

(Model.)

2 Sheets—Sheet 1.

J. H. & H. MORRIS.
COMBINATION LOCK.

No. 466,420.

Patented Jan. 5, 1892.

Fig. 1.

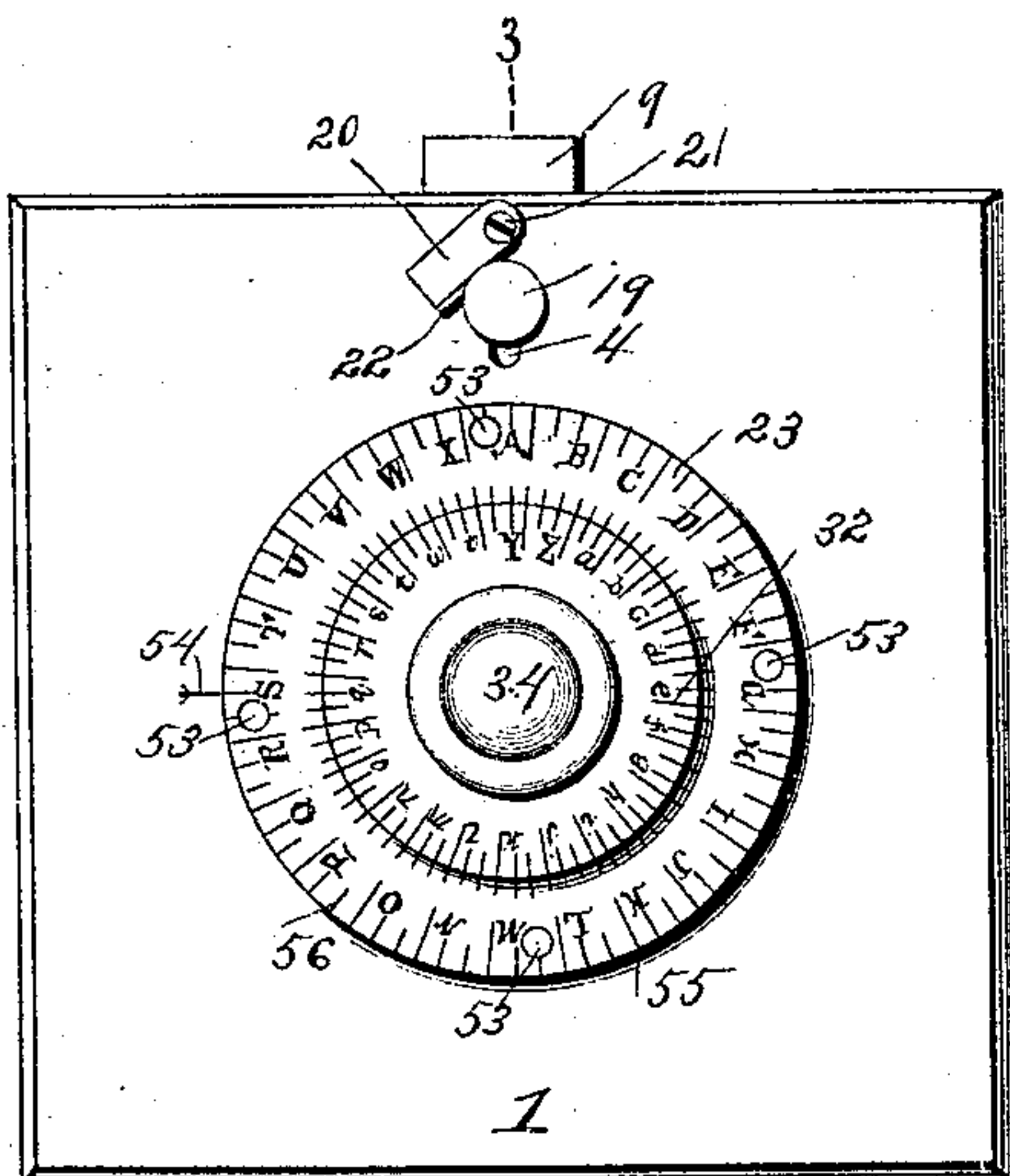


Fig. 2.

