

No. 817,616.

PATENTED APR. 10, 1906.

L. BECK.

AUTOMATIC SETTING KEY FOR SETTING THE FIRING CHARGE RINGS  
OF TIME FUSES.

APPLICATION FILED JAN. 23, 1905.

3 SHEETS—SHEET 1.

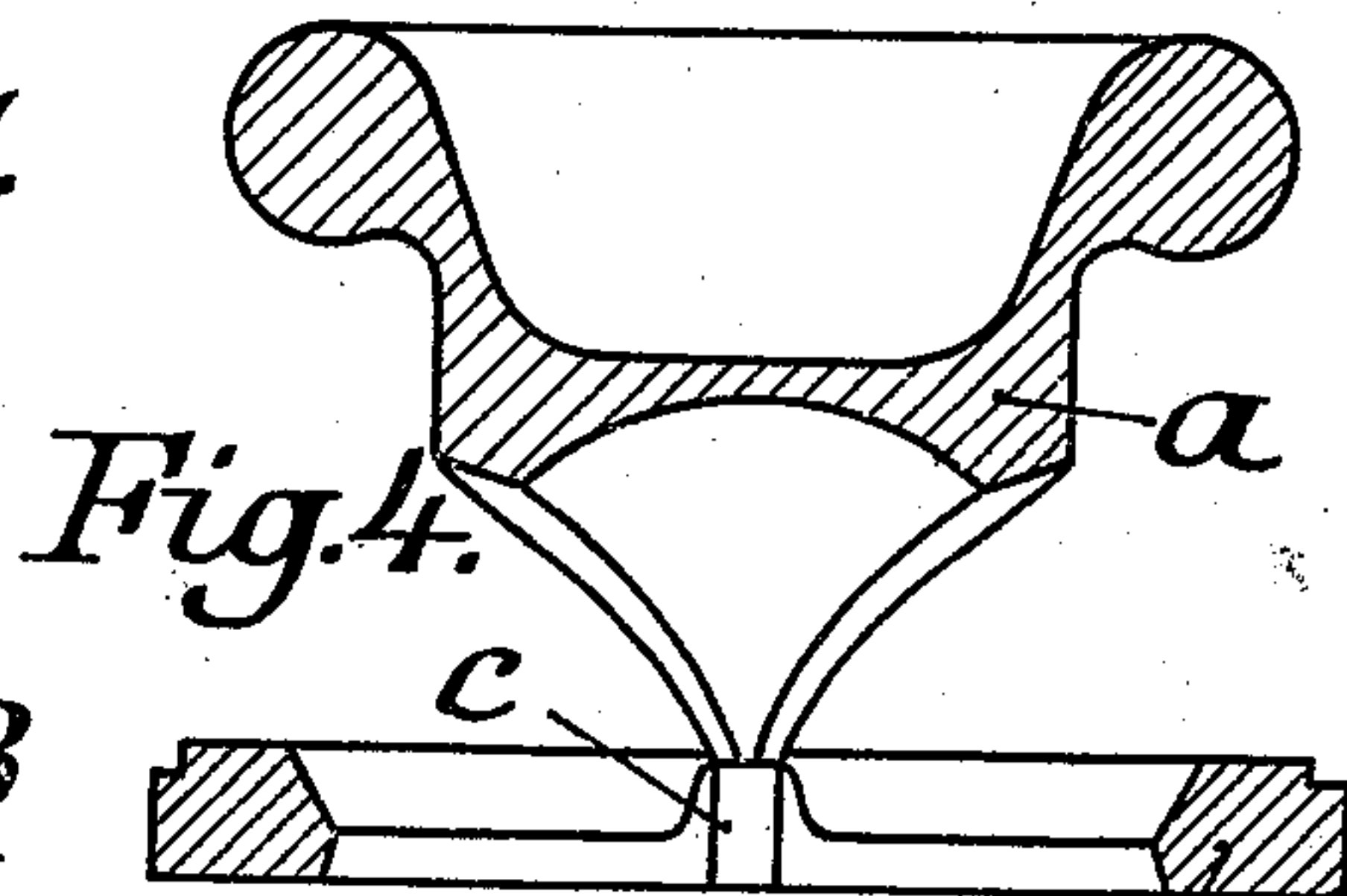
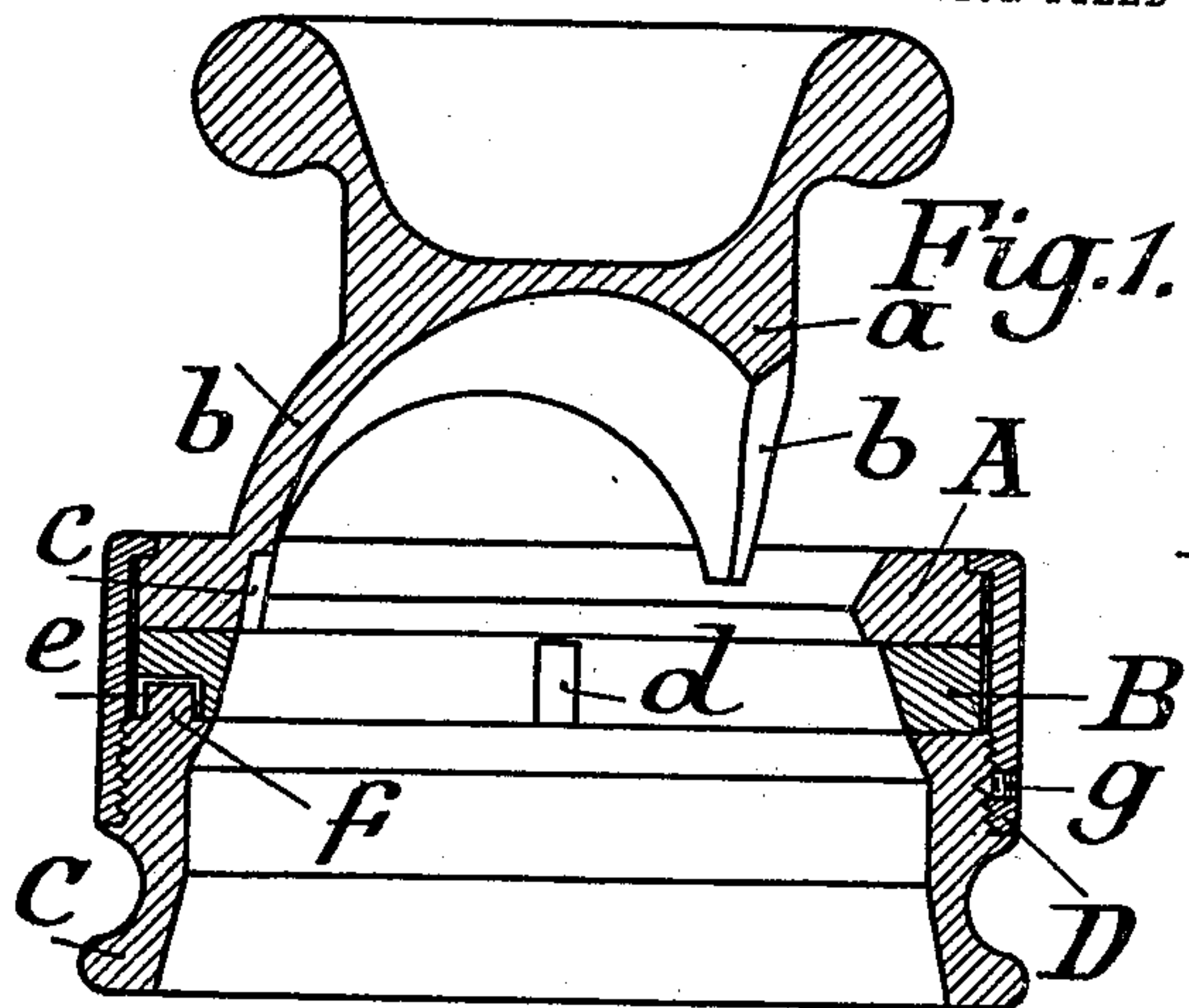


