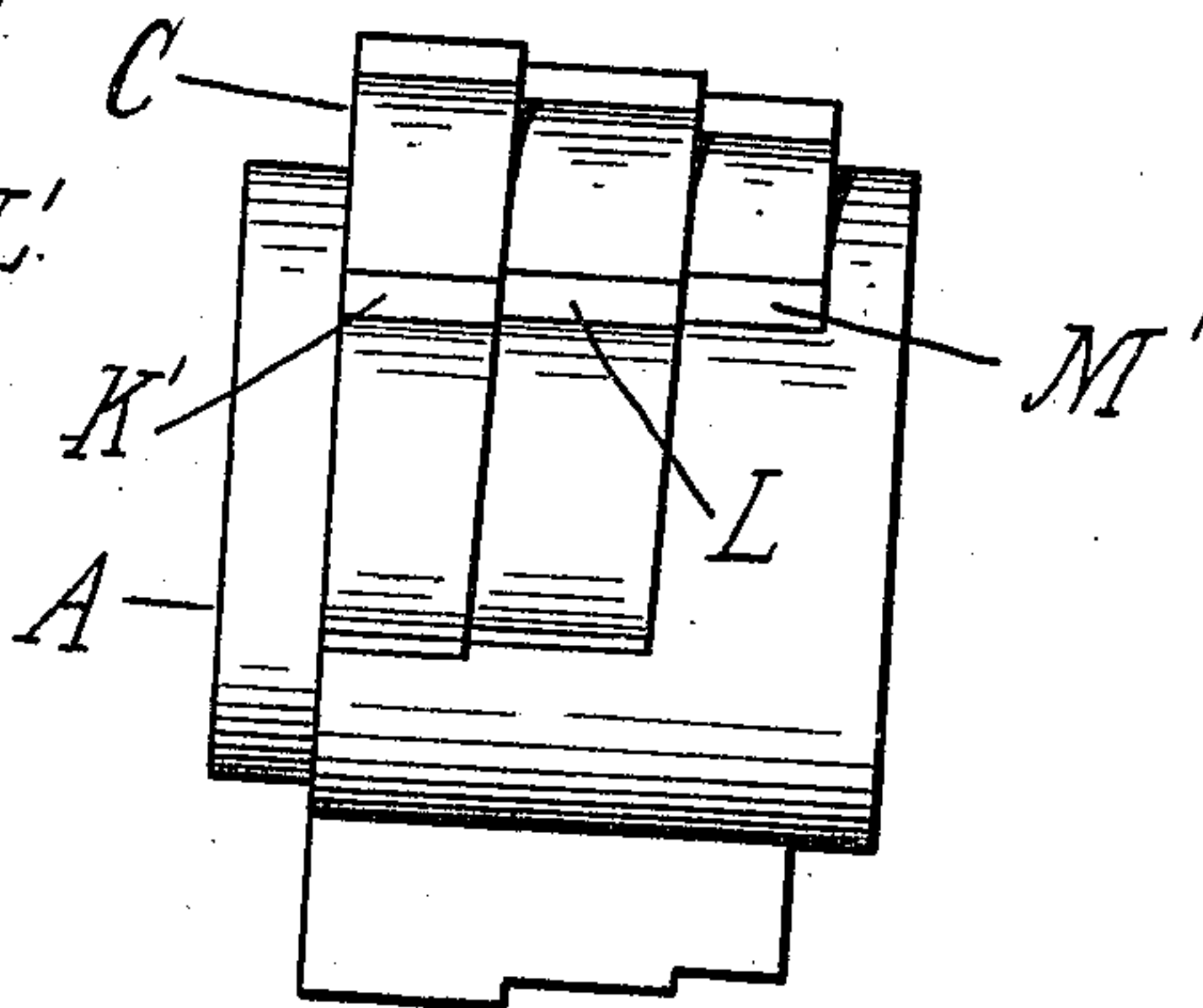


FIG. 10.

