

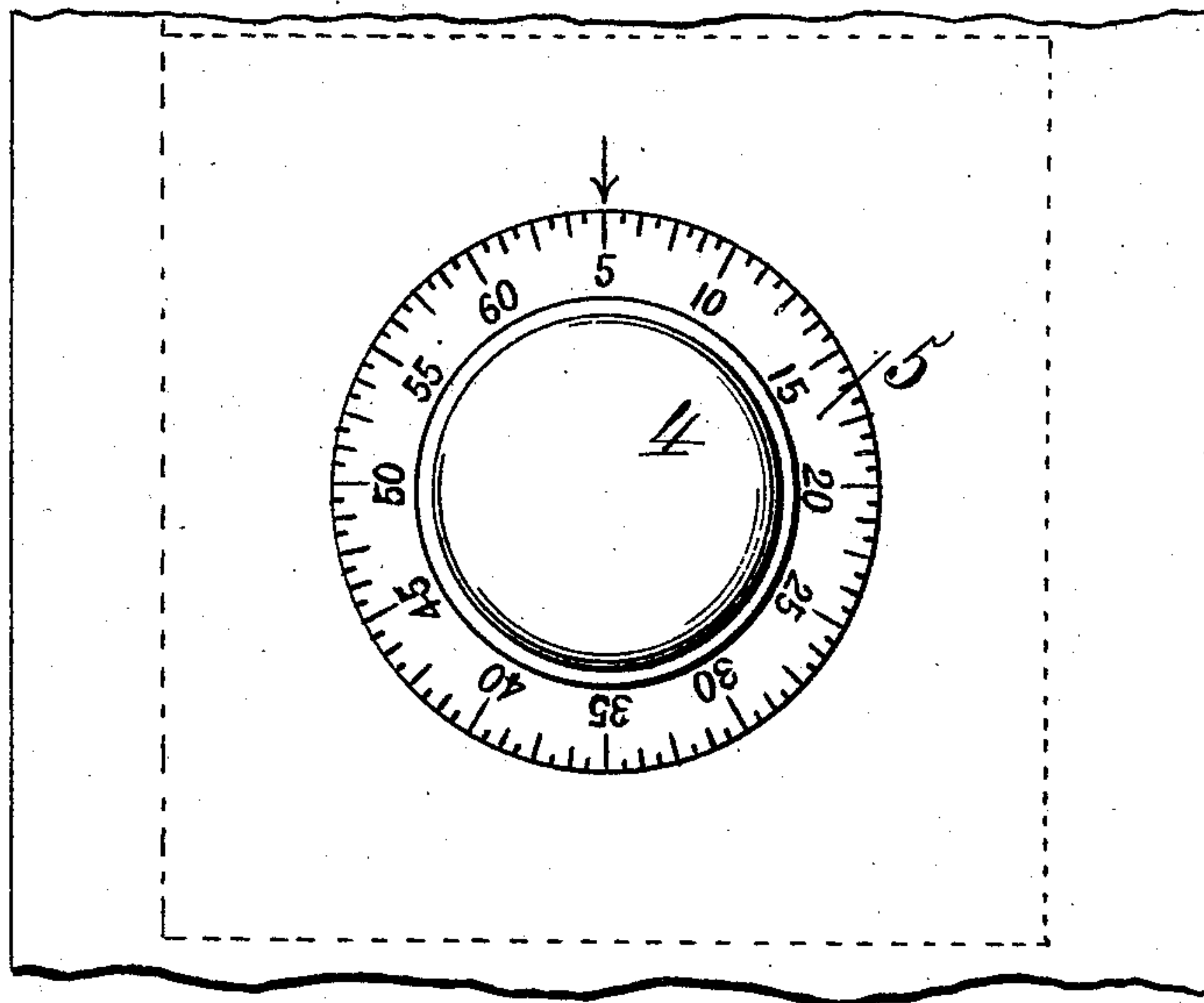
No. 842,076.

PATENTED JAN. 22, 1907.