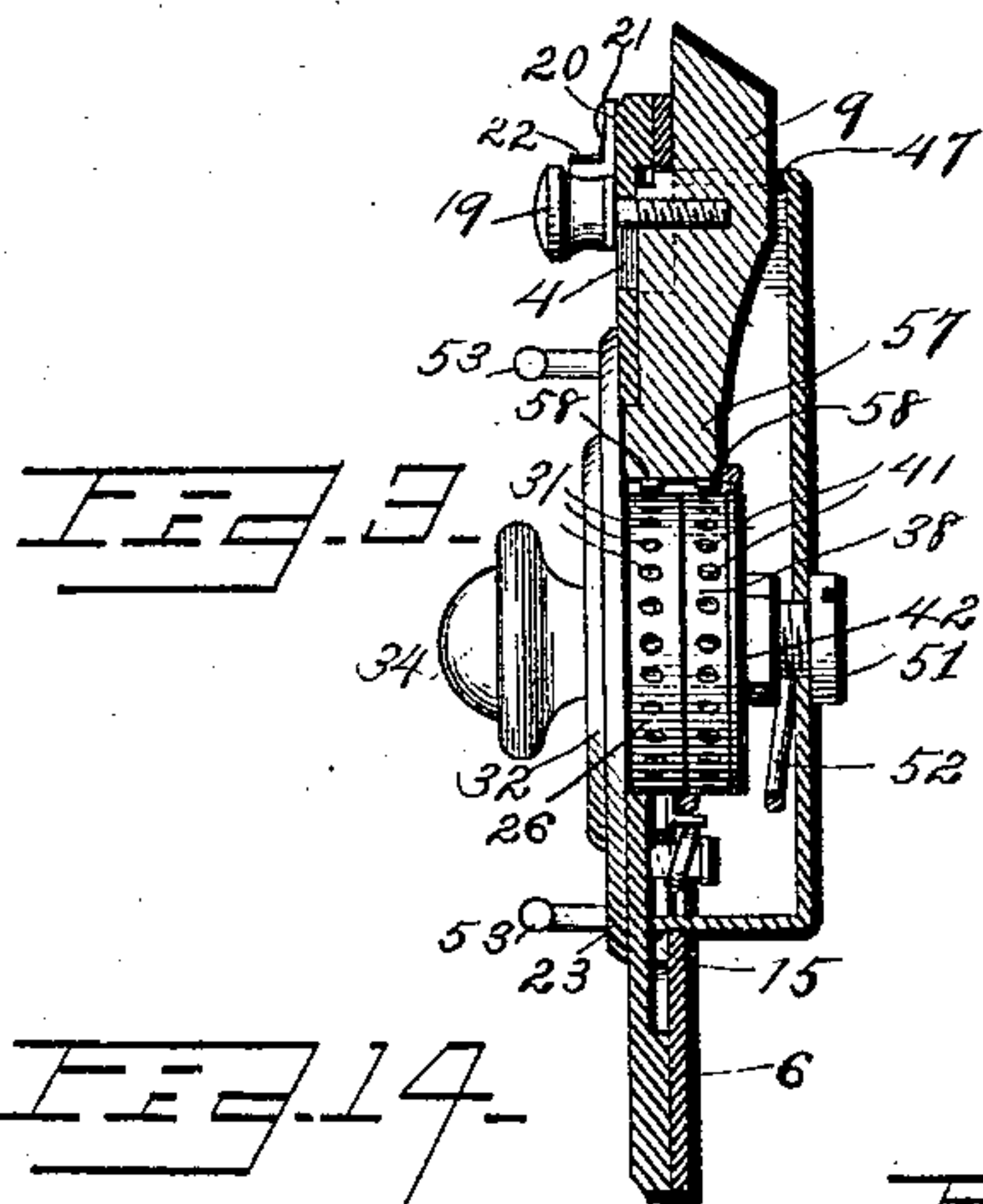