Fig. 5.

Fig. 2.

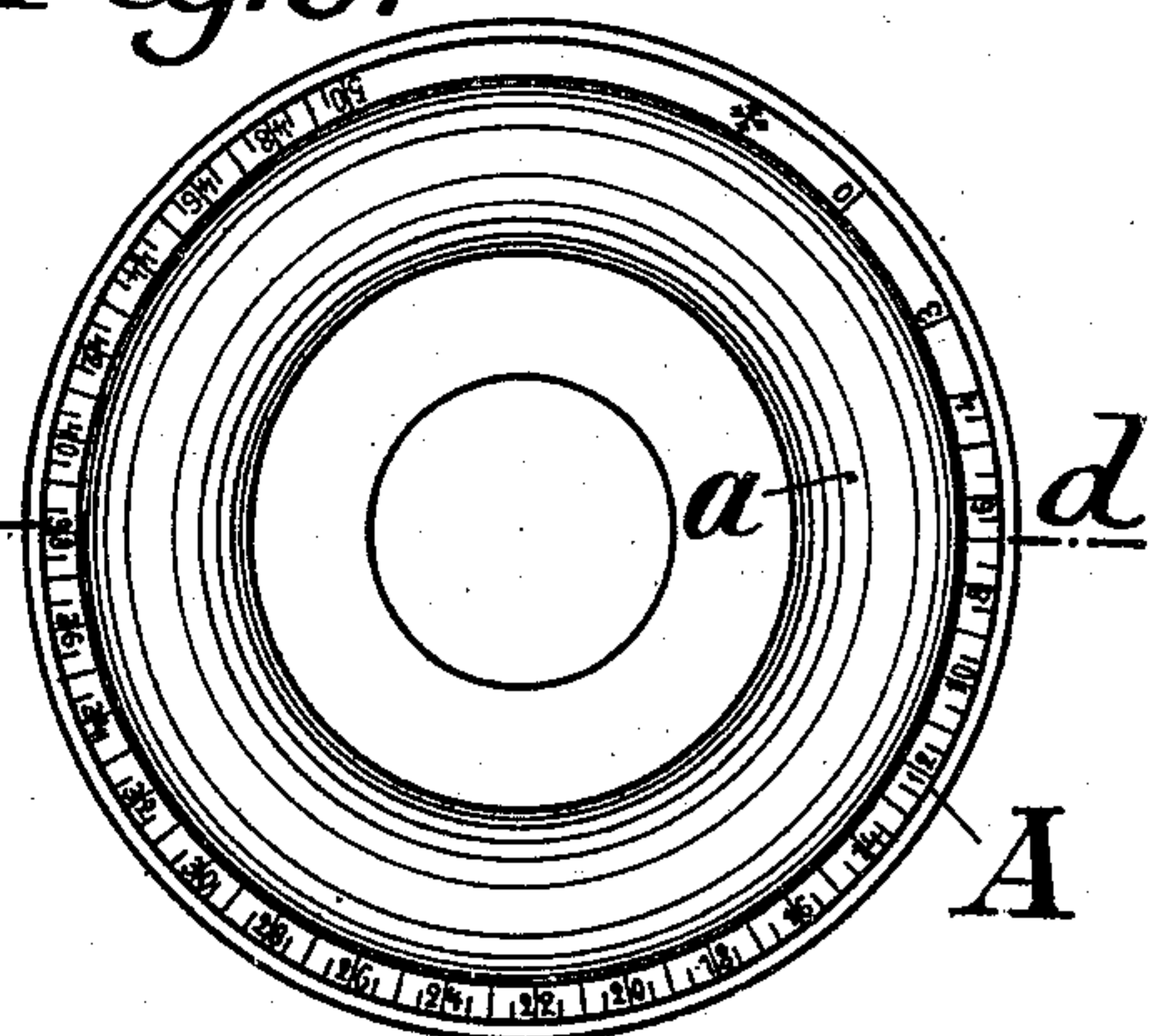
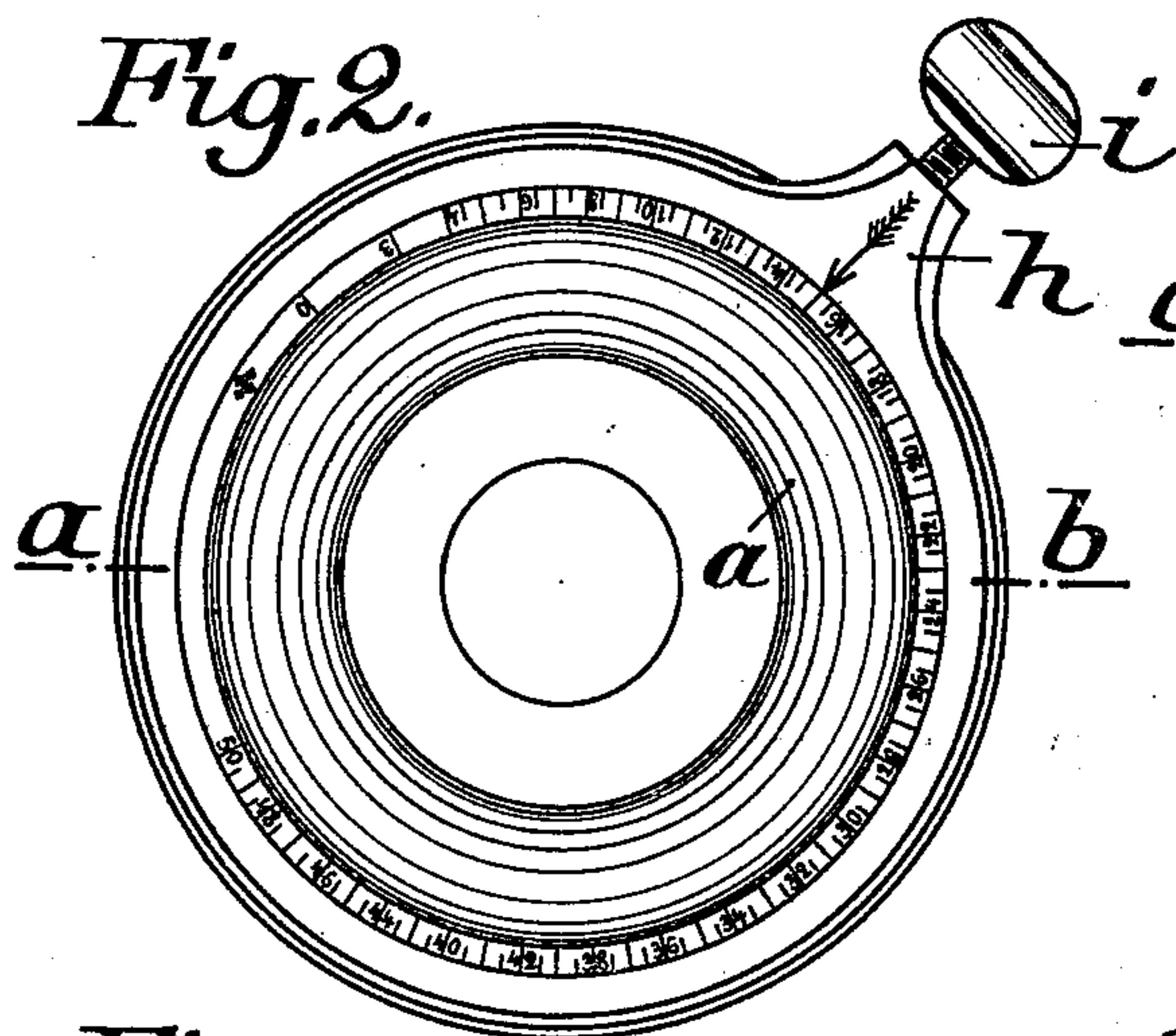