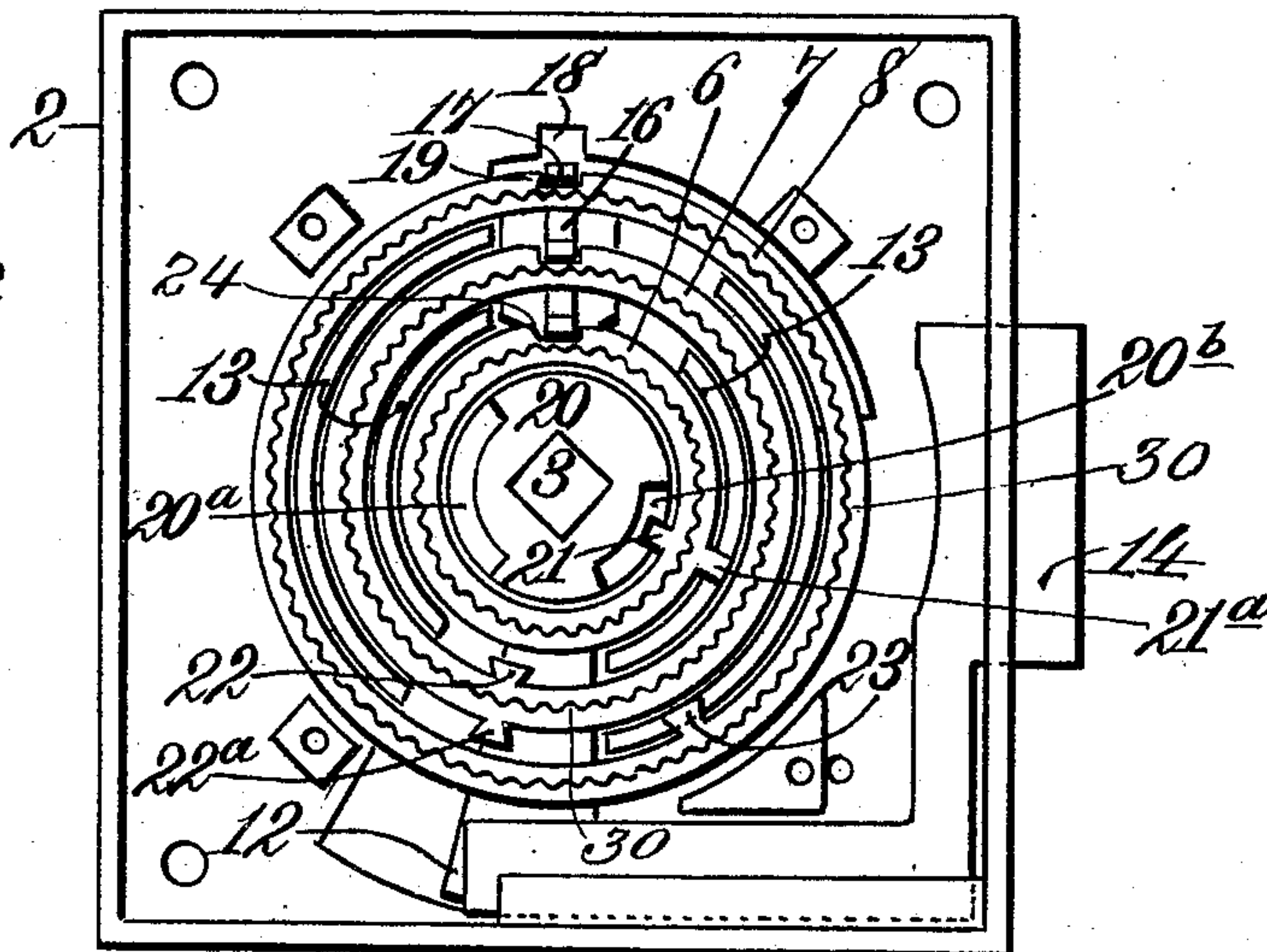
B. S. BURNETT.  
COMBINATION LOCK.  
APPLICATION FILED NOV. 4, 1905.

