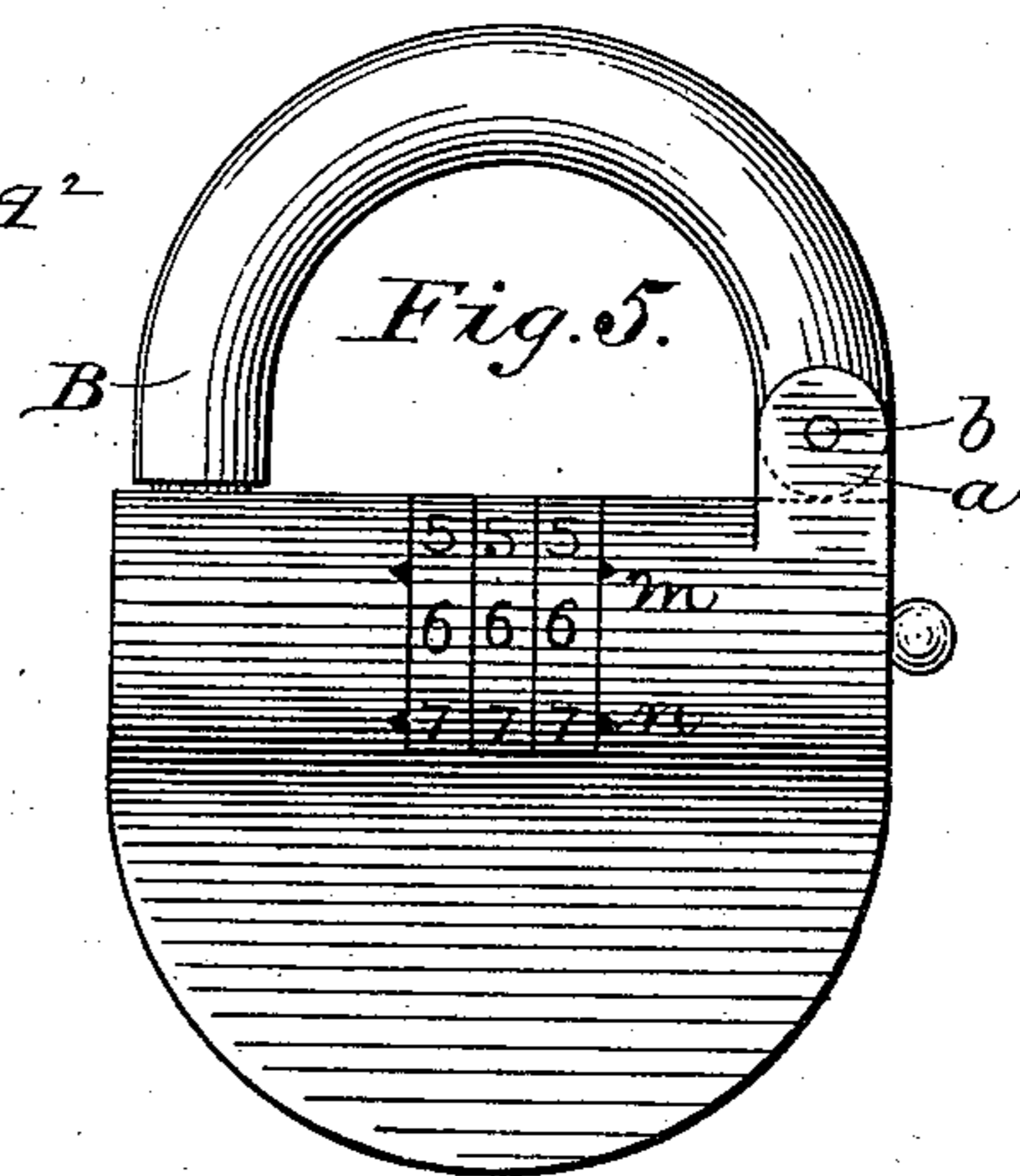