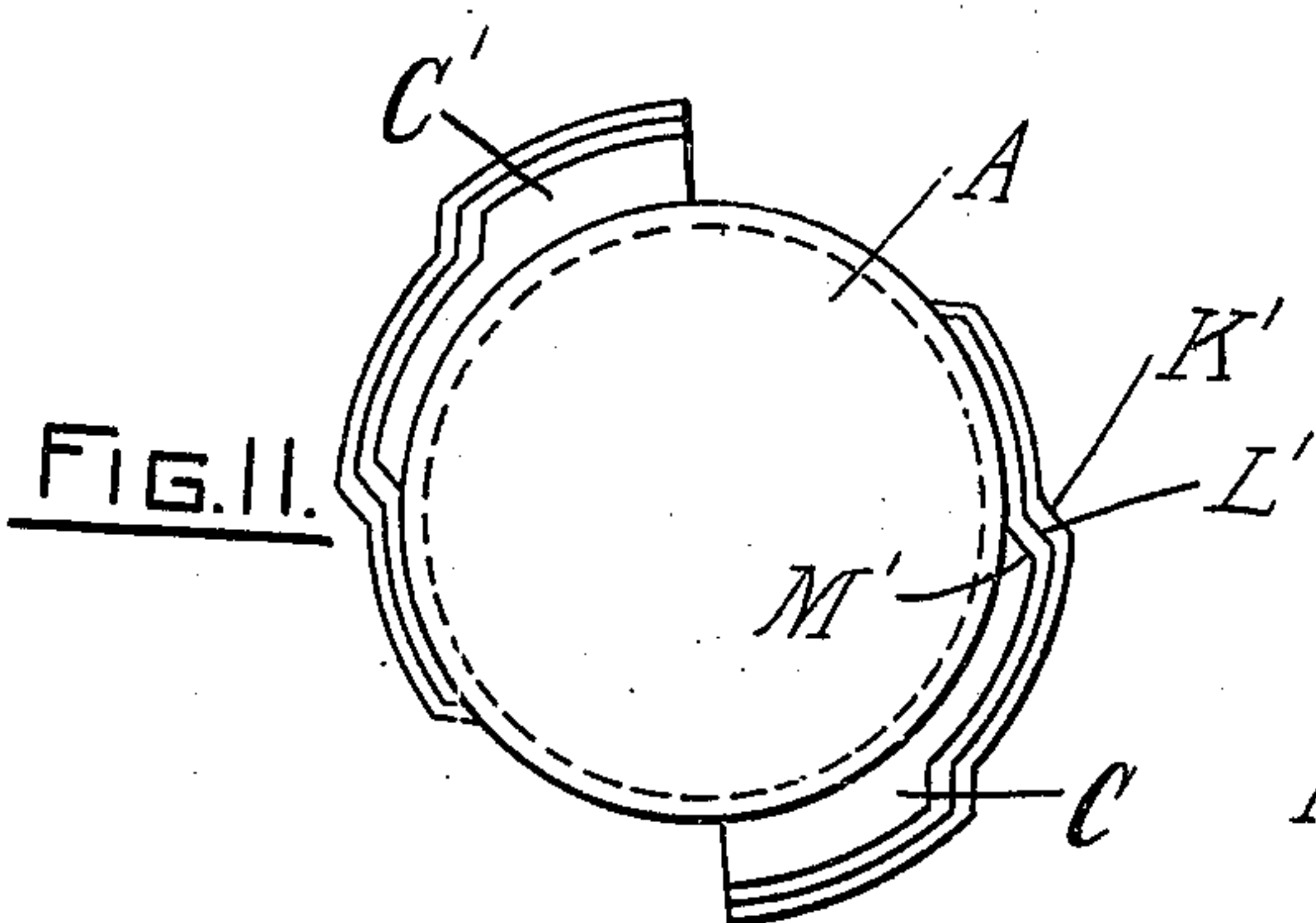


FIG. 11.

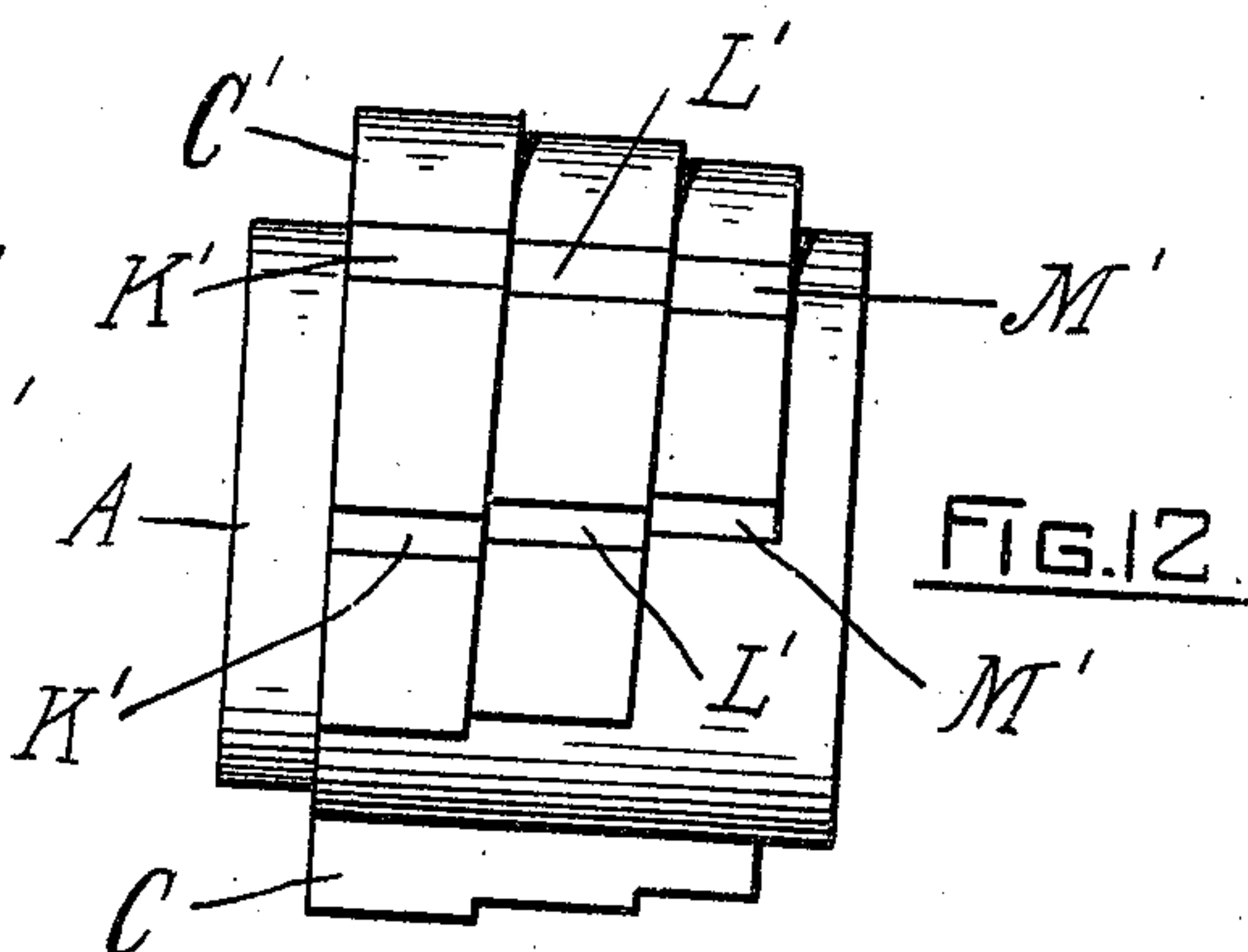


FIG. 12.