2 SHEETS—SHEET 1.

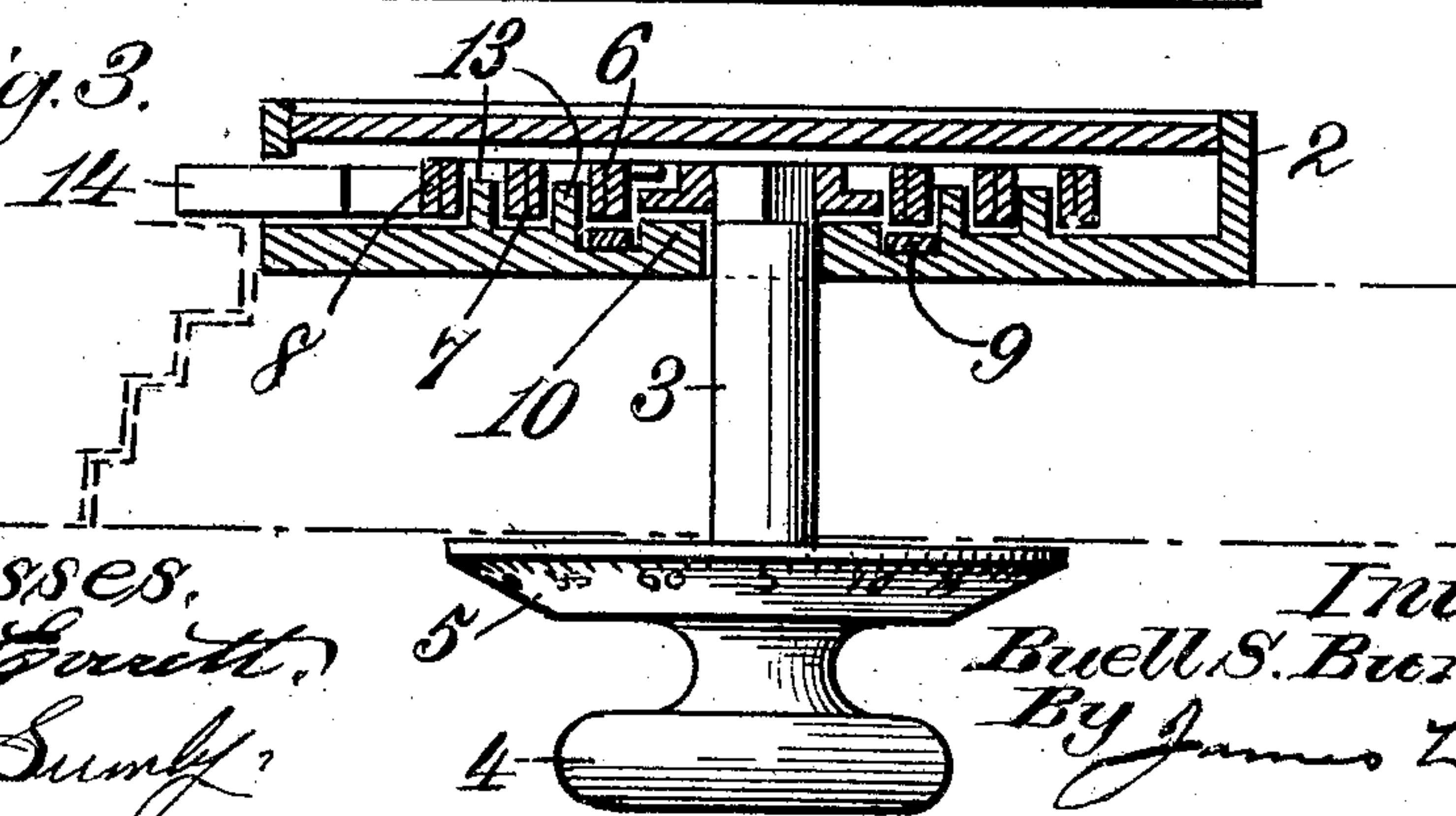
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses,  
Robert Everett,  
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Buell S. Burnett.  