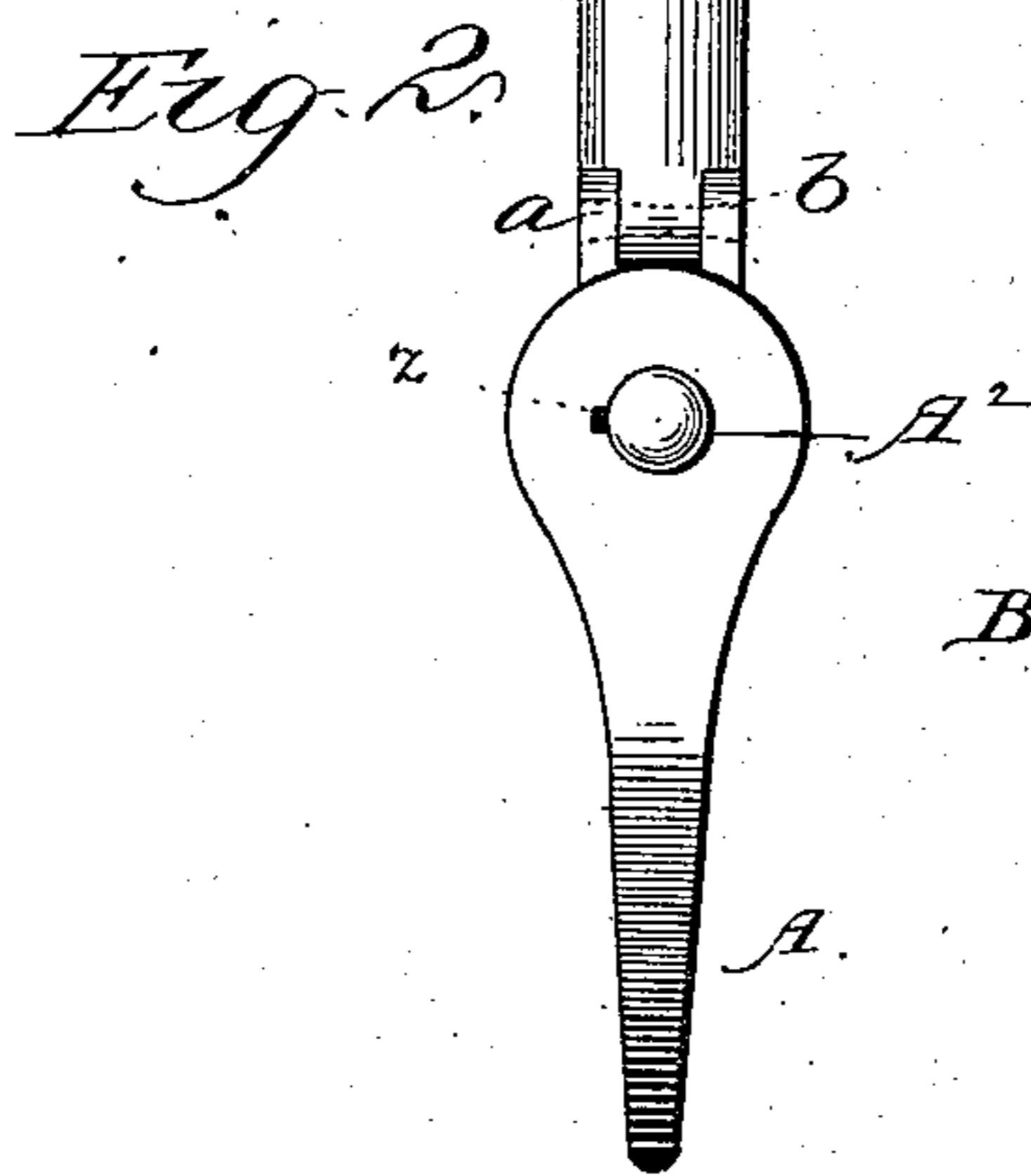