WITNESSES.

*Albert G. Fugentkowski.*  
*George H. McLaughlin.*

INVENTOR.

*Carl J. Ljunggren*  
*By Horatio E. Bellows*

ATTORNEY.



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3 SHEETS—SHEET 3.

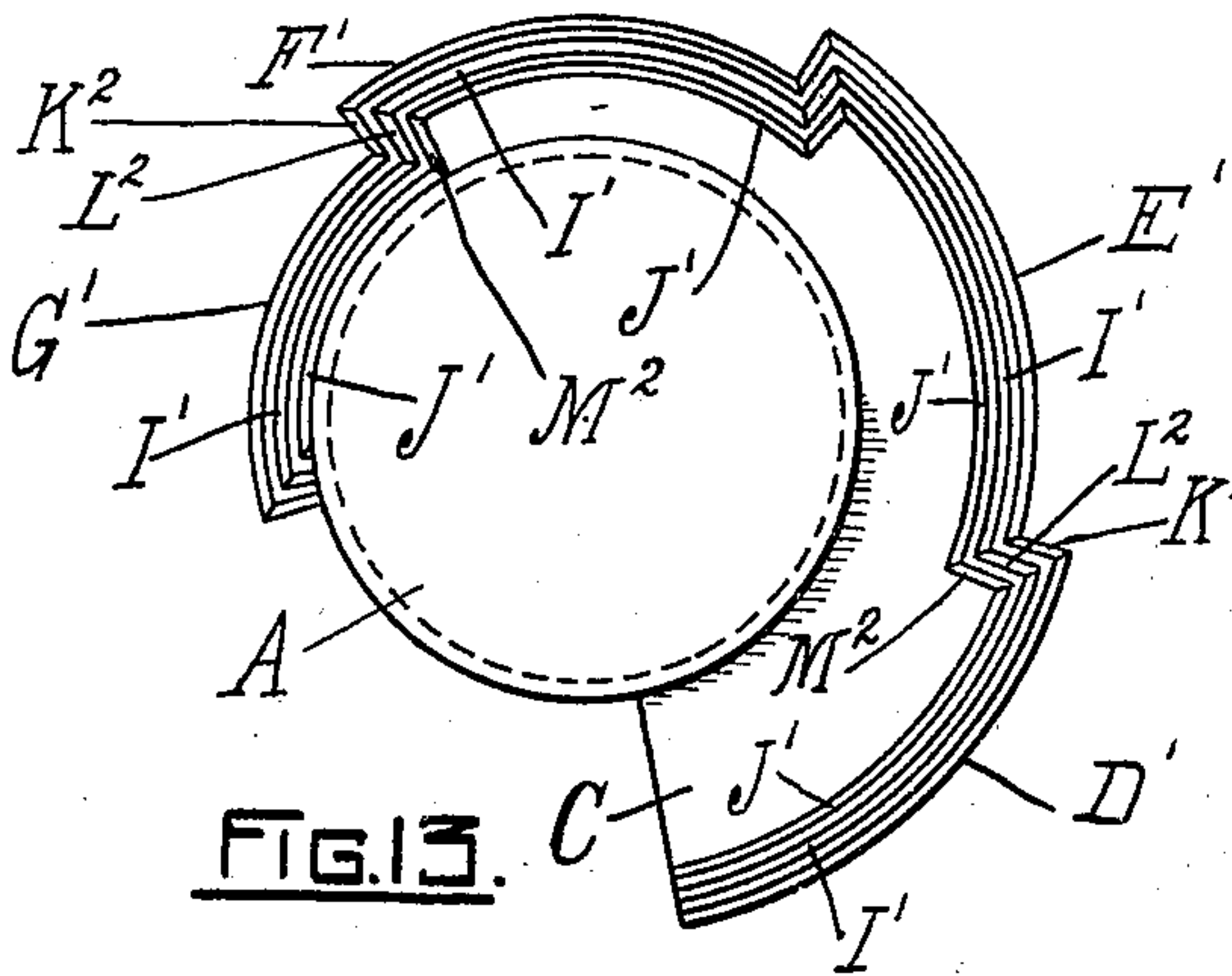


FIG. 13.