Fig. 6.

Fig. 3.

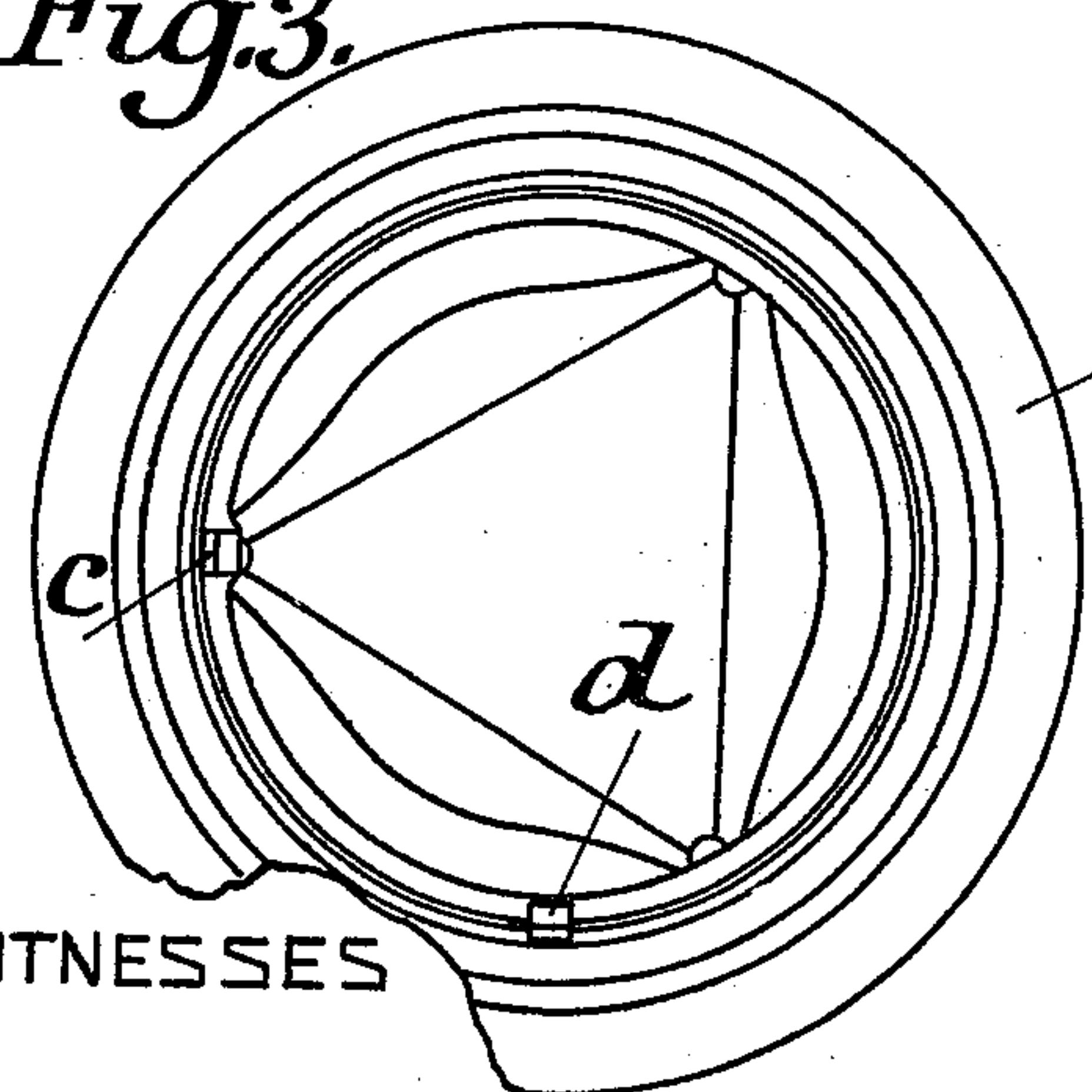
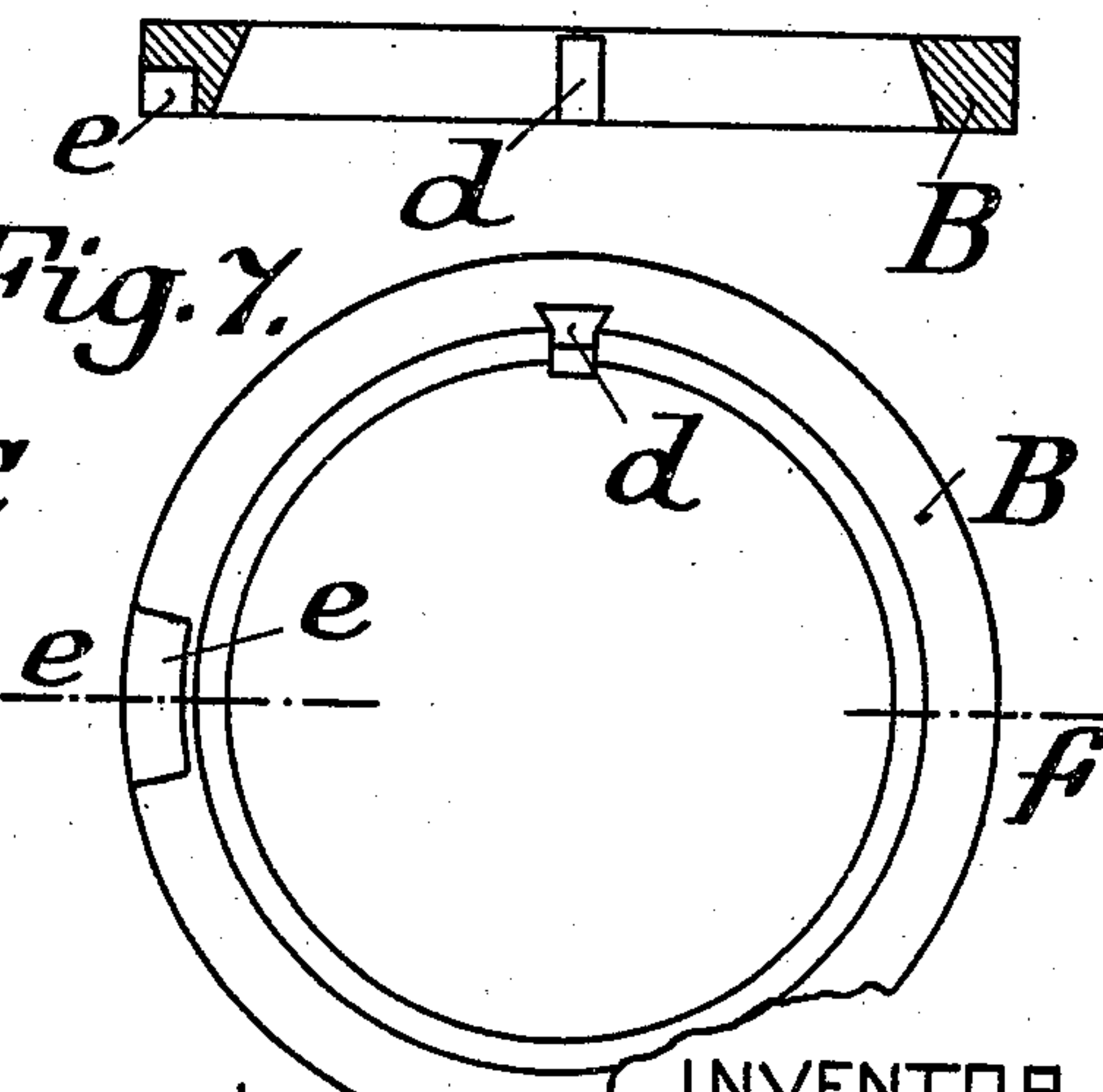


Fig. 7.



WITNESSES

*E. C. Wilderbrand*  
N. J. Anderson

INVENTOR  
*Leopold Beck*  
by *George Massie*  
ATTORNEYS

No. 817,616.