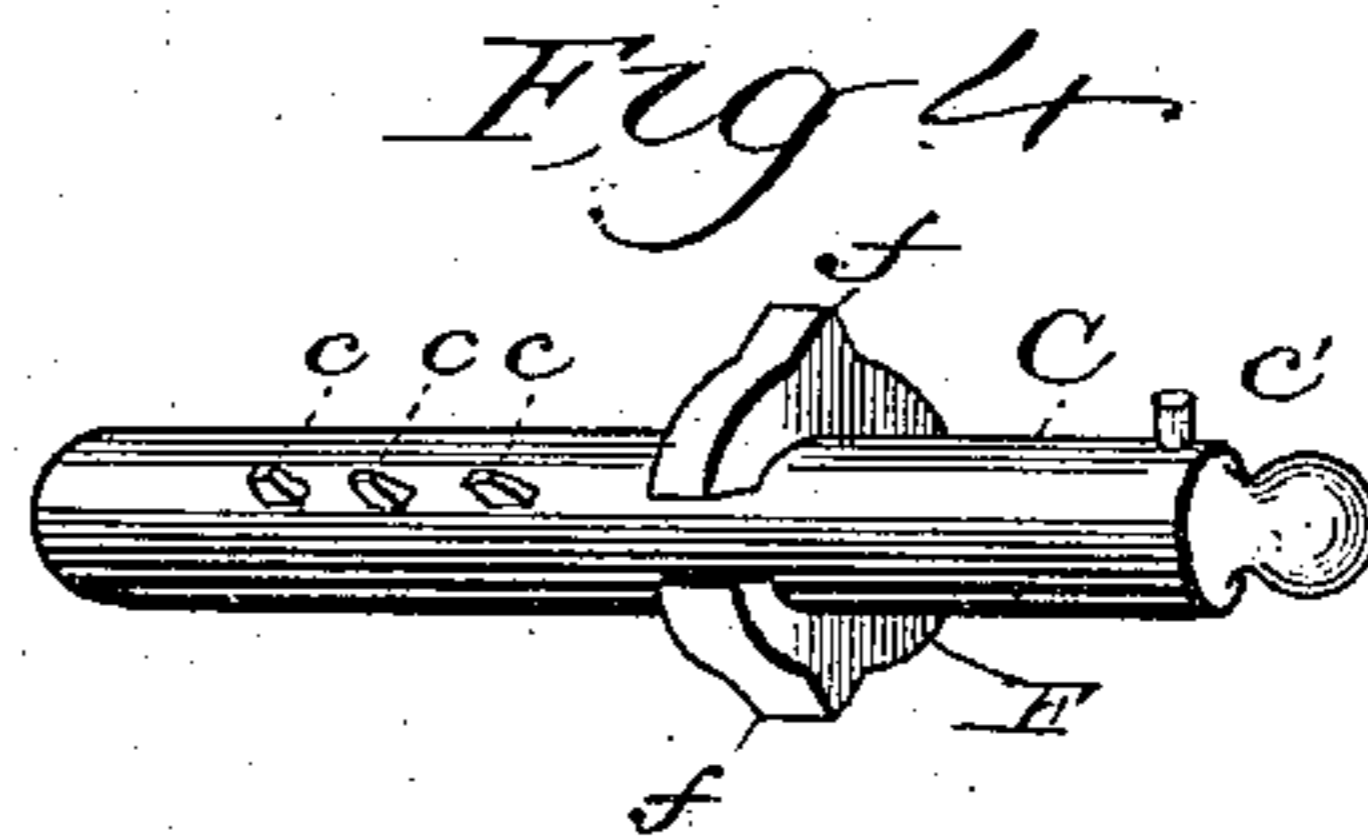