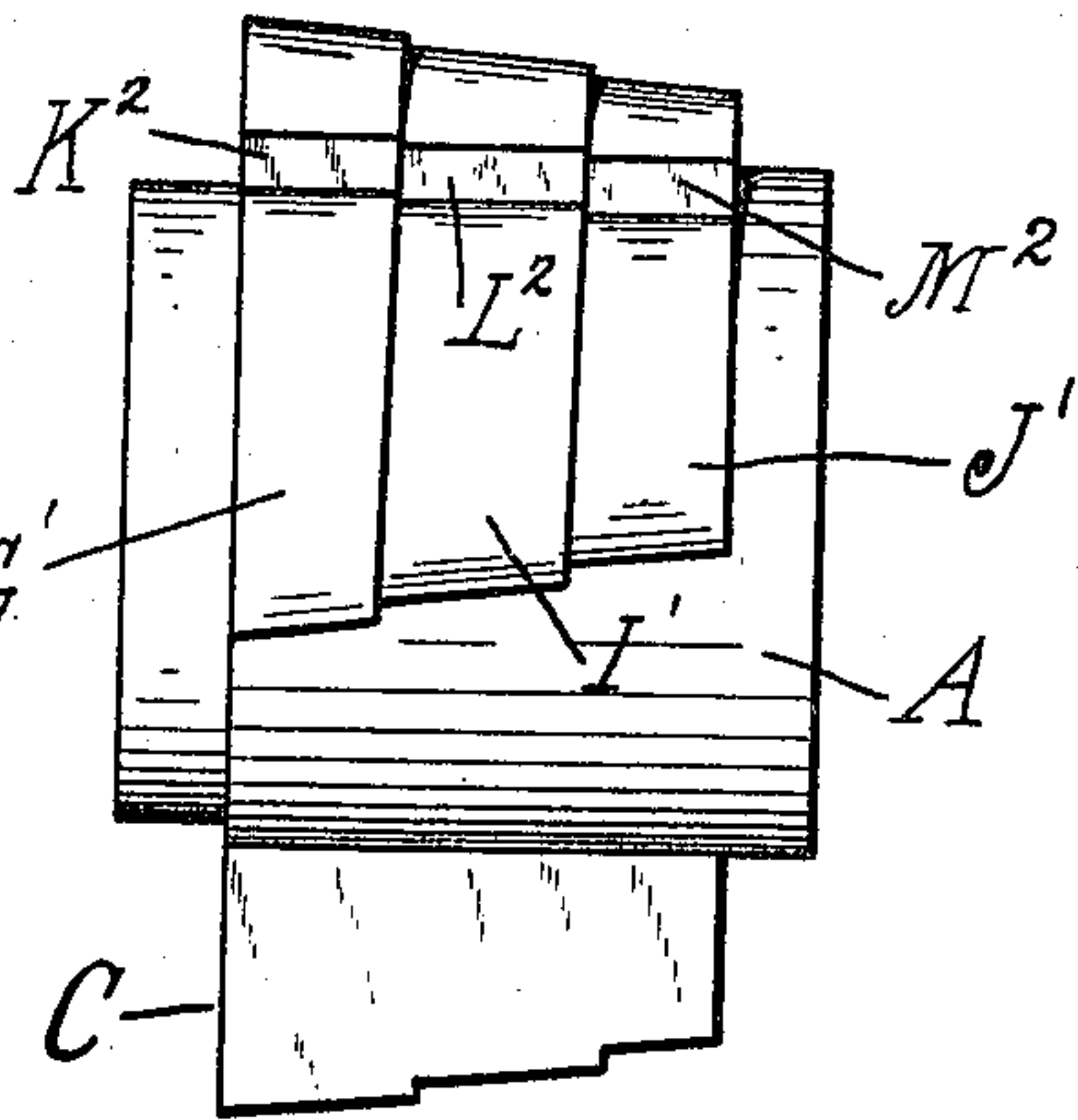


FIG. 14.