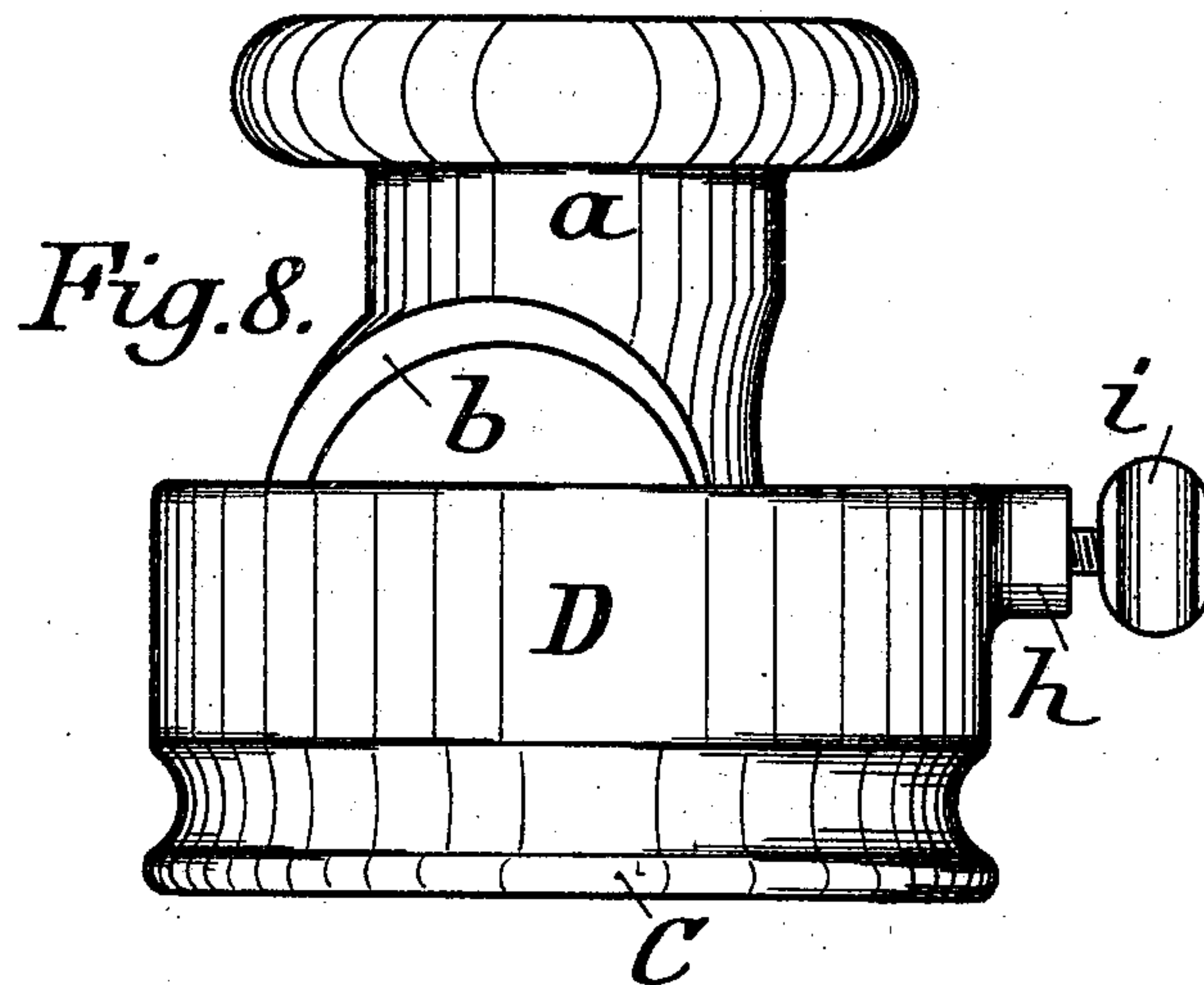
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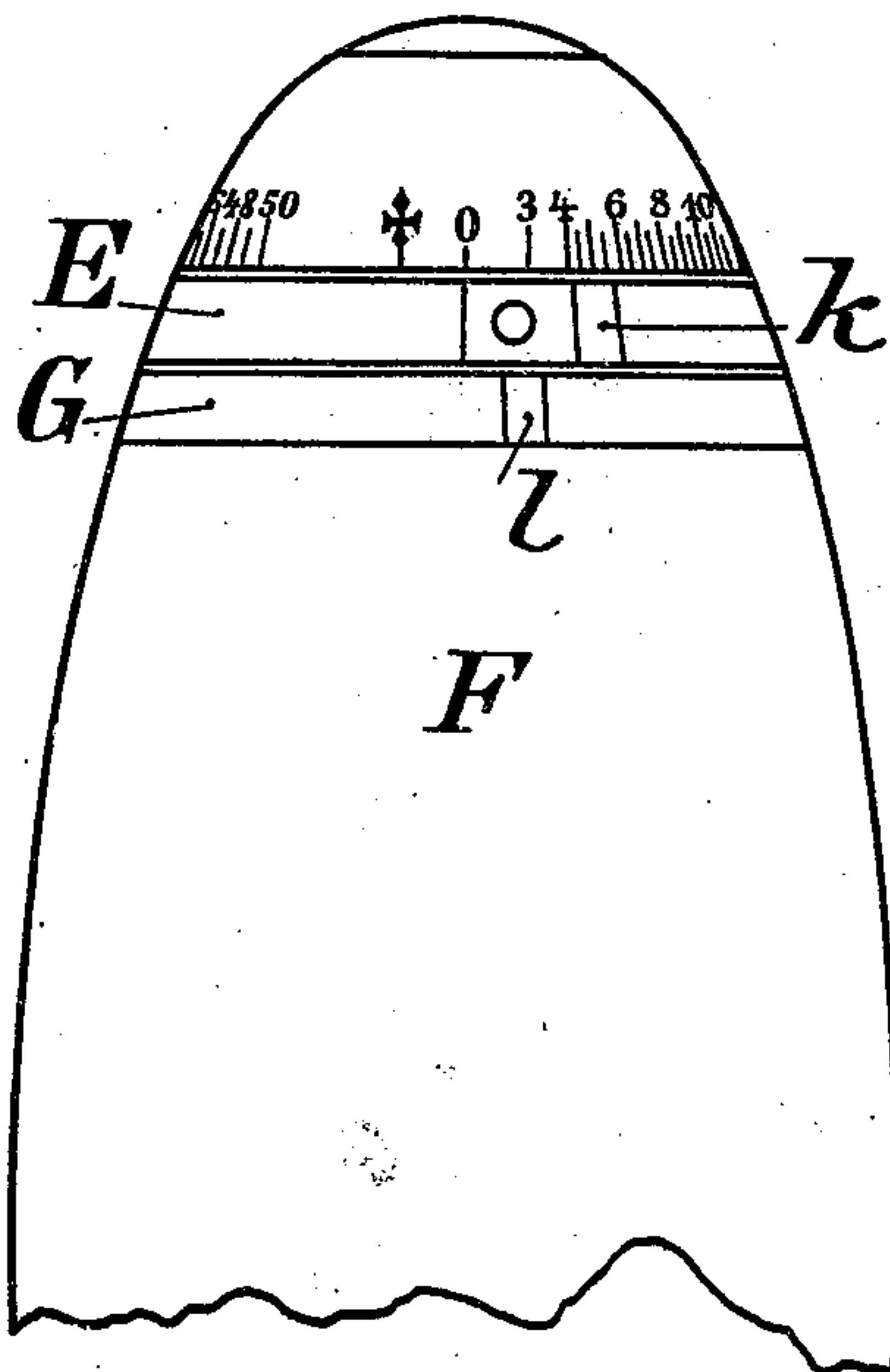
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3 SHEETS—SHEET 2.