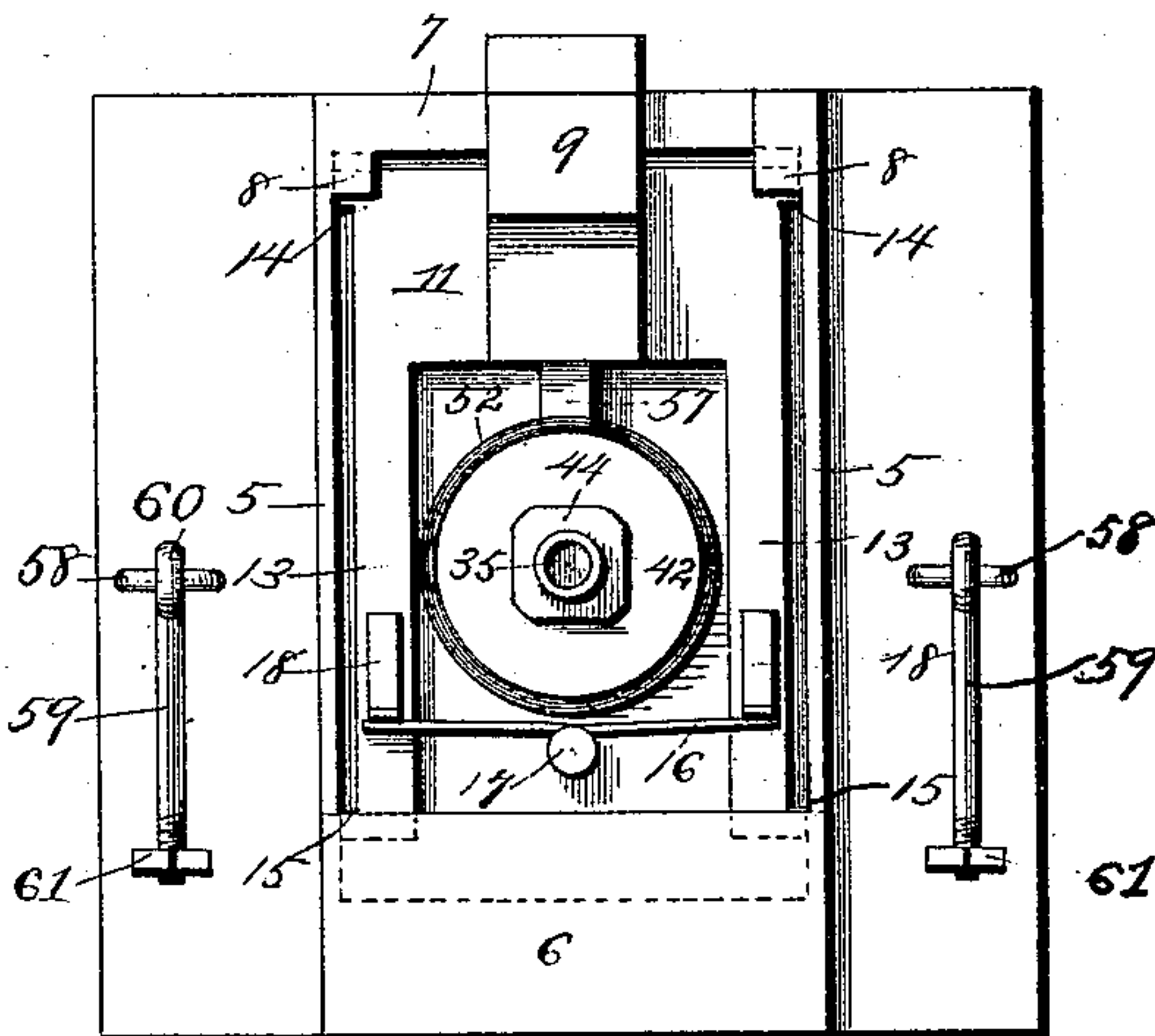