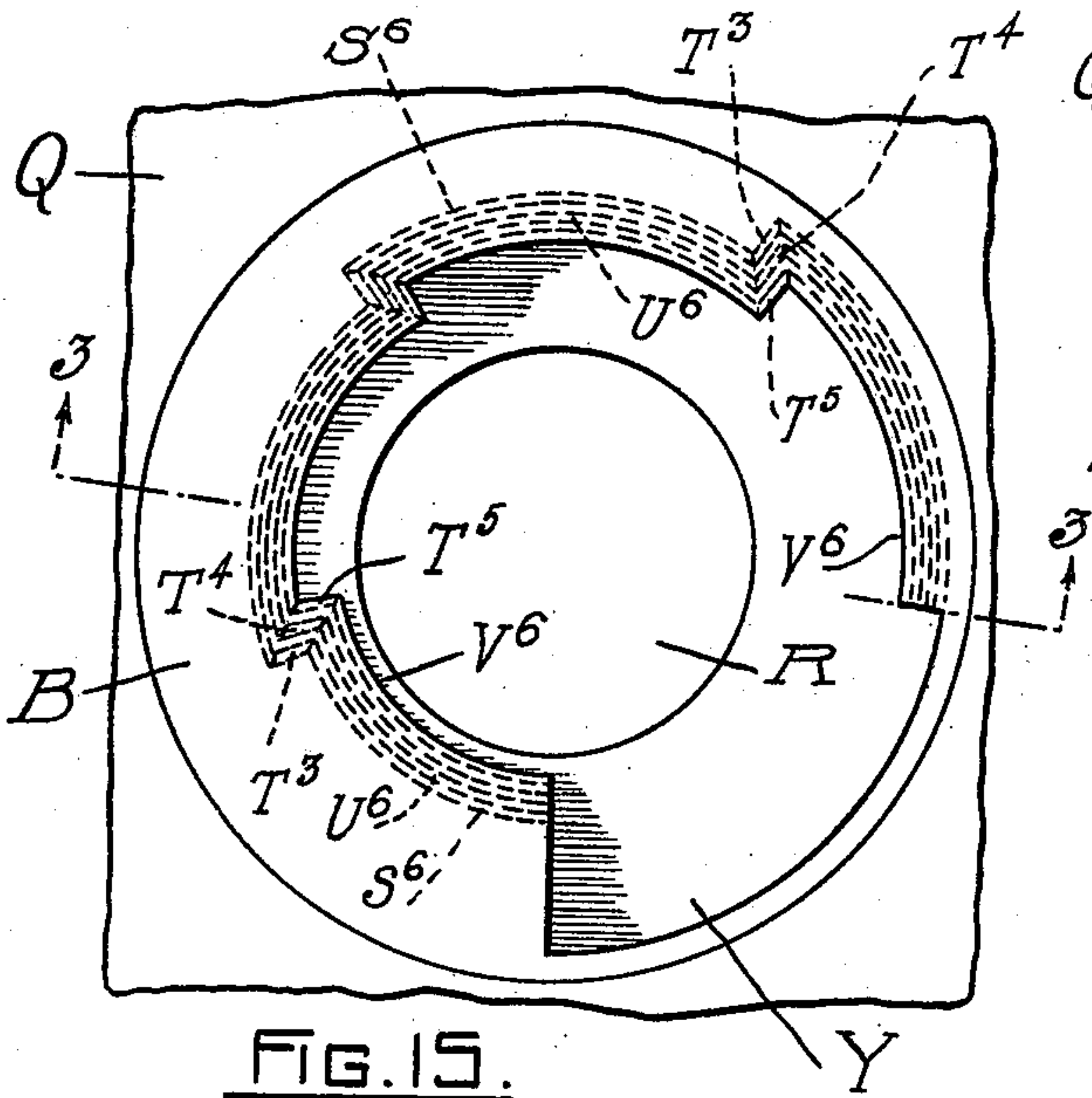


FIG. 15.

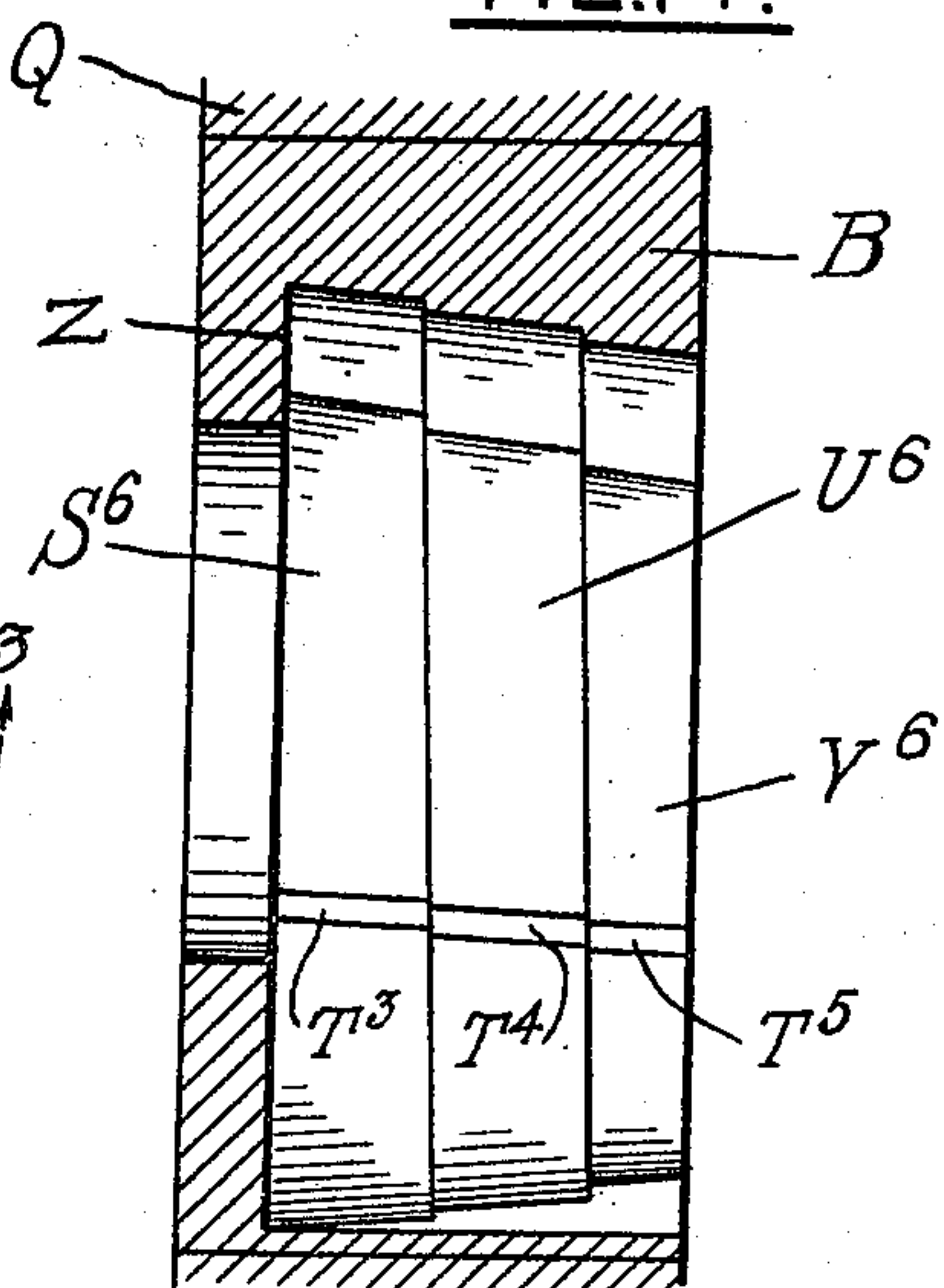


FIG. 16.

