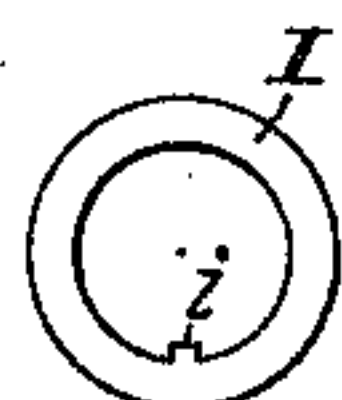
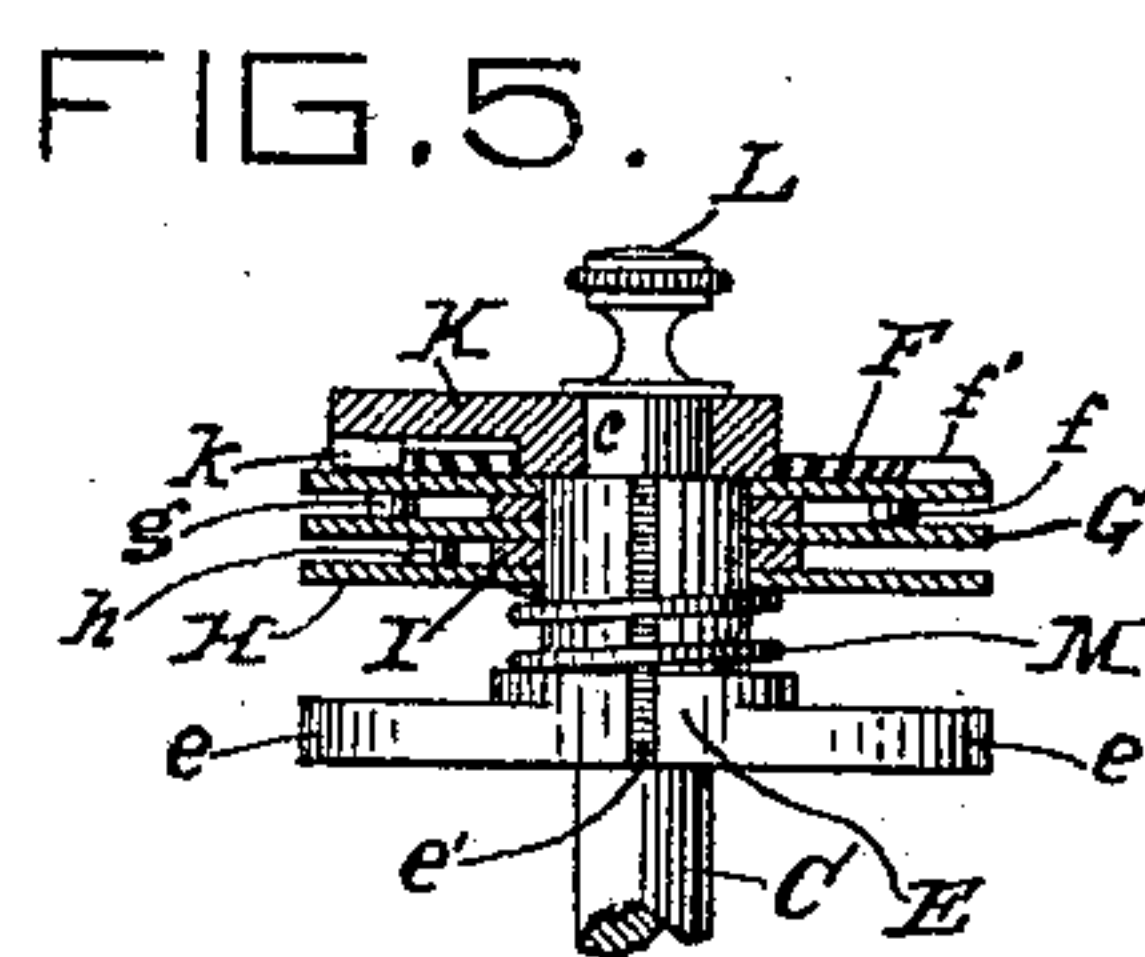