Fig. 14.



Fig. 13.

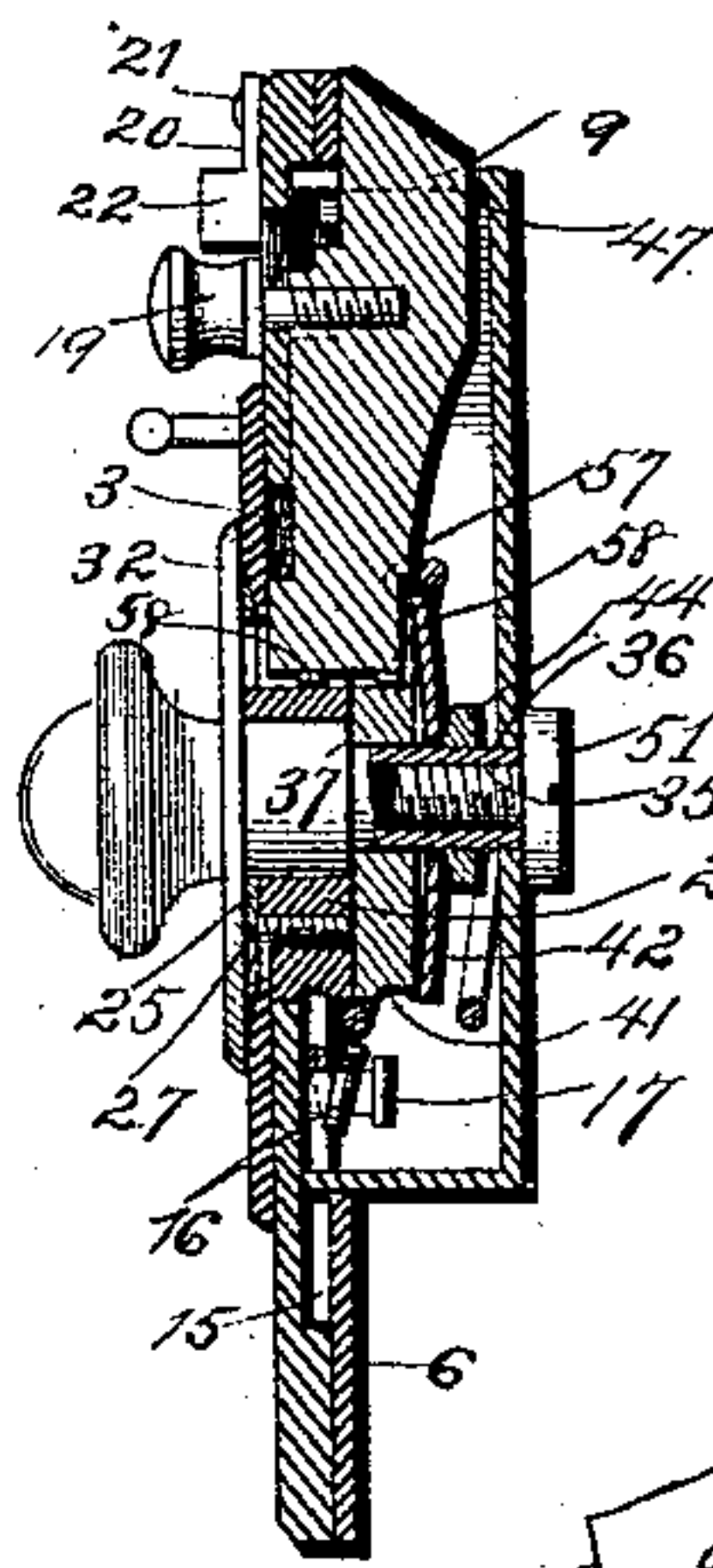
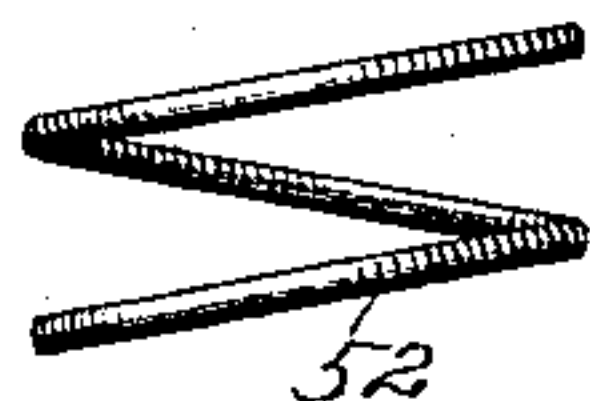
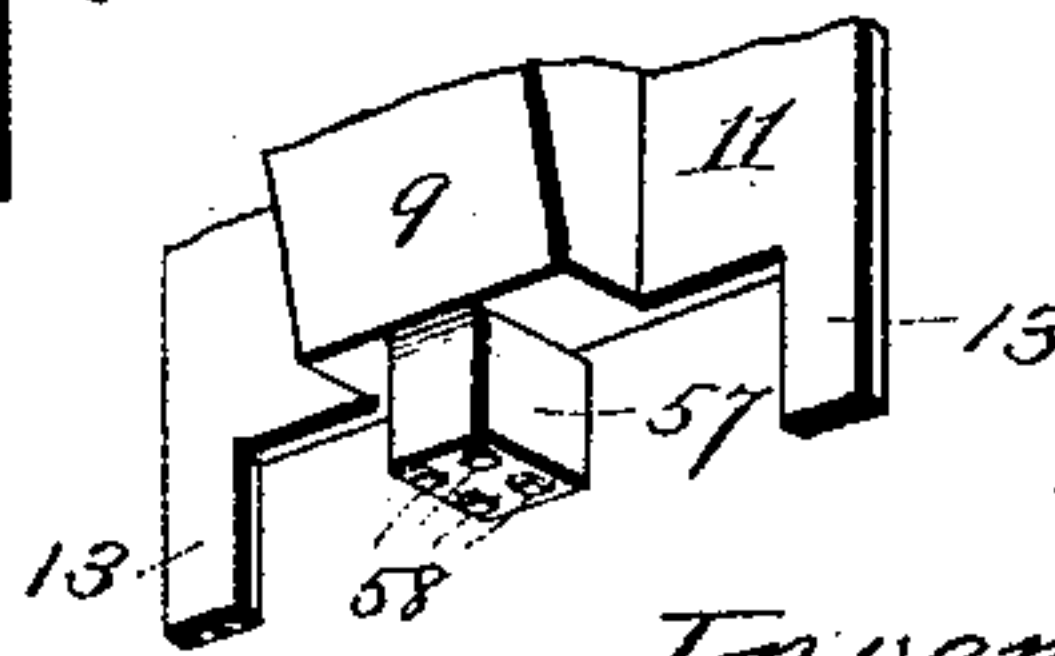