*Fig. 9.*



WITNESSES

*E. O. Nieclebrand*  
*H. F. Anderson*

INVENTOR  
*Louis Beck*  
by *George M. Harris*  
ATTORNEYS

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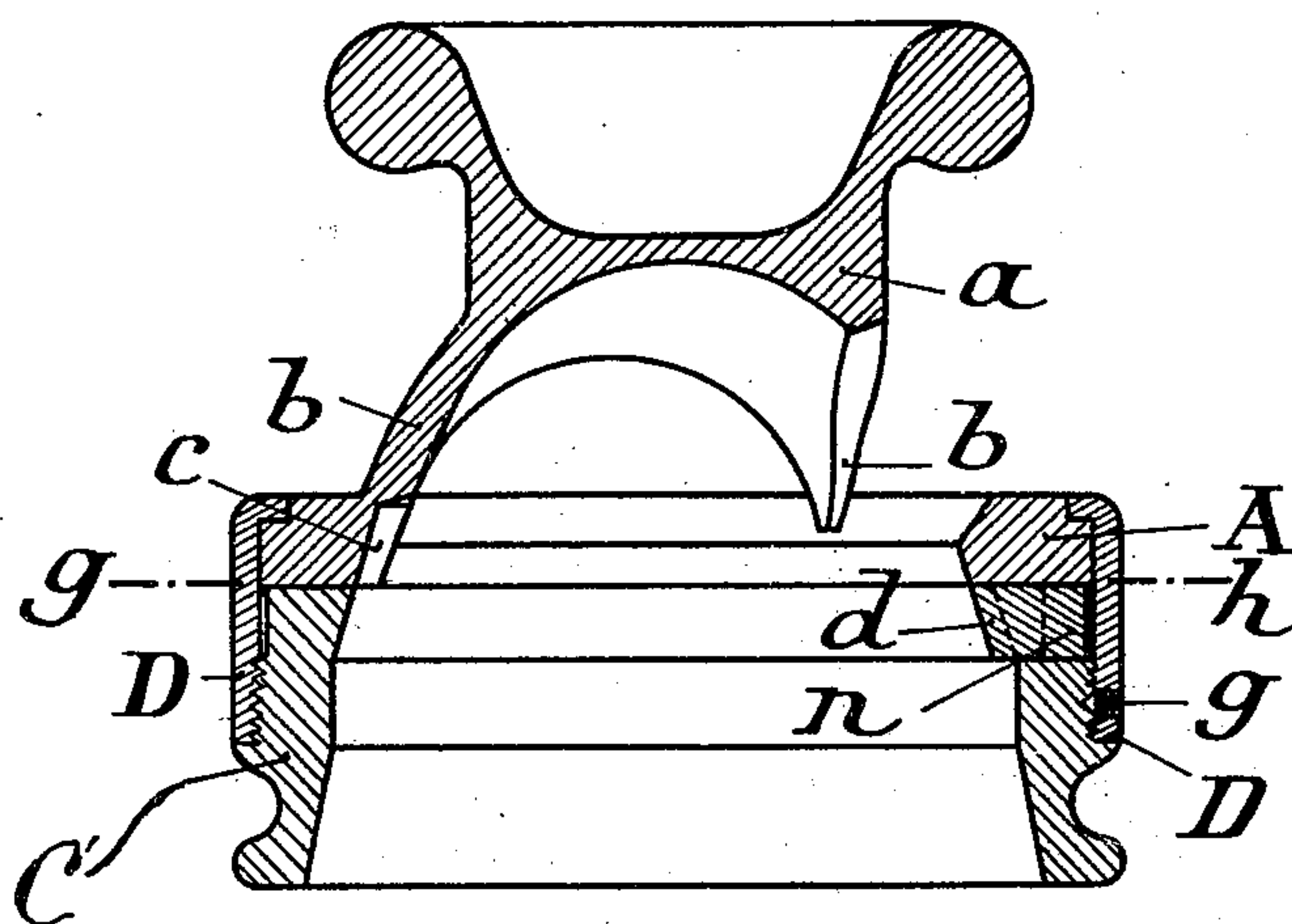
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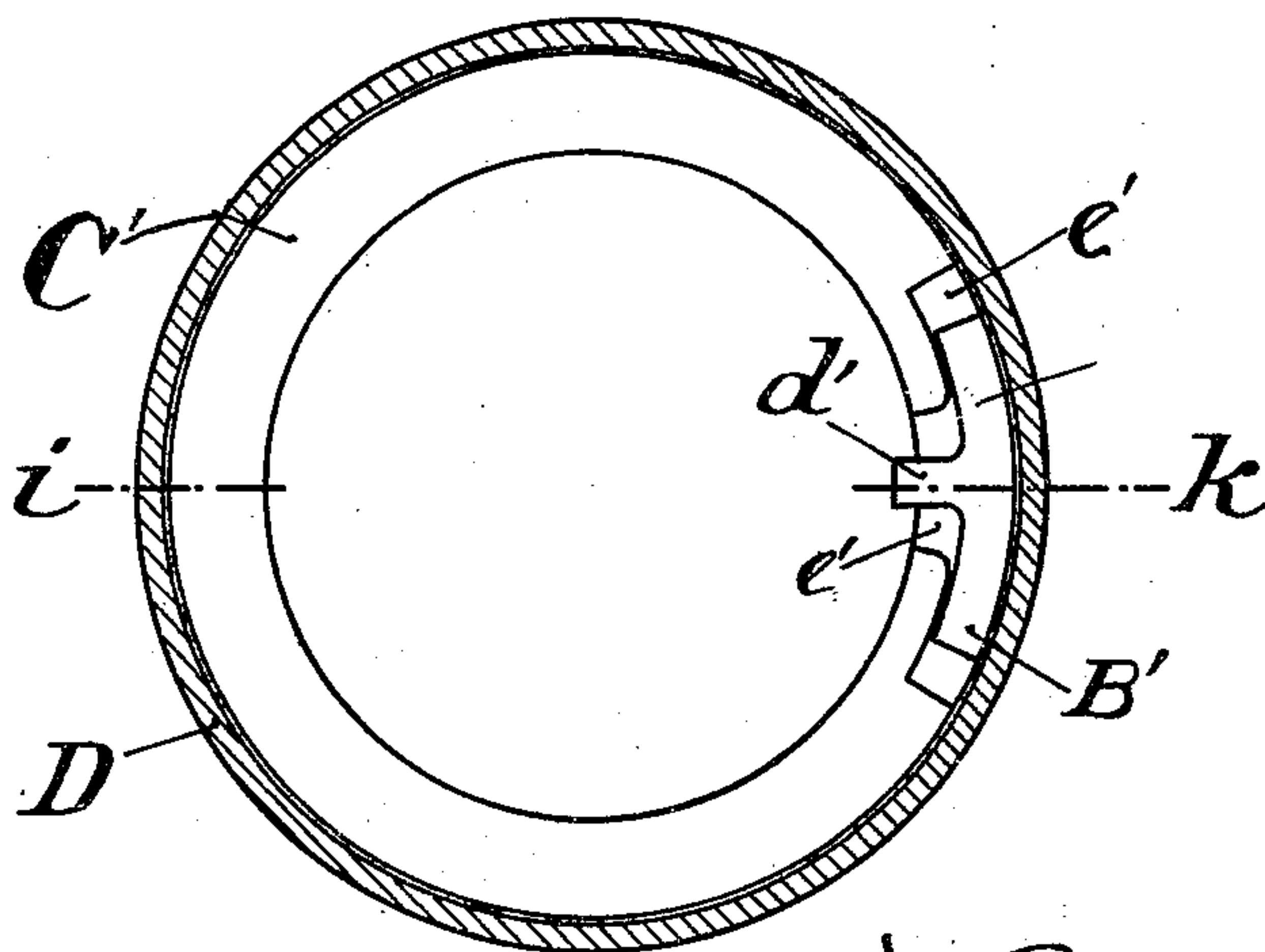
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3 SHEETS—SHEET 3.