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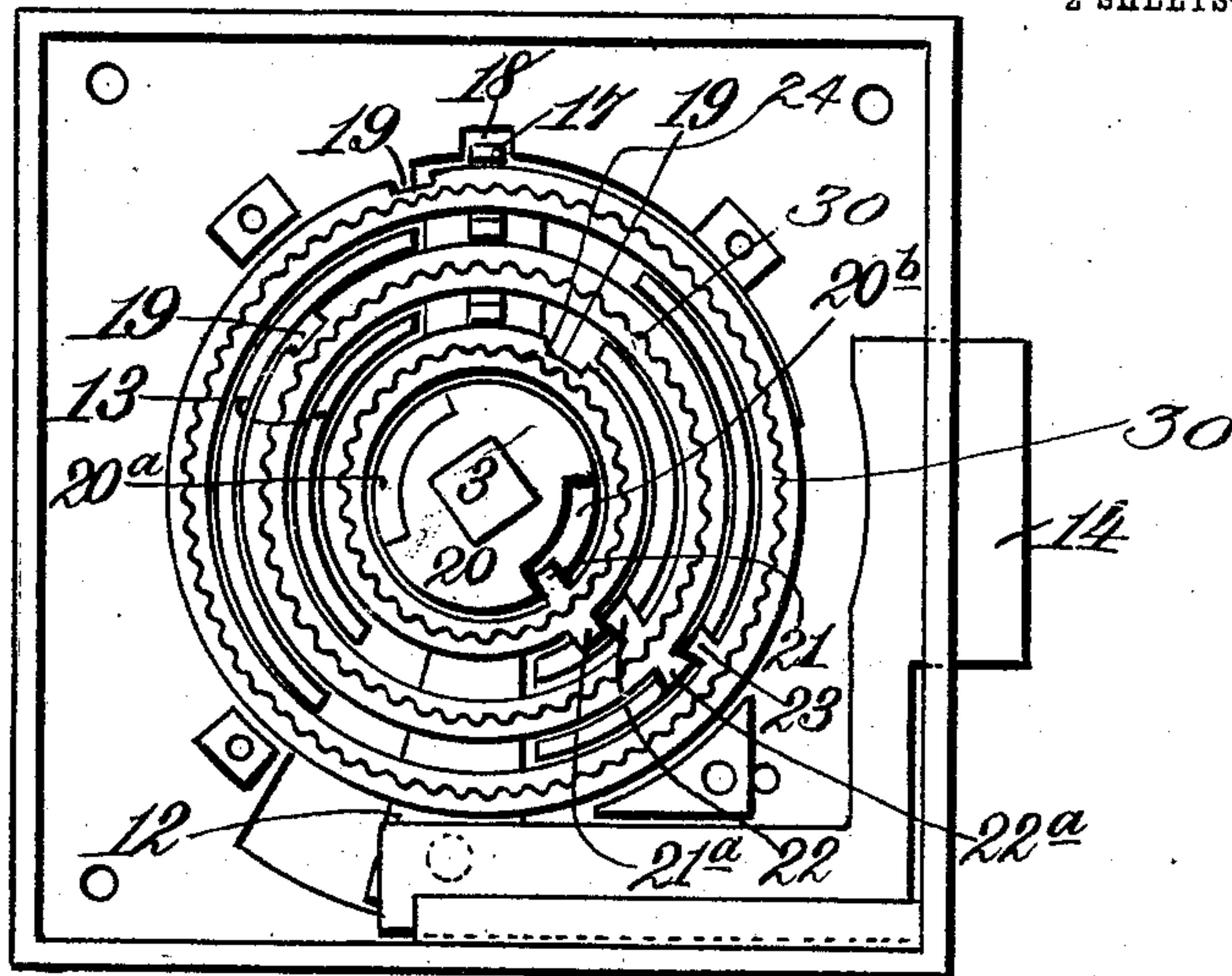
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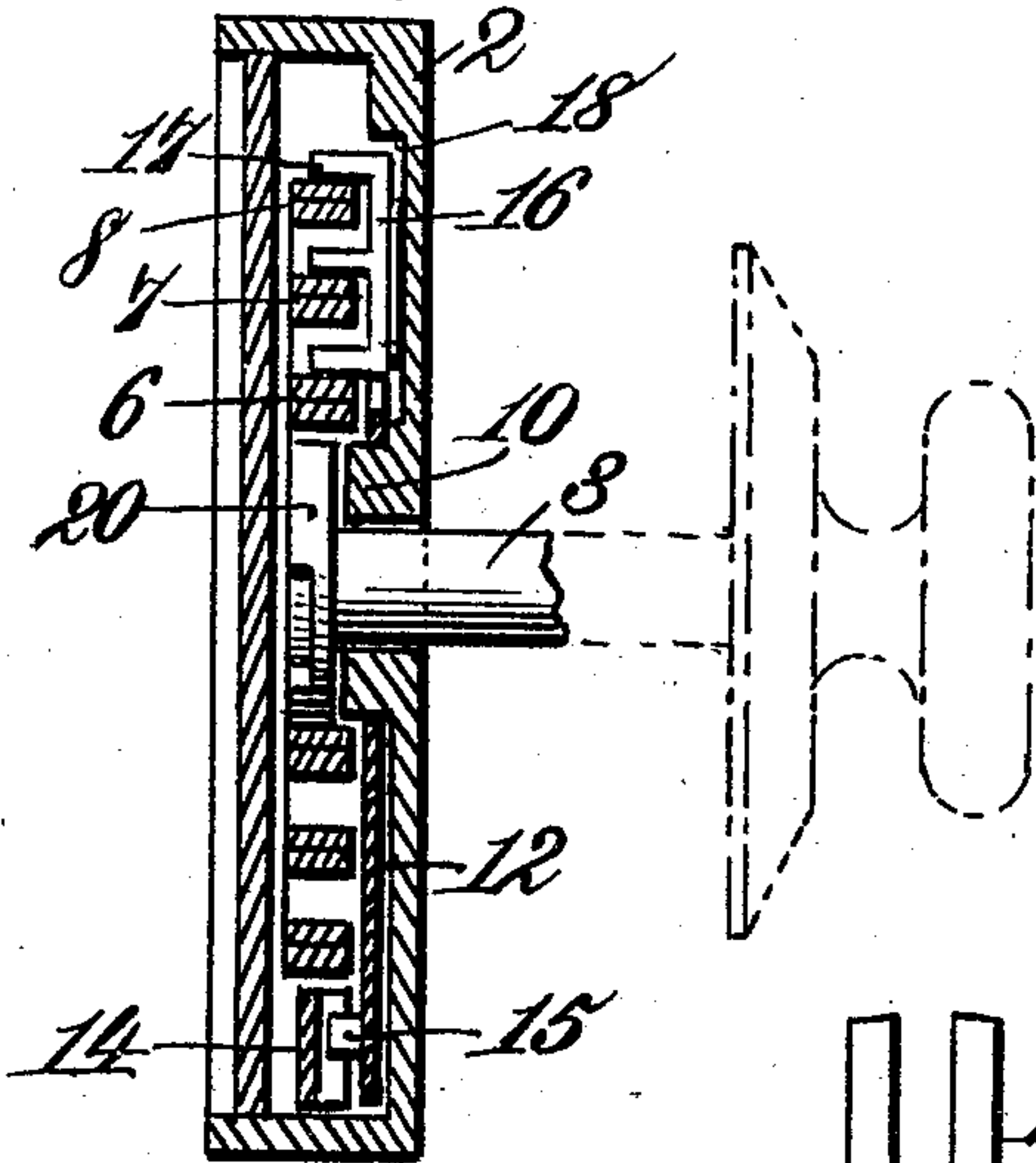
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2 SHEETS—SHEET 2.