Fig. 4.

Fig. 15.



Witnesses.

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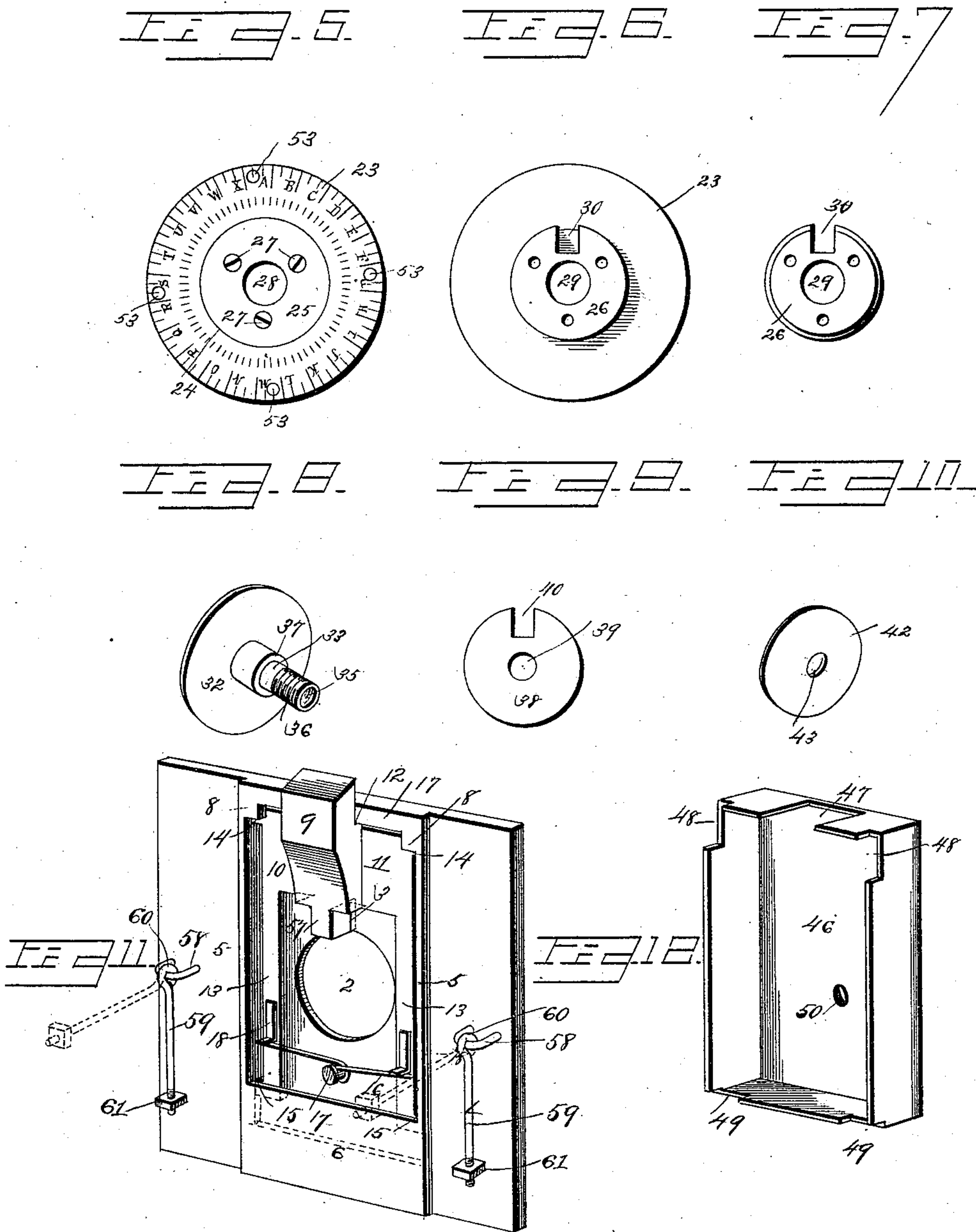
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2 Sheets—Sheet 2.