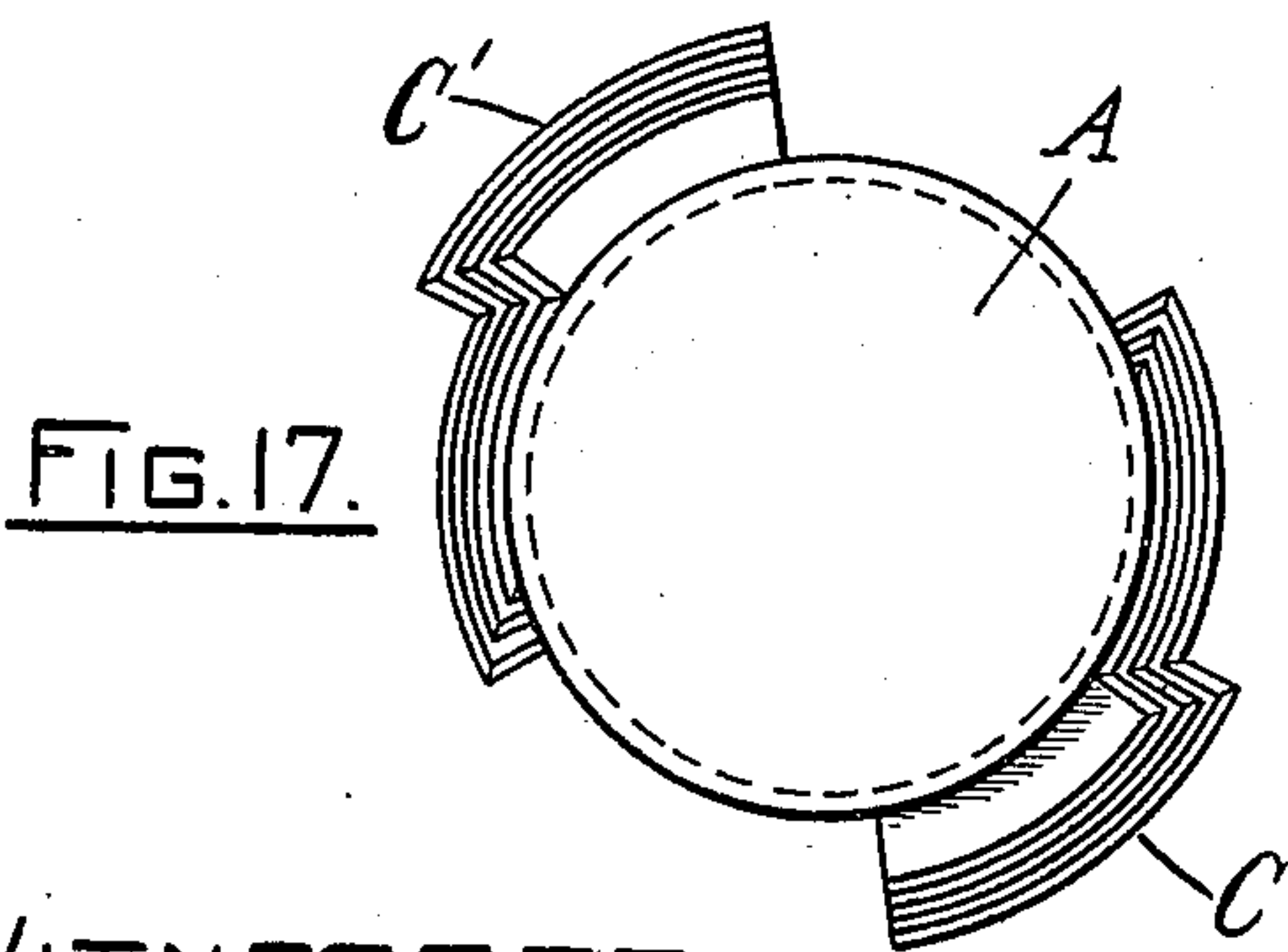


FIG. 17.