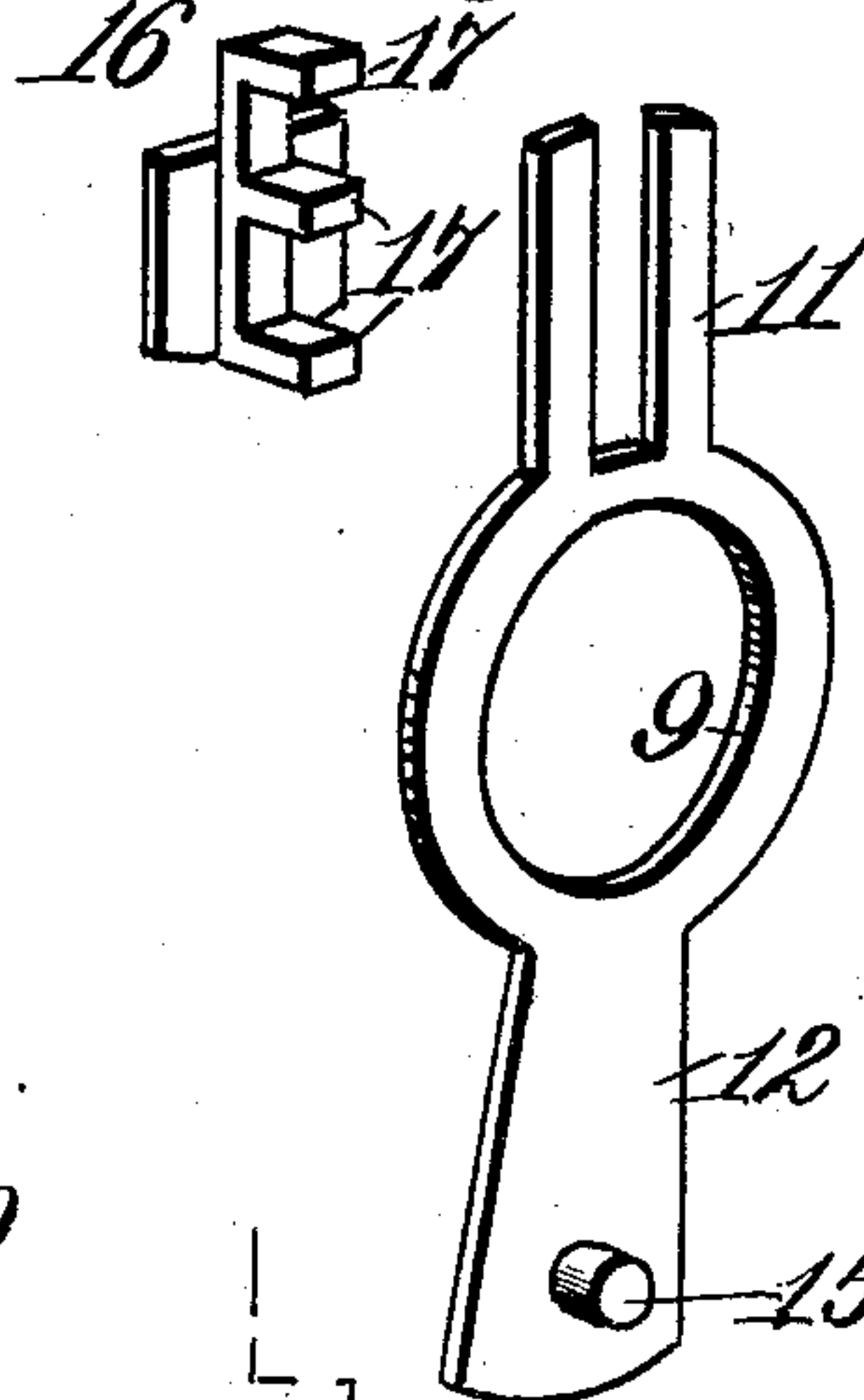
*Fig. 4.*



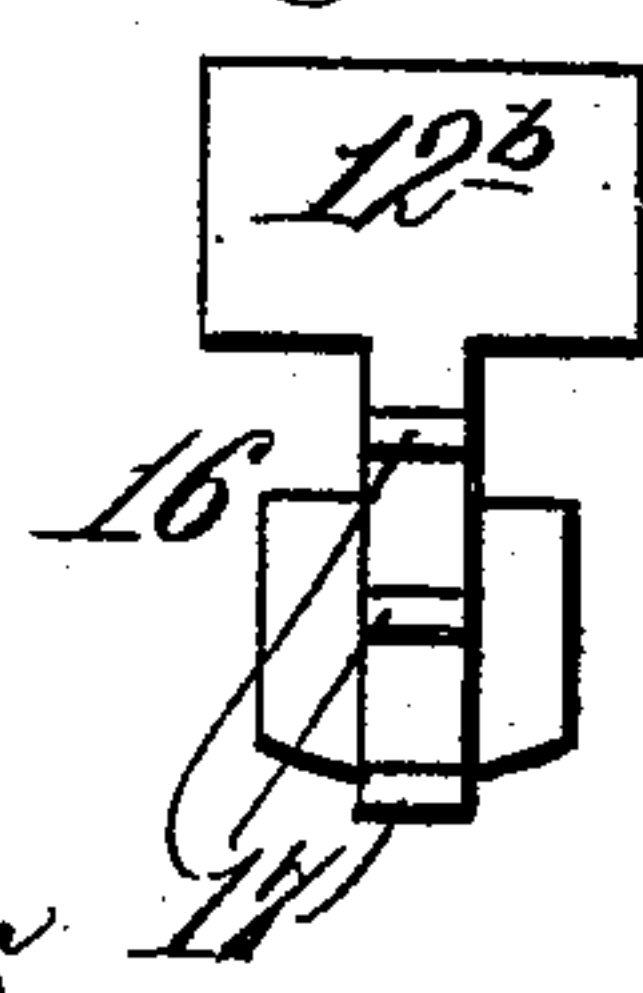
*Fig. 5.*



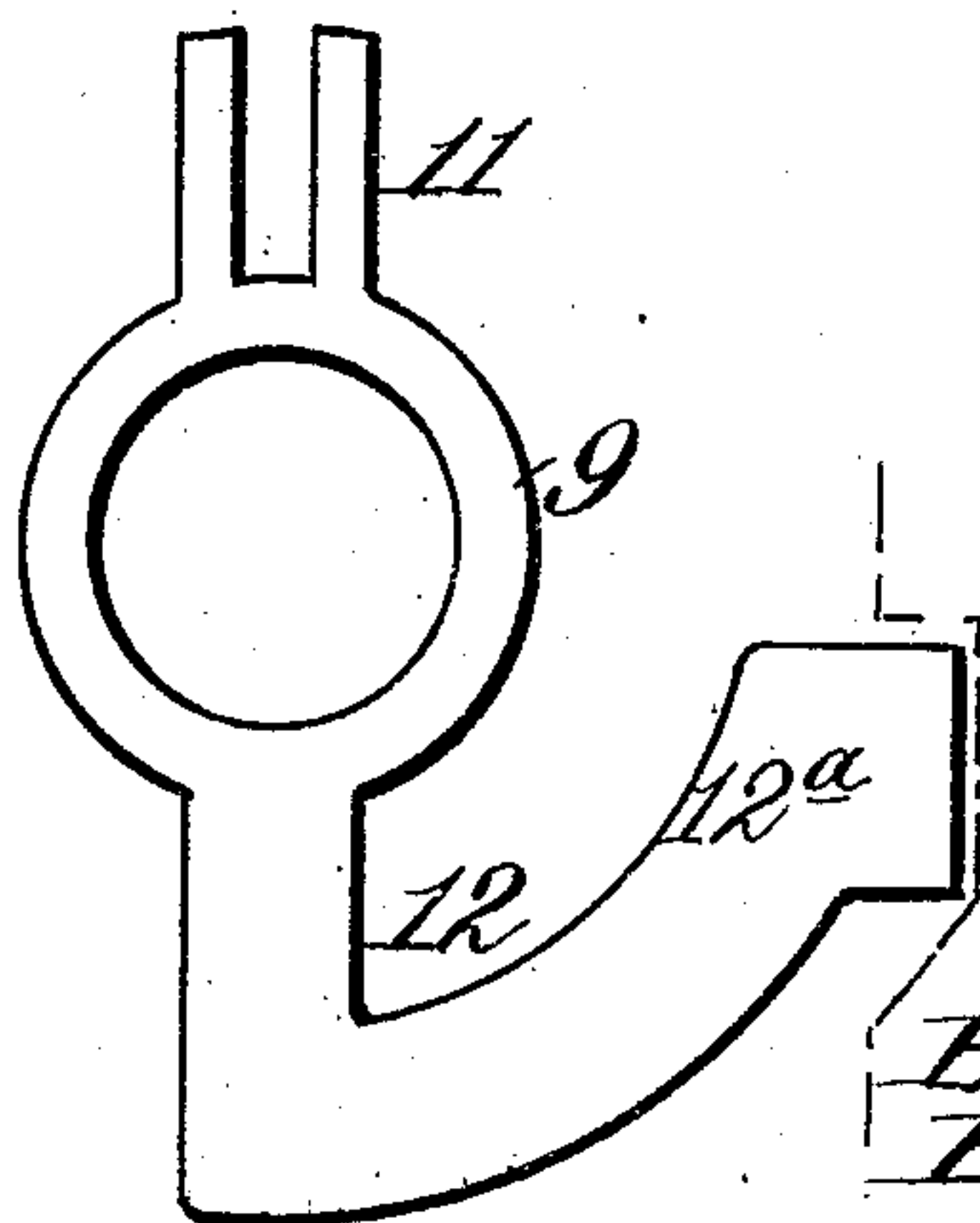
*Fig. 6.*



*Fig. 8.*



*Fig. 7.*



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# UNITED STATES PATENT OFFICE.

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## COMBINATION-LOCK.

No. 842,076.

Specification of Letters Patent.

Patented Jan. 22, 1907.

Application filed November 4, 1905. Serial No. 285,886.

*To all whom it may concern:*

Be it known that I, BUELL S. BURNETT, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented new and useful Improvements in Combination-Locks, of which the following is a specification.

This invention relates to combination-locks, the object of the invention being to provide a device of this character which is simple in construction and effective in operation.

While the device has large combinational possibilities, it can be successfully operated without the use of springs or screws.

In the drawings accompanying and forming a part of this specification I illustrate a simple form of embodiment of invention, which I will set forth in detail in the following description to enable those skilled in the art to practice the invention, while the novelty of the latter will be included in the claims succeeding said description.