J. H. & H. MORRIS.
COMBINATION LOCK.

No. 466,420.

Patented Jan. 5, 1892.



Witnesses,

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UNITED STATES PATENT OFFICE.

JOHN H. MORRIS AND HENRY MORRIS, OF SEWARD, NEBRASKA.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 466,420, dated January 5, 1892.

Application filed March 9, 1891. Serial No. 384,319. (Model.)

To all whom it may concern:

Be it known that we, JOHN H. MORRIS and HENRY MORRIS, of Seward, Seward county, Nebraska, have invented certain new and useful Improvements in Combination-Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to what are known as "permutation-locks"—that is to say, to that class of locks the tumblers of which are capable of various changes of relative position, so that the locking-bolt cannot be shot until the tumblers have been brought into a certain predetermined relation to each other.

The objects of our present invention are, first, to produce a lock which shall be simple, compact, and comparatively inexpensive in construction, and which shall be peculiarly adapted for application to the boxes or drawers or other mail-receptacles in post-offices and other similar places, and which shall also be equally adapted to application to portable receptacles, such as boxes, trunks, &c.

A further object of our invention is to increase the ease of manipulation of this class of locks, and also to materially extend the range of combinations to which they can be set; and, finally, our invention has for its object the general improvement of this class of locks in point of durability and of security against being opened by unauthorized parties.

To the above purpose our invention consists in certain peculiar and novel features of arrangement and construction, as hereinafter described, and pointed out in the appended claims.

In order that our invention may be fully understood, we will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a front or outer side view of our improved lock. Fig. 2 is a rear or inner side view of the same with the cap-plate or cover removed. Fig. 3 is a central transverse section of the lock on the line 3 4 of Fig. 1 and showing the bolt in locked condition. Fig. 4 is also a central transverse section of the lock on the line 3 4 of Fig. 1, and showing the bolt in retracted position as when the lock is unlocked. Fig. 5 is an outer side elevation of the inner or larger dial-plate in detached con-

dition. Fig. 6 is an inner side elevation of the same in detached condition and showing the outer tumbler-disk which is carried by said dial-plate. Fig. 7 is a side elevation of said outer tumbler-disk in detached condition. Fig. 8 is a detached perspective view of the outer dial-plate and its screw-post, such parts being in detached condition and the point of view being toward the inner side of the dial-plate. Fig. 9 is a side elevation of the inner tumbler-disk in detached condition. Fig. 10 is a perspective view of the concavo-convex washer which surrounds the inner portion of the screw-post, said washer being in detached condition. Fig. 11 is an inner side perspective view of the face-plate of the lock and the carrying-slide and its retracting-spring in position upon said plate. Fig. 12 is an inner side perspective view of the cap-plate or cover of the lock, said plate or cover being in detached condition. Fig. 13 is a detached view of the spiral lock-spring. Fig. 14 is a detached sectional view of the nut for compressing the concavo-convex washer. Fig. 15 is a detached perspective view of the outer portion of the bolt-slide, showing the inner end of the bolt-extension.