*Fig. 10.*



*Fig. 11.*



WITNESSES

*E. O. Nidebrand*  
W. F. Anderson.

INVENTOR  
*Leopold Beck*  
by *Georgii Marsid*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

LEOPOLD BECK, OF SÖMMERDA, GERMANY.

AUTOMATIC SETTING-KEY FOR SETTING THE FIRING-CHARGE RINGS OF TIME-FUSES.

No. 817,616.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed January 23, 1905. Serial No. 242,418.

*To all whom it may concern:*

Be it known that I, LEOPOLD BECK, director, a subject of the German Emperor, residing at 11 Dreyseplatz, Sömmerda, Germany, have invented certain new and useful Improvements in Automatic Setting-Keys for Setting the Firing-Charge Rings of Time-Fuses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an automatic setting-key for setting the firing-charge rings of time-fuses, the essential feature of which consists in the provision of a ring situated between the other parts of the key, which after the coming in contact of the carrier-stud of the key with the stud of the fuse is shifted to the right or left to an extent equal to the width of the said two studs, and thus enables the setting-key to be moved in any desired direction on setting the fuse, thus effectually preventing any incorrect setting of the fuse caused by the turning of the key in the wrong direction, as has been liable to occur with the automatic setting-keys of known construction.

On the accompanying drawings, Figure 1 shows a vertical section through the setting-key on the line *a b*, Fig. 2. Fig. 2 shows a top plan view; Fig. 3, an under side plan view; Fig. 4, a vertical section through the ring A on line *c d* of Fig. 5; Fig. 5, a top plan view of the ring A; Fig. 6, a vertical section through the ring B on line *e f*, Fig. 7; Fig. 7, an under side plan view of the ring B; Fig. 8, an elevation of the complete setting-key; Fig. 9, an elevation of the fuse with the projectile-head. Fig. 10 is a vertical section of a modified construction of the key, and Fig. 11 is a horizontal section on the line *g h* of Fig. 10.

The setting-key consists of four rings arranged concentrically one above the other, of which the setting-ring A, Figs. 1, 4, and 10, is provided with a handle *a*. At the upper edge the ring is recessed for engagement with the connecting-ring D. On its upper surface is situated a scale, Figs. 2 and 5, which corresponds with the divisions of the corresponding igniting charge. The inner periphery of the ring is formed with two conical surfaces.

The handle *a* is connected to the ring A by means of arms *b*. The openings between the arms and through the lower cone-surface of the ring A expose to a great extent the di-

visions of the igniting charge and serve for the purpose of a direct visual control of the setting of the fuse when the setting-key is fitted on. The handle terminates at the top in an outwardly-extending circular-bead for facilitating the handling thereof. The inner periphery of the ring A is provided at the one arm *b* with a recess *c* for engagement with the stud *k* of the igniting-charge ring E, as shown at Figs. 1, 4, and 9.

The middle ring B, Figs. 1, 6, and 7, is formed with a cylindrical outer periphery, while the inner periphery is formed conical, corresponding to the form of the fuse-head. The inner surface carries a stud *d*, Figs. 1, 6, and 7, and at right angles to this a slot *e*, the length of which corresponds with the total width of the stud *f*, the stud *d* of the middle ring B, and the stud *k* of the igniting-charge ring E. It will be obvious that the slot *e* and stud *f* may be transposed without alteration in proportions or function.

The under surface of the middle ring B rests upon the guide-ring C, Figs. 1 and 3, the lower part of the inner periphery of which is formed to fit the head *F* of the projectile, so as to afford a reliable guide to the key. On the upper surface is a stop-stud *f*, Fig. 1, which engages with the recess *e* of the middle ring B. The ring C is provided with an external screw-thread for connection with the ring D, and below this it is formed with a necking for reducing the weight.

The connecting-ring D has its lower end screwed to the guide-ring C and engages, by means of an inner shoulder, with the recess of the ring A, by which means all four rings are secured together. A setting-screw *g* is provided for preventing an unintentional loosening of the two rings after assembling, as shown at Figs. 1 and 10.