In said drawings, Figure 1 is a face view of a lock including my invention. Fig. 2 is a front elevation with the face-plate of the lock removed. Fig. 3 is a horizontal section. Fig. 4 is a view similar to Fig. 2, but showing the parts in different positions. Fig. 5 is a vertical section. Fig. 6 is a perspective view of the key and its carrier. Fig. 7 is a detail view of a modification hereinafter more fully described. Fig. 8 is a like view of another modification.

Like reference-numerals indicate corresponding parts in the several views.

The different parts of the lock may be housed within a casing or boxing, as 2, the face-plate of which is perforated to receive the spindle 3 of the knob 4, the spindle carrying a dial, as 5, graduated in the customary way and revoluble against the face-plate of the boxing or casing 2.

The lock involves in its construction several rings. These may be of any desired number. I have shown three of them, (designated, commencing with the inner one, respectively, by 6, 7, and 8.) These rings revolve within the casing or boxing 2, the two outer ones, 7 and 8, turning upon or against the inner side of the face-plate of the casing, while the inner one turns upon a collar, as 9, revoluble around a hub 10 upon the inner side of the face-plate of the casing, the inner

end of the spindle 3 extending through said hub. From diametrically opposite sides of the collar 9 upper and lower arms, as 11 and 12, extend, the inner side of the face-plate of the casing being apertured to receive the collar and the two projecting arms. Radial motion of the several rings 6, 7, and 8 is prevented by segmental flanges (each designated by 13) upon the inner side of the front plate of the casing. The collar 9 may be made integral with the two arms 11 and 12. The bolt is denoted by 14, the working portion or head thereof being adapted to be projected or shot through a slot in one side of the casing or boxing 2. One branch of the L-shaped bolt 14 is represented as having a slot to receive for sliding movement a lug, as 15, upon the arm 12, such construction providing a convenient loose joint between the arm and bolt, for they have relative motions. The arm 12, however, serves as the direct agency for moving the bolt back and forth.

In the upper arm is a radial slot, in which is fitted for sliding motion a key or coupling device, as 16, said key or coupling device having on one side thereof three teeth or projections, each denoted by 17, and the function of which will hereinafter appear. When the key or coupling device 16 is in its inoperative or retracted position, the upper end thereof fits in a notch 18, opening into the aperture or cut-away portion, in which the collar 9 and its two arms 11 and 12 oscillate.

In the periphery of each ring 6, 7, and 8 is an aperture or slot, each denoted by 19, and adapted to respectively receive the teeth 17 upon the coupling device 16 when all three notches are brought into radial alinement with each other and into radial alinement with the coupling device or key. The key or coupling device is of the gravity type in the present instance—that is, it assumes by its own weight or automatically its operative position with the three teeth 17 in the three slots or apertures 19. When this takes place, as will be understood, the three rings are connected or moved as a single element.

Non-rotatably connected in some suitable way to the inner end of the spindle 3 is a disk 20, having notches 20<sup>a</sup> and 20<sup>b</sup> of different lengths and either one of which is adapted to fit the projection 21 upon the inner ring 6, said projection 21 serving as a catch to be operated by the disk 20 when the latter is



turned. The projection 21 is shown as fitted in the shorter notch or slot 20<sup>b</sup>. Extending outward from said inner ring 6 is a projection 21<sup>a</sup>, serving as a convenient actuating device for the intermediate ring 7, the latter having a projection or catch 22 to be engaged by the projection or actuator 21<sup>a</sup> upon the inner of the two revoluble rings 6 and 7. The intermediate ring 7 is provided with an outward projection 22<sup>a</sup>, constituting a convenient actuator for the outermost revoluble ring 8, the latter having an inward projection or catch, as 23, to be engaged by the projection or actuator 22<sup>a</sup>.

It will be assumed that the bolt 14 is in its operative position, that the key or coupling device 16 is in its retracted or inoperative position, and that the slots or apertures 19 are out of radial alinement. To open the safe, the knob 4 is turned to the right, and when it has made a partial turn the disk 20 will revolve the inner ring 6. When the inner ring has turned a certain distance, the projection 21<sup>a</sup> will strike the catch 22, carrying around the intermediate ring 7, the knob being continued on its movement to the right. The movement will be continued until the projection 22<sup>a</sup> strikes the catch 23. This motion will be continued until the first number of the combination is reached, at which time the slot 19 in the outer ring 8 will be directly opposite the cooperating tooth 17. The knob will be then turned to the left, the disk 20 and inner ring 6 being moved in a corresponding direction. When the inner ring has moved a certain distance toward the left, the projection 21<sup>a</sup> will strike the catch 22, carrying the intermediate ring 7 around, and this motion will be continued until the second number of the combination is reached, at which point the notch or aperture 19 in said middle ring 7 will be directly opposite its cooperating tooth 17. The knob is then turned to the right, carrying the inner ring therewith, until the third number of the combination is reached, when the notch or aperture in the inner ring 6 is opposite the cooperating tooth 17. This will have brought the three slots 19 into radial alinement and, as explained, opposite the respective teeth or projections 17, whereby the coupling device or key can drop to carry said projections or teeth into the appropriate slots or apertures, and thereby lock or couple the three rings to each other. Then by moving the knob 4 to the left the locked together rings will be operated by the knob, whereby the key and necessarily the arm 11 and the arm 12 will be swung in such direction as to draw the bolt backward to its unlocking or inoperative position. Opposite motion of the knob will shoot the bolt back. The inner ring 6 has at one side of the slot or aperture 19 therein a beveled surface 24, which as said inner ring is turned to effect the movement of the bolt to its lock-

ing position rides against the innermost teeth 17 to move the key upward to its original position. Each of the rings 6, 7, and 8 has peripherally thereof and at opposite sides of the slots or apertures 19 therein outwardly-diverging beveled portions, which prevent the rings from catching against the teeth or projections 17 as the rings are turned.