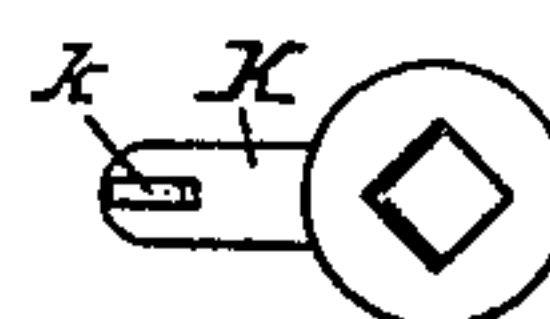
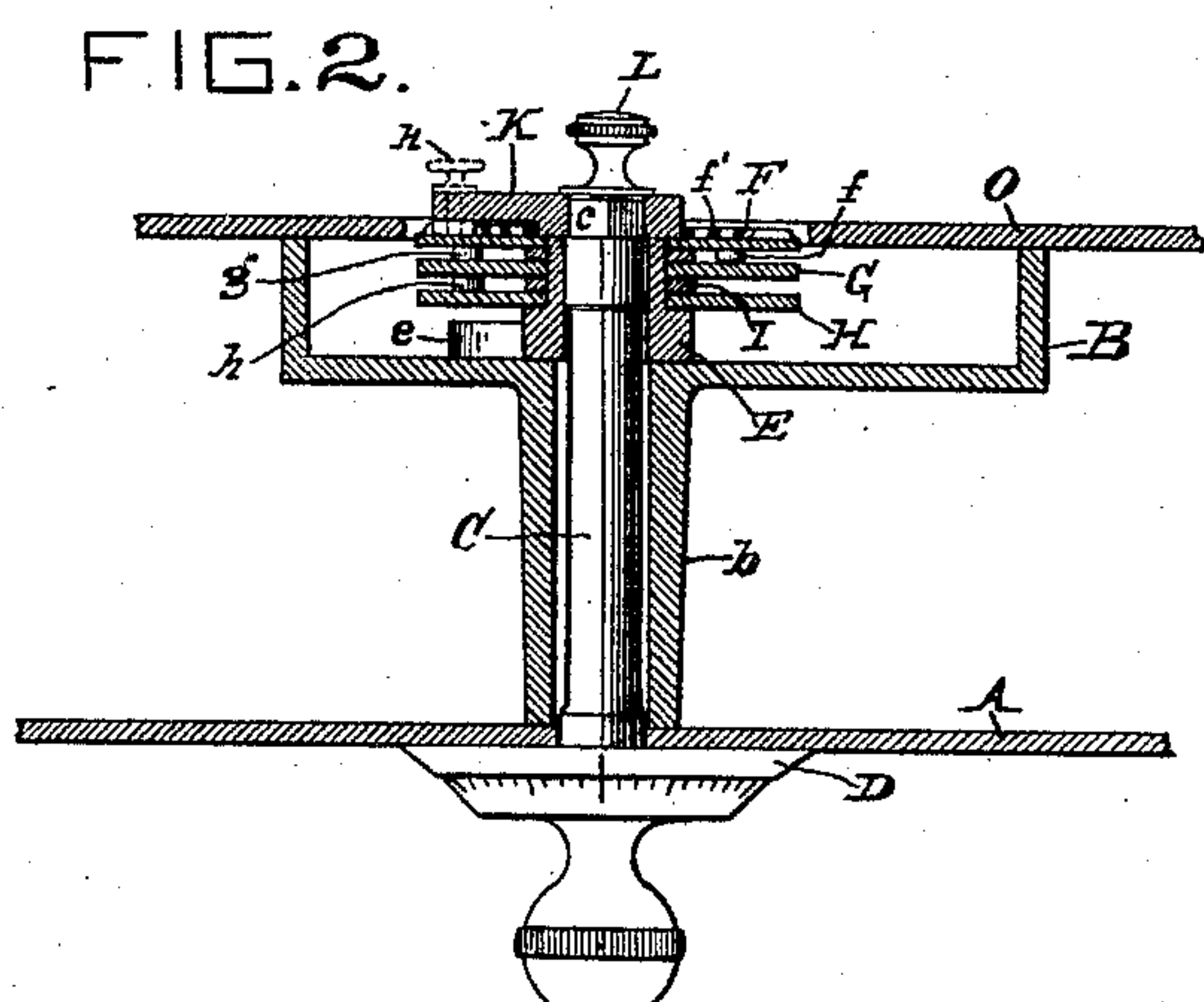
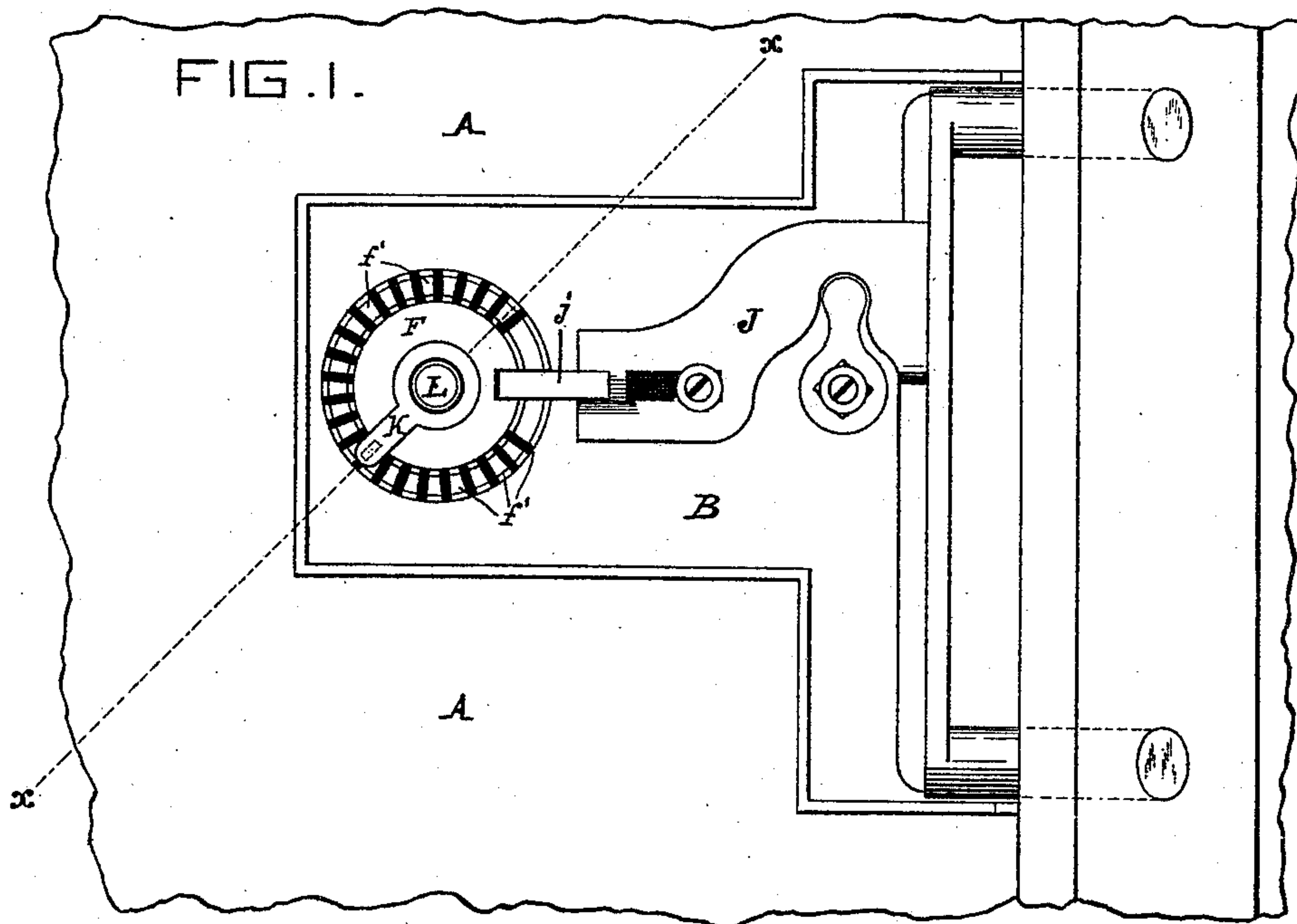