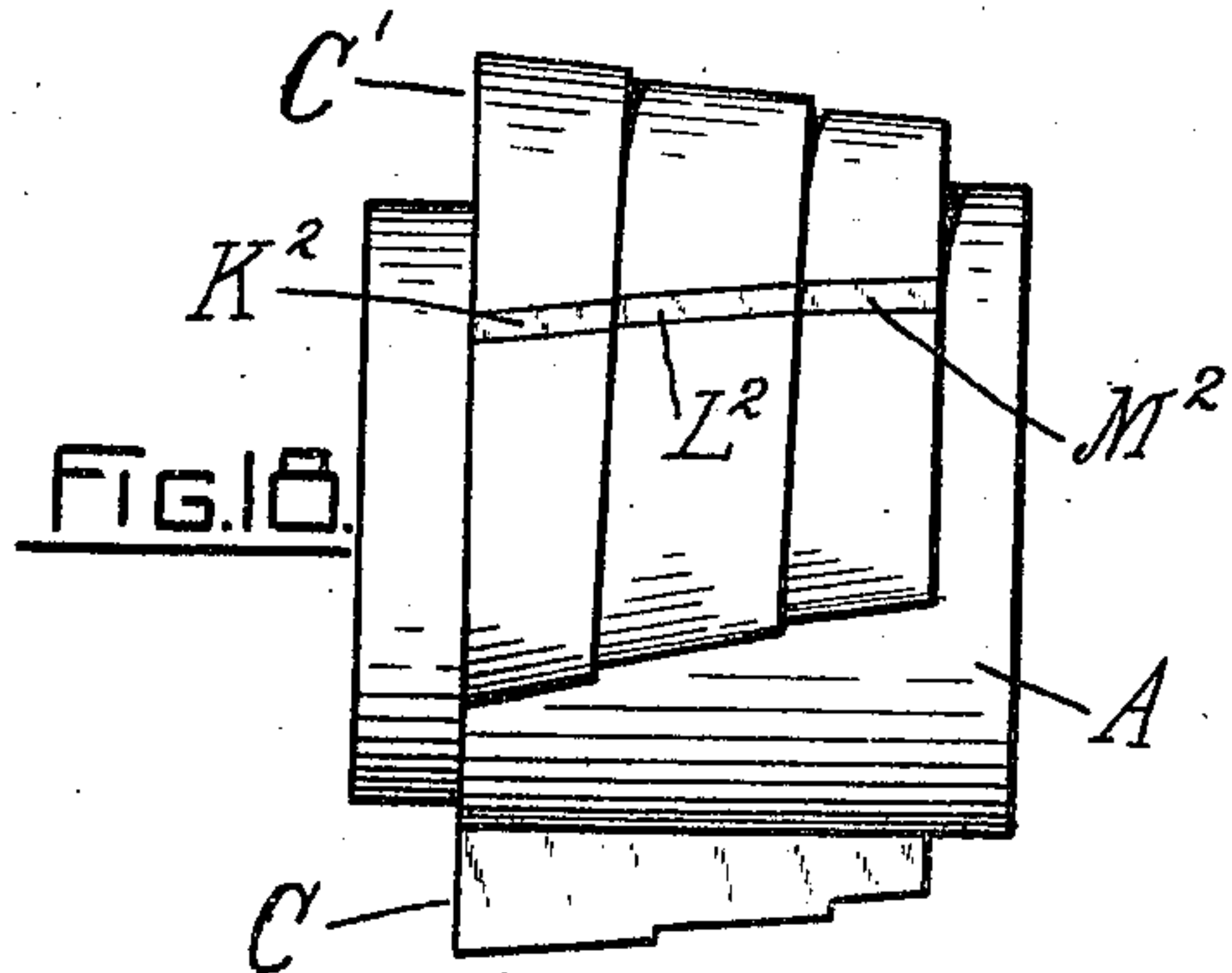


FIG. 18.

WITNESSES.  
Albert G. Piegonkowski.  
George H. McLaughlin.

INVENTOR.  
Carl J. Ljunggren  
By Horatio E. Bellows  
ATTY.



# UNITED STATES PATENT OFFICE.

CARL J. LJUNGGREN, OF PROVIDENCE, RHODE ISLAND.

## CLOSURE-LOCKING MEANS.

975,546.

Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed March 21, 1910. Serial No. 550,593.

*To all whom it may concern:*

Be it known that I, CARL J. LJUNGGREN, a subject of the King of Sweden, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Closure-Locking Means, of which the following is a specification.

My invention relates to closure locking means for use in such structures as vault doors, gun breeches, port holes, and man holes, and its essential objects are to enhance the resistive power of the parts against explosive or other pressure, to distribute the pressure, to insure against play of the parts, to facilitate the seating of the same, and to compensate for the wear thereof, also to effect these ends in an inexpensive structure comprising a minimum of parts and without the employment of screw threads which have been found weak under sudden stress, disposed to accumulate adhesions, expensive to form, and inaccessible for cleaning.

My invention consists in constructing the interengaging closure and stationary members with smooth solid peripheral members arranged to furnish a maximum bearing area and comprising graduations in three directions.

My invention further consists in the construction, combination, and mode of operation of the parts set forth in and falling within the scope of the claims hereto appended.

In the accompanying drawings which form a part of this specification, Figures 1 and 2 are rear end and side elevations respectively of a closure member embodying my invention, Fig. 3, rear end view of the receiving orifice, Fig. 4, a section of the same on line 1, 1, of Fig. 3, Fig. 5, a rear elevation of the closure member in engaged position within the orifice of the stationary member, Fig. 6, a section on line 2, 2, of Fig. 5 showing the closure in side elevation, Figs. 7 and 8, rear and side elevations of a modified form of closure member, Figs. 9 and 10, similar elevations respectively of another modification of the same, Figs. 11 and 12 like elevations of still another modification, Figs. 13 and 14, similar views of a fourth modified form of closure member, Fig. 15, a rear end view of an orifice adapted to receive the last form of closure member, Fig. 16, a section of orifice on line 3 3 of Fig. 15, and

Figs. 17 and 18, rear end and side elevations respectively of a fifth modified form of closure member.

Like characters of reference indicate like parts throughout the views.

My invention comprises a plug, door, block, or closure member A adapted to cooperate with a breech or jamb B. The mechanism for supporting, inserting, rotating and withdrawing the member A forms no part of the present invention, is well known in the art, and is therefore not illustrated herein.

In the construction shown in Figs. 1 to 6 inclusive the member or body A is preferably cylindrical in general outline and, in the form thereof shown in Fig. 1, has a segment C comprising transversely graduated stepped portions D, E, F, G, and H which in turn are longitudinally graduated forming stepped portions whose peripheries are indicated as D, I, J; E, I, J; F, I, J; G, I, J; and H, I. The end faces K, L, M of the radially graduated stepped portions are in different radial planes and are disposed diagonally relatively to the axis of the body. The peripheral faces of the stepped portions are longitudinally parallel with the axis of the closure body, and the side faces N, O, of the stepped portions, which face endwise of the member are in vertical planes and helically disposed or pitched.

The stationary member in this instance is a collar B fixed to the wall Q in any desired manner and incloses an orifice R. Within this orifice and transversely thereof the member B has an annular series of pitched channels S', S<sup>2</sup>, S<sup>3</sup>, S<sup>4</sup> and S<sup>5</sup> of gradually lessening radii around the orifice forming radial end abutments T. Arranged longitudinally of the orifice are one or more series of similar channels U', U<sup>2</sup>, U<sup>3</sup>, U<sup>4</sup>, and U<sup>5</sup>, and V', V<sup>2</sup>, V<sup>3</sup>, V<sup>4</sup>, and V<sup>5</sup> of gradually lessening radii endwise of the orifice, whose respective end abutments T' and T<sup>2</sup> are also radial. The abutments T, T', and T<sup>2</sup> are diagonally disposed lengthwise of the orifice. The longitudinally stepped relation of the channels S', U', V', and S<sup>2</sup>, U<sup>2</sup>, V<sup>2</sup> etc. form side abutments X, X', facing endwise of the member, and which, as heretofore suggested, are pitched. The peripheral surfaces of all the channels are horizontally disposed.