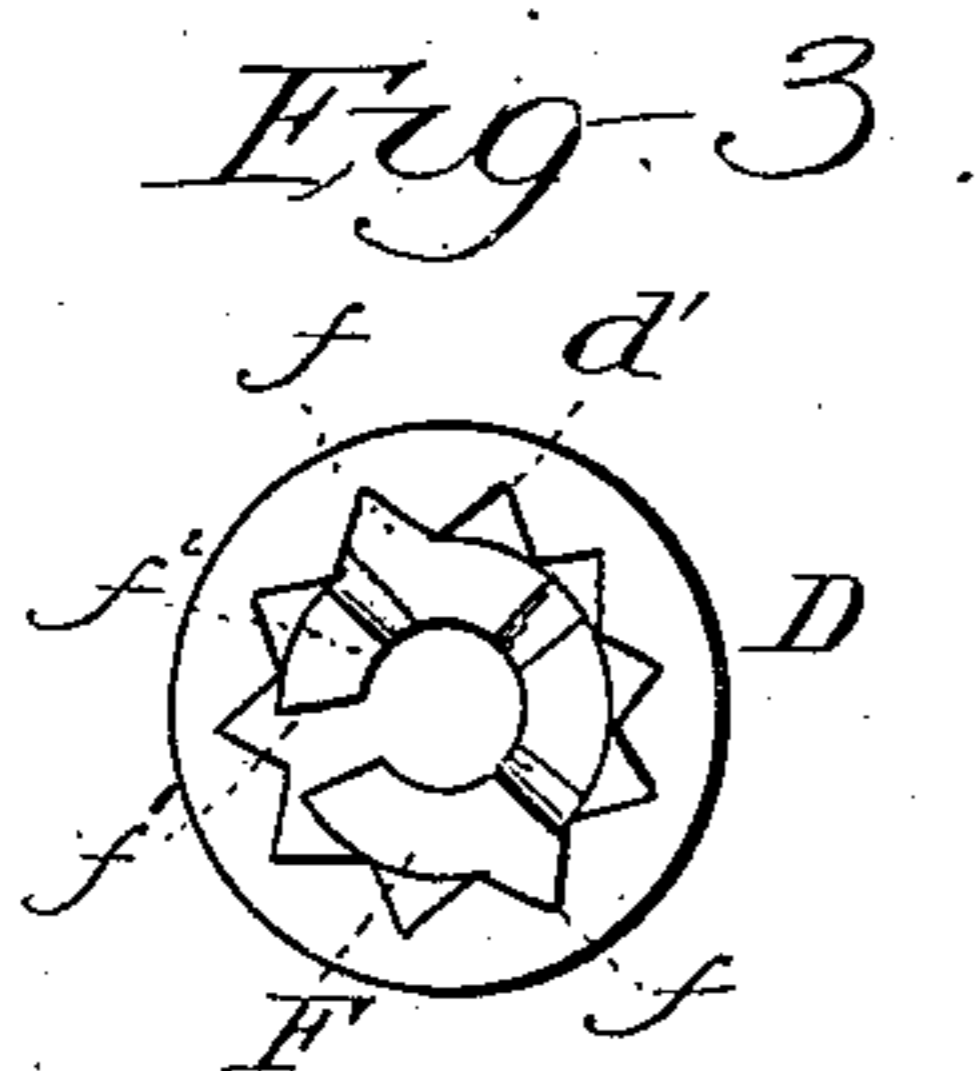