(Model.)

W. B. FOLGER.
PERMUTATION LOCK.

No. 444,210.

Patented Jan. 6, 1891.



Witnesses
Frank L. Millward
Davis

Inventor
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UNITED STATES PATENT OFFICE.

WILLIAM B. FOLGER, OF CINCINNATI, OHIO.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 444,210, dated January 6, 1891.

Application filed March 24, 1890. Serial No. 345,061. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM B. FOLGER, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification.

The object of my invention is to provide a cheap reliable permutation-lock for safes, cash-drawers, &c., the combinations of which may be readily changed from one series of letters to another by the user without the aid of a skilled artisan.

The invention will be first fully described in connection with the accompanying drawings, and will then be particularly referred to, and pointed out in the claims.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the various views, Figure 1 is an inside elevation of a safe-door, the inner plate being removed to expose one of my improved locks with which the door is provided. Fig. 2 is a sectional view of the same, taken through the line $x x$ of Fig. 1. Fig. 3 is an inside plan view of the radial arm which couples the arbor with the tumblers. Fig. 4 is a plan view of the rings or washers which separate the tumblers. Fig. 5 is an axial section of a modified form.

A represents the front plate of a fire-proof safe door, and B the lock-case, which is secured to the inside of the door-plate and has its supporting-post b perforated to receive the lock-spindle C in the usual manner.

The lock-arbor has its front bearing in the door-plate A and the dial D, and its rear bearing in the piece E, which is secured upon the inside of the lock-case by screws which pass through its lugs e and are tapped into the back of the lock-case. The part of the spindle which passes through the post b is formed smaller than the bearings at each end to reduce friction and the cost of fitting.

The tubular piece E, which furnishes the bearing for the inner end of the arbor or spindle, is turned off upon the outside to furnish the journal-bearing for the tumblers F G H of the lock. These tumblers are separated from each other by the rings I, Fig. 4, which have inwardly-projecting teeth i , which enter a

groove e' in the piece E to prevent the rings from turning with the tumblers. Each of the tumblers is notched in the usual manner to receive the stump j of the bolt-bar J, and they are provided with tappets $f g h$, which are set on each tumbler at different distances from the stump-notch. The tumbler F is provided with radially-arranged teeth f' upon its inner face.

K is a radial arm, which has an angular opening in its hub to fit over the angular end c of the arbor C, and is held in place by a screw L, which is tapped into the end of the arbor C. The arm K has projecting from its inner face a tooth k to enter the spaces between the teeth f' and couple the tumbler F to the arbor C. The tumbler F thus becomes the driving-tumbler, and the combination of the lock is changed by loosening the screw L, taking off the arm K, and placing it in a different position upon the arbor C, or by allowing it to remain in the same position and turning the tumblers F, so that the pin k of the radial arm K will enter a different notch between the teeth f' of the driving-tumbler. It will thus be seen that a great many different combinations can be made with my lock. For instance, every time the position of the tumbler F is changed to bring the tooth k of the arm K into a different position, while the arm remains in the same position on the arbor, the whole combination is changed, and the changing of the radial arm upon the angular end of the arbor also changes the combination. I am therefore enabled to produce a great many locks and set them without setting any two to open upon the same combination of letters or figures.

The labor of fitting locks of this class has heretofore added considerably to their cost. I have reduced this labor. The tumblers with their tappets and notches and the teeth on the driving-tumbler F are all cast complete, and the rings I are stamped out of sheet-brass, so that all these parts are interchangeable. Indeed, the only parts of my lock that require dressing are the journal-bearings, and these require no special tools to dress them uniformly, so that all parts of the lock are interchangeable.

In the modification shown in Fig. 5 the tu-

bular neck of the piece E is made longer than in the preferred form, and a coiled spring M is compressed between the inner tumbler and the shoulder of piece E to press the tumblers inward and hold the toothed driving-tumbler F in engagement with the pin *k* on the radial arm K. The combination in this form is readily changed without disturbing the arm K by simply pressing the nest of tumblers against the force of the spring M until the teeth *f'* of the driving-tumbler are disengaged, and then turning the tumbler F around to bring a different space between its teeth *f'* in position to receive the pin *k* when the pressure on the spring is released. I have also shown in dotted line, Fig. 2, a screw *n*, which may be substituted for the pin *k* on the radial arm K. With this construction, when it is desired to change the combination it is only necessary to retract the screw *n* until its point is withdrawn from between the teeth *f'*, when the tumbler F may be turned around to the position desired and the screw *n* turned to bring its point in engagement with the teeth in the new position of the tumbler.

The lock-case may be so arranged that the inner plate O of the door may rest upon its walls, as seen in Fig. 2, in which case the said plate is perforated to allow part of the tumbler F to pass through it, so that the combina-

tion may be changed without removing the back plate, or, if desired, the plate O may cover and conceal the whole lock.

I claim—

1. The combination of the lock-arbor, the piece E, furnishing the inner bearing for the arbor and the journal-bearings for the tumblers fitted to revolve upon said bearing, the inner driving-tumbler F, having teeth *f'* radially arranged upon its face, and the radial arm K, secured upon said arbor and having pin *k* to enter the spaces between said teeth and couple the driving-tumbler to the arbor, substantially as shown and described.

2. The combination of the arbor, the piece E, furnishing the inner bearing for the arbor and the journal-bearings for the tumblers, the inner driving-tumbler F, having teeth *f'*, the radial arm K, secured upon said arbor and having pin *k* to couple the driving-tumbler and arbor, and the spring M between the inner tumbler and shoulder of piece *e* to press the tumblers inward and normally hold the driving-tumbler in engagement with the radial arm K, substantially as shown and described.

WILLIAM B. FOLGER.

Witnesses:

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