Y represents the usual clearance slot or opening of the orifice adapted to admit the



closure portions D I J and is deeper than the entrance openings V' V<sup>2</sup> etc. with which it is in series.

The interengagement of the parts A and B is effected as follows: The member A, disposed as shown in Fig. 2, is introduced as a sliding fit into the member B from right to left as shown in Fig. 6. The member A is then turned in the direction opposite the hands of a clock bringing the portions D, I, J, into the channeled portions S', U', V', etc. until the shoulders K, L, M, contact with the faces T, T', and T<sup>2</sup>; and the pitched endwise facing side surfaces or shoulders N, O, come into frictional contact with the abutments X, X'. The shoulder formed by the advanced face of the segment C abuts against the internal end face Z of the member B.

It will be observed that the steps and abutments have extended bearing areas; that the pitched character of the side abutting faces guide the parts to their seats and afford compensation for wear; and that the diagonally arranged shoulders K, L, M, serve also to distribute the strain and strengthen the whole device. In short there is a graduation of the parts in three directions.

In the modification shown in Figs. 7 and 8 the segment C and its constituent parts are of less annular extent, and this segment is supplemented by a second segment C' similar in all details with the segment C, but with the corresponding parts located at diametrically opposite points upon the periphery of the body A.

The form of closure shown in Figs. 9 and 10 is similar to that of Fig. 1 except that the end faces K' L' M' of the radially graduated annular portions are inclined.

The closure of Figs. 11 and 12 differs from that of Fig. 9 in that the segment is of less annular length, and in that the body A has an opposite similar segment C'.

In Figs. 13 and 14 is shown a closure member which differs from Fig. 1 in that the peripheral faces of all the stepped portions, namely D', E', F', G', I', and J' are inclined toward the axis of the closure body or lengthwise thereof. It further differs from Fig. 1 in that the end faces K<sup>2</sup>, L<sup>2</sup>, M<sup>2</sup>, are obliquely inclined. The stationary member for this body, as shown in Figs. 15 and 16, differs from that shown in Figs. 3 and 4 in that the peripheral faces of all the channels S<sup>6</sup> U<sup>6</sup> and V<sup>6</sup> are inclined lengthwise of the orifice; and in that the faces of the abutments T<sup>3</sup>, T<sup>4</sup>, and T<sup>5</sup> are obliquely inclined.

The modified form shown in Figs. 17 and 18 differs from that last described in that the segment C is shortened and an opposite segment C' is added.

One of the possibilities of the treble graduations is shown in the structures disclosed in Figs. 13 to 18 inclusive wherein the abut-

ting faces have an inclination in three directions which still further distributes the stress or strain upon the complementary members.

What I claim is,—

1. In a device of the type set forth, the combination with the stationary member, of a closure body, and a segment upon the body comprising stepped portions, said stepped portions being graduated radially, longitudinally, and diagonally.

2. In a device of the type set forth, the combination with the stationary member, of a closure body, and a segment upon the body comprising a plurality of radially graduated portions disposed in diagonal series, the graduated portions being of gradually lessening radii longitudinally of the body.

3. In a device of the type set forth, the combination with the stationary member, of a closure body, and a segment upon the body comprising a plurality of radially graduated portions disposed in diagonal series, said portions being also graduated longitudinally of the body and having a pitched relation thereto.

4. In a device of the type set forth, the combination with the stationary member, of a closure body, and a segment upon the body comprising a plurality of radially graduated portions disposed in diagonal series, said portions being also graduated longitudinally of the body and pitched with relation thereto, the end faces of the diagonal series being circumferentially inclined.

5. In a device of the type set forth, the combination with the stationary member, of a closure body, and a segment upon the body comprising a plurality of radially graduated portions disposed in diagonal series, said portions being also graduated longitudinally of the body and pitched with relation thereto and provided with peripheral faces inclined toward the axis of the body, the end faces of the diagonal series being diagonally inclined.

6. In a device of the type set forth, the combination of a hollow stationary member provided with annular series of channels in stepped relation to each other both radially and longitudinally, the lengths of the radial portions being relatively graduated to form abutments diagonally disposed longitudinally of the member, and a closure member within the stationary member provided with radially, longitudinally, and diagonally graduated portions adapted to register in the graduated channels.

7. In a device of the type set forth, the combination with a hollow stationary member provided with annular series of channels in stepped relation to each other both radially and longitudinally, the bottom surfaces of the channels being inclined, and the lengths of the radial portions being relatively graduated to form abutments diago-



nally disposed longitudinally of the member, said abutments being each diagonally inclined, and a closure member within the stationary member provided with radially  
5 longitudinally and diagonally graduated portions adapted to register in the channels, and provided with inclined faces adapted to coöperate with the inclined surfaces of the channels and of the abutments.

10 8. In a device of the type set forth, the combination with the stationary member, of a closure body, and a segment upon the body

comprising a plurality of radially graduated portions, said portions being also graduated longitudinally of the body and pitched with  
15 relation thereto and provided with peripheral faces inclined toward the axis of the body.

In testimony whereof I have affixed my signature in presence of two witnesses.

CARL J. LJUNGGREN.

Witnesses:

HORATIO E. BELLOWS,  
WALTER LOUIS FROST.