On the outer surface of the connecting-ring D is provided a projection *h*, Fig. 2, in which is formed a radial screw-threaded hole for the reception of the setting-screw *i*, for fixing the ring A after the adjustment of the setting-key. On the upper surface of the said projection is marked an arrow, Fig. 2, to which the ordered division-line of the scale of ring A is adjusted. If now the rings A and D are prevented from shifting relatively to each other by screwing up the setting-screw *i* and the setting-key is so mounted on the fuse that the notch *c* of the ring A fits over the stud *k* of the igniting-charge ring E, then on turning the setting-key the ring E will be carried



round with it until the stud  $d$  of the middle ring bears against the stud  $l$  of the fuse-plate G. At this moment the setting of the fuse is not yet completed, because there is wanting in the turning motion of the lower igniting-charge ring an amount equal to the width of the two studs  $d$  and  $l$  before the said division-line can be made to agree with the mark on the fuse-plate G. Owing to the arrangement of the elongated recess or slot  $e$  in the middle ring B, the ring A can be turned further to the extent of the said recess, which, as above stated, is equal to the width of the two studs, until the stud  $f$  stops the further motion, while at the same time the desired division-line is brought to correspond with the setting-mark of the fuse-plate.

It will be seen from the above description of the arrangement of the setting-key that in consequence of the movability of the ring B to the extent of the width of both studs  $d$  and  $l$  beyond the point of contact thereof the setting-key will with certainty effect a correct setting of the fuse, whether it be turned to the right or to the left.

Figs. 10 and 11 show a modification of the construction of the setting-key in which the ring C of the first-described construction is represented by the ring C'. This ring C' contains in its upper edge and at the height of the conical inner periphery a double recess  $e'$ , Fig. 11, having the function of the slot  $e$ , previously described, and in which is placed a concentrically-movable slide B', which takes the place of the middle ring B and which is covered by the ring A. This slide carries the extended stud  $d'$ , which forms the double function of the studs  $d$  and  $f$ . The other parts of the setting-ring and the mode of operating therewith are the same as above described.

Having thus described the nature of this invention and the best means I know of carrying the same into practical effect, I claim—

1. A key for setting the firing-charge ring of time-fuses, comprising a setting member provided with means for engaging the firing-charge ring and rotatable in either direction, and means for registering a predetermined charge value, in combination with a second member provided with means for positively stopping the rotation of the first member in either direction when the position of the firing-charge ring is brought to correspond with the predetermined value.

2. A key for setting the firing-charge ring of time-fuses, comprising a setting member provided with means for engaging the firing-charge ring, in combination with a second member provided with means for engaging a fixed portion of the projectile, and movable concentrically relative to the setting member to an extent equal to the total width of the engaging means between the second member and the projectile.

3. A key for setting the firing-charge ring of time-fuses, comprising a setting member provided with means for engaging the firing-charge ring and rotatable in either direction, in combination with a second member provided with a stud for engaging a stud carried by a fixed portion of the projectile, and movable concentrically relative to the setting member to an extent equal to the total width of the two studs.

4. A key for setting the firing-charge ring of time-fuses, comprising a setting member provided with means for engaging the firing-charge ring, in combination with a second member provided with a stud for engaging a stud carried by a fixed portion of the projectile, and movable in either direction concentrically relative to the setting member to an extent equal to the total width of the two studs.

5. A key for setting the firing-charge ring of time-fuses, comprising a setting-ring provided with a recess for engaging a stud carried by the firing-charge ring, in combination with a second member provided with a stud for engaging a stud carried by a fixed portion of the projectile, and movable concentrically relative to the setting member in either direction to an extent equal to the total width of the two studs carried by the second member and the projectile.

6. A key for setting the firing-charge ring of time-fuses, comprising a setting member provided with means for engaging the firing-charge ring, in combination with a second member provided with means for engaging a fixed portion of the projectile, the setting member and the second member connected by a slot and stud, the slot being of an extent equal to the total width of its stud and the engaging means between the second member and the projectile.

7. A key for setting the firing-charge ring of time-fuses, comprising a setting-ring provided with a recess for engaging a stud carried by the firing-charge ring, in combination with a second member provided with a stud for engaging another stud carried by a fixed portion of the projectile, the setting member and the second member connected for relative concentric movement by a slot and stud, the slot being of an extent equal to the aggregate width of its stud and the two studs carried by the second member and the projectile.

8. A key for setting the firing-charge ring of time-fuses, comprising a setting member provided with means for engaging the firing-charge ring, a second member movable concentrically of the setting member and provided with means for engaging a fixed portion of the projectile, a third member in engagement with the second member by means permitting relative concentric movement to an extent equal to the total width of the engaging means between the second member and the projectile.



and the projectile, and means for adjustably securing the setting member and the third member in fixed relation.

5 9. A key for setting the firing-charge ring of time-fuses, comprising a setting member provided with means for engaging the firing-charge ring, a second member movable concentrically of the setting member and provided with a stud for engaging another stud  
10 carried by a fixed portion of the projectile, a third member in engagement with the second member by means permitting of relative concentric movement in either direction to an extent equal to the total width of the two  
15 studs carried by the second member and the projectile, and means for adjustably securing the setting member and the third member in fixed relation.

20 10. A key for setting the firing-charge ring of time-fuses, comprising a setting member provided with a recess for engaging a stud carried by the firing-charge ring, a second member freely movable concentrically of the setting member and provided with a stud for  
25 engaging another stud carried by a fixed portion of the projectile, a third member in engagement with the second member by means of a slot and stud, the slot being of an extent equal to the aggregate width of its stud and

the two studs carried by the second member 30 and the projectile, and means for adjustably securing the setting member and the third member in fixed relation.

11. A key for setting the firing-charge ring of time-fuses, comprising a setting-ring pro- 35 vided with a recess for engaging a stud carried by the firing-charge ring, a second member freely movable concentrically of the setting-ring and provided with a stud for engaging another stud carried by a fixed portion 40 of the projectile, another ring connected with the second member for concentric relative movement in either direction by means of an elongated slot and stud, the slot being of an extent equal to the aggregate width of its 45 stud and the two studs carried by the second member and the projectile, a scale carried by the setting member corresponding to that carried by the projectile and means for ad- 50 justably securing the setting member and the third member in fixed relation.

In testimony whereof I have affixed my signature to this specification in the presence of two witnesses.

LEOPOLD BECK.

Witnesses:

BERNHARD SCHMIED,  
ROBERT BALZER.