The different parts of the lock may be cast or made by dies from sheet or other suitable metal, or they may be constructed as individual desire may dictate.

The collar 9 and its oppositely-disposed arms 11 and 12 constitute a simple carrier for the key or coupling device 16, said carrier being adapted to actuate the bolt of the lock when the key 16 connects rigidly together the rings 6, 7, and 8.

I have described the lock as having three rings. It may have two or it may have more than three, the number of them depending upon the character of the lock. Each of the rings consists of two sections, which in the present case are of substantially duplicate formation, each ring-section having on its inner edge teeth or cogs, as 30, to register or mesh with the companion ring-section. From this it will be evident that each ring-section can be adjusted circumferentially of the companion ring-section. By this construction I can vary the combinations so that, for example, if I have one hundred teeth upon the outer ring, sixty upon the intermediate ring, and thirty-five upon the inner ring, I can obtain two hundred and ten thousand combinations. To effect a complete change in combination, each of the rings will be operated to bring the projections which they have been described as carrying in different relative positions than those illustrated. To change the relative position of the projection 21<sup>a</sup> and the projection 21 on the inner ring 6, the sections thereof will be separated and one ring-section moved circumferentially of the other the desired distance, after which their teeth will be brought into mesh.

In some cases I may, and, as represented in Fig. 7, make the bolt integral with the key-carrier, which has been described as consisting in the present case of a collar 9 and two arms, as 11 and 12, extending oppositely from said collar. The bolt 12<sup>a</sup> (shown in said figure) is carried directly at the outer end of the arm 12.

In Fig. 8 I have shown a second modification. In this modification the bolt 12<sup>b</sup> is carried directly by the coupling device 16, so that when the coupling device drops in the manner hereinbefore described the bolt 12<sup>b</sup> will be moved to its unlocked position.

Having thus described my invention, what I claim is—

1. A combination-lock comprising a plurality of concentric rings each adapted to op-



erate another and having peripheral notches, an automatically-operated key having projections to enter the respective peripheral notches when the latter are in registration radially of the rings, and a bolt cooperative with said key.

2. A combination-lock comprising a plurality of revoluble concentric rings arranged one within the other and each adapted to operate another, each ring having a peripheral notch, an automatically-slidable key having projections to enter the respective notches when the same are in registration radially of the rings, and a bolt controlled by said key.

3. A combination-lock comprising a plurality of revoluble concentric rings each adapted to operate another and each having a peripheral notch, an arm mounted for rocking motion about the same axis as that of the rings, a key supported for swinging motion with and slidable motion by said arm, said key having projections to enter said notches when the same are in registration radially of the rings, and a bolt cooperative with the key.

4. A combination-lock comprising a plurality of revoluble rings each adapted to operate another, an automatically-operative key to lock the rings together, a bolt, oppositely-disposed arms mounted for oscillation, one of said arms carrying said key, and the other being connected with the bolt to operate it, and manually-operable means for turning one of the rings.

5. A combination-lock comprising a plurality of revoluble concentric rings each including two sections, one of said sections of each ring being adjustable circumferentially with respect to the companion section of said ring, an automatically-operable key to lock the rings together, and a bolt controlled by said key.

6. A combination-lock comprising a plu-

ality of revoluble concentric rings each adapted to operate another and each having a peripheral slot, a slotted arm oscillatory about the axis of said ring, a key movable in said slot and having projections to enter said notches when the same are in registration radially of the rings, and a bolt controlled by said arm.

7. A combination-lock involving a plurality of revoluble rings each adapted to operate another and consisting of sections, each of which sections is circumferentially adjustable with respect to a companion section, an automatically-operable key to lock the rings together, a bolt, and a carrier for the key connected with the bolt for operating the same.

8. A combination-lock involving a plurality of revoluble rings arranged in concentric relation one within the other, each ring adapted to operate an adjacent ring, and each consisting of complementary sections having meshing teeth, an automatically-operable key to lock the rings together, a bolt, and means for carrying the key and adapted also for actuating the bolt when the rings are locked together by said key.

9. A combination-lock comprising a plurality of revoluble concentric rings one within the other, each ring being adapted to operate an adjacent ring and each consisting of complementary sections having meshing teeth, an automatically-operable key to lock the rings together, and a bolt governed by said key.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BUELL S. BURNETT.

Witnesses:

F. T. PETTY,  
ERA A. BRAZIER.