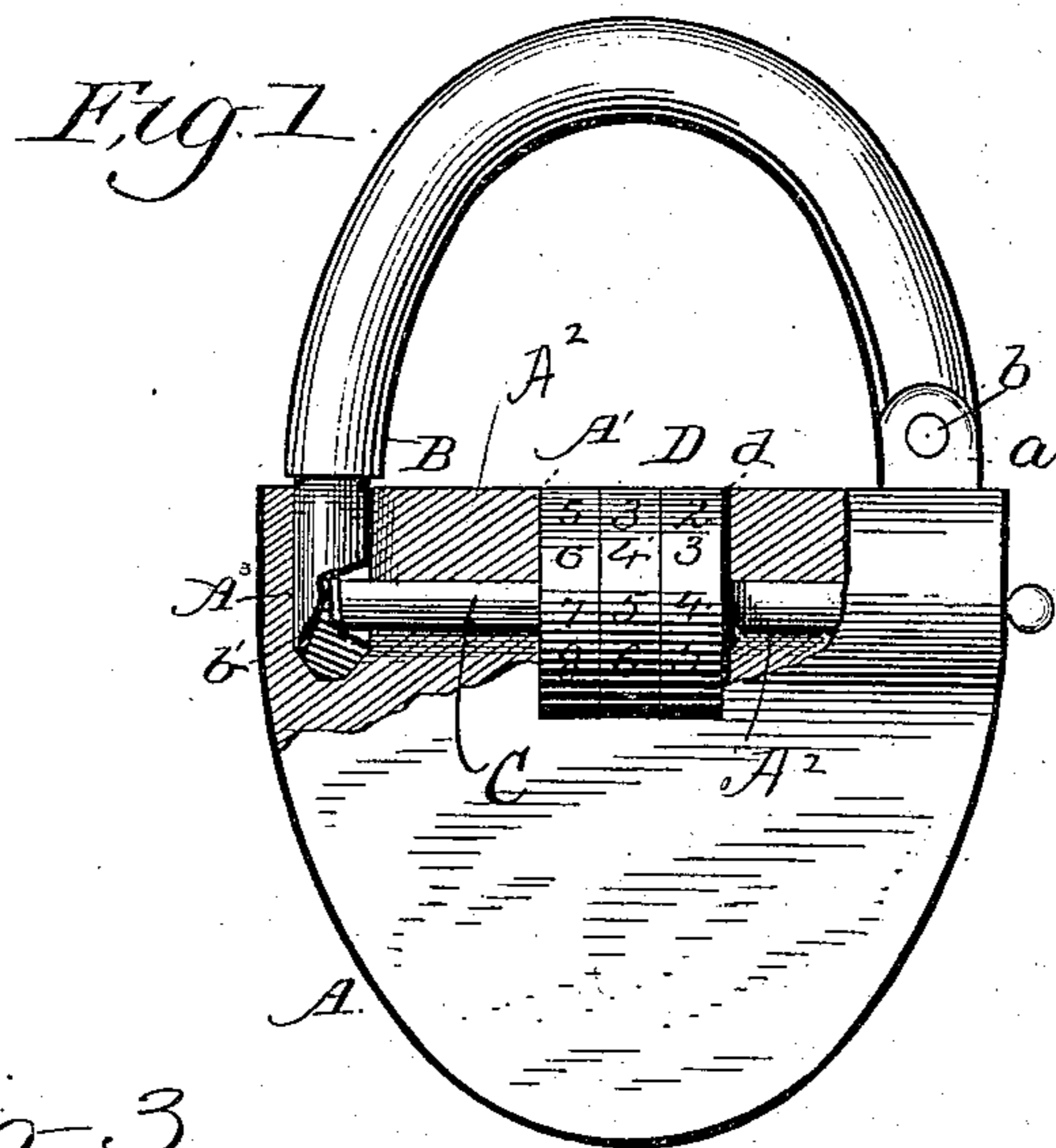


(No Model.)

R. H. ROOT.  
PERMUTATION LOCK.

No. 345,323.

Patented July 13, 1886.



WITNESSES:

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BY

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# UNITED STATES PATENT OFFICE.

RUSSELL H. ROOT, OF SOUTH ORANGE, NEW JERSEY.

## PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 345,323, dated July 13, 1886.

Application filed September 19, 1885. Serial No. 177,577. (No model.)

*To all whom it may concern:*

Be it known that I, RUSSELL H. ROOT, a citizen of the United States, residing at South Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to permutation-locks; and the novelty consists in the construction, arrangement, and adaptation of parts, as will be more fully hereinafter set forth, and specifically pointed out in the claim.

I will now describe the invention as applied to a padlock; but it will be understood that the essential features of the same may serve with equal success in other relations and lock combinations.

The invention is illustrated in the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation of the device, partly in section, embodying my invention. Fig. 2 is an end elevation of the body and shackle. Fig. 3 is a detail plan view of one pair of permutation-rings; and Fig. 4 is a detail perspective of one of the slotted rings and the bolt. Fig. 5 is a face view.

Referring to the drawings, A designates the body of the padlock, having a recess, A', to receive the permutation-rings, a barrel, A<sup>2</sup>, to receive the locking-bolt, and a keeper-recess, A<sup>3</sup>, intersecting the barrel A<sup>2</sup>, and adapted to receive the free end of the shackle B. This shackle is pivoted at b to the perforated ears a of the body, and it has a recess, b', near its free end adapted to receive the inner end of the bolt.

C designates the bolt. It is provided with three equidistant teeth, c c c, arranged in a row parallel with the axis of the bolt. Near the outer end is a tooth or stud, c', which is arranged out of line with the teeth c, for purposes which will presently appear.

D designates the outer rings, having their peripheral faces divided into ten equal spaces, designated by countersunk figures d, as 1, 2, 3, &c., to zero. The inner peripheral face is provided with a corresponding notch, d', ar-

anged in five opposite pairs. These rings are of such width as to neatly fill the recess A' of the body, and when in operation they are concentric with the locking-bolt C.

F designates the open rings, each having in this case two opposite points or teeth, f, adapted to engage two of the notches d' of rings D, and a slot, f', and a central bore, f<sup>2</sup>, which receives the bolt. The rings F fit neatly within the rings D, and when in position the slot f' lies opposite one of the peripheral signs. A straight longitudinal slot, z, is arranged along the barrel A<sup>2</sup> between the recess A' and its mouth.

To bring the parts into operative position, arrange the rings D to bring the numbers of the desired combination in a line and with the slots f' in the rings F opposite the combination in each ring. Then place the combination devices in the recess A' and insert the bolt C. The slots f' being in a row, the several teeth c will pass through them until the tooth c' bears against the end of the body. The desired combination having been placed opposite the point marked m on the face of the body before the bolt was inserted, it follows that the tooth c' is the same distance from the slot z as the combination figures are from the determining-point n upon the face of the body. Bringing the combination figures down to the point n therefore takes the pin c' opposite the slot z, and the bolt may be forced into engagement with the shackle. The rings being turned in either direction throws the combination off, and the bolt can only be withdrawn by bringing the combination again to the point n. As soon as the combination is again brought to that point the bolt may be withdrawn from the shackle to unlock the device; but the bolt will withdraw no further than just sufficient to accomplish that end until the combination is brought opposite another point, m, when the bolt may be withdrawn and the entire lock taken to pieces.

Not only may the combination be changed within the range of the three sets of figures on the three rings, D, but by multiplying open rings F, each changed with relation to its ring, the combination may be changed to an endless extent.

The lock is simple, efficient, and may be made so as to sell for a nominal sum.

I fill the depressions of the figures with a luminous paste which will absorb enough light  
5 to make the figures recognizable in the dark.

I attach importance to the construction of the two rings D F and in their adaptation as described.

What I claim as new is—

10 The combination of a body having barrel A<sup>2</sup>, with slot z, the rings D, and slotted rings

F, fitted therein, as described, and a bolt, C, having teeth c, arranged in a line adapted to engage said slotted rings, and a tooth, c', arranged out of such line and adapted to en- 15  
gage said slot z, as set forth.

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

RUSSELL H. ROOT.

Witnesses:

COLIN MELVILLE,  
B. KELLY.