In the said drawings, 1 designates the face-plate of the lock. This plate is usually and preferably of oblong rectangular form or of square form, substantially as shown. It is to be understood, however, that as this plate forms the front of the lock it is to be of any suitable or preferred marginal contour, and that its outer or front side is to present any degree of ornamentation which circumstances may demand. In its center this face-plate is formed with an opening or aperture 2, having a circular margin and a lateral or radial recess or offset 3 extending from one side of said opening, as shown in dotted lines in Fig. 11 and in section in Fig. 4. Immediately above the recess 3 is formed in the said face-plate 1 an elongated opening or slot 4. The purposes of these several openings will be explained in the ensuing description. The inner or reverse side of the front or face plate 1 is formed with two raised parallel guides 5, which are connected together at one end of the face-plate by a broad bridge-piece 6, formed upon or suitably secured to the reverse side of the face-plate. The opposite

ends of the guides 5 are connected together by a narrow cross-piece 7, also formed upon or suitably secured to the reverse side of the plate and rising somewhat above the surface thereof. At the angles of juncture of the cross-piece 7 and the ends of the guides 5 are enlargements 8, which preferably form integral parts of the said guides, and which are separated at their under sides by intervals from the inner or reverse surface of the face-plate. For a portion of its width extending from the inner margin of the bridge-piece 6 an interval exists also between the inner or reverse surface of the face-plate 1 and the said bridge-piece.

9 designates the locking-bolt, which is designed to engage a recess or keeper of any suitable or preferred type located at an adjacent part of the frame-work to which the lock is applied. This bolt is carried by the bolt-slide 10, and said slide is of skeleton form and of U shape, the bolt being formed upon or suitably secured to the cross-piece 11 of the slide. The under side of the bolt 9 is formed with a transverse shoulder, which, when the bolt is in extended position, comes into contact with the inner side of the cross-piece 7 before referred to. It will thus be seen that the said cross-piece 7 constitutes a stop which properly limits the throwing or locking movement of the bolt 9. The two arms 13 of the bolt-slide 10 are of narrow elongated form and work in proximity to the inner sides of the guides 5, above described; but in order to lessen the working friction-slide outwardly-extending enlargements 14 are formed at the outer angles of juncture of the arms 13 with the cross-piece 11 of the bolt-slide. Thus when the bolt 9 is in extended or locked position the enlargements 14 lie beneath the overhanging enlargements 8, above described, and the outer part of the slide is retained in working connection with the face-plate. The arms 13 of the slide are of such length that their inner extremities always lie beneath the overhanging portion of the bridge-piece 6, so that when the slide is in extended or retracted position the inner portion of the slide is constantly retained in operative connection with the face-plate 1. When the slide is retracted, however, the inner extremities of the arms 13 strike the closed portion of the bridge-piece 6, and the latter thus acts also as a stop to properly limit the retraction of the bolt. These inner ends of the arms 13 are each formed with an outwardly-extending enlargement 15, the outer edges of which work in contact with the inner sides of the guides 5, and thus reduce the working friction of the slide. In addition to reducing the friction of the slide, these enlargements 15 and also the enlargements 14 give space for properly oiling the guides and add materially to the durability of these parts of the lock. The bolt and bolt-slide thus constructed are retained normally in extended or locked position by a plate-spring 16, which midway of

its length surrounds a stud 17, projecting from the reverse side of the face-plate 1 just rearward of the opening 2, and the ends of this spring 16 press outwardly against the short ends of two L-shaped projections 18, one of which is secured to the inner surface of each arm 13 near the inner end thereof. A stud or pin 19 is screwed into or otherwise secured to the outer side of the bolt 9 and extends through the slot 4, above referred to. This stud or pin thus serves as a means for retracting the bolt 9 and unlocking the receptacle, when the combination may be properly made, as hereinafter described.

It is to be observed that we have shown a swinging catch 20 as pivoted at 21 by a screw or other suitable device upon the outer surface of the face-plate 1 and just beyond the outer end of the slot 4. The purpose of this catch is to retain the bolt 9 in retracted position, if desired, against the action of the spring 16 when the door has been properly locked, and this is accomplished by moving the catch inward into alignment with the pivot 21, a lip 22 being formed on each side of the catch to receive the operator's finger, so that the inner end of each catch shall come into engagement with the outer part of the stud or pin 19, and thus retain the bolt in this retracted position. It is to be understood that the precise form of this catch may be greatly varied, if desired, without departing from the spirit of this part of our invention, which consists, essentially, in providing a movable stop or catch of any shape for temporarily retaining the bolt in retracted position.

23 designates the inner and larger dial-plate, the outer face of which is provided with combination marks or characters, preferably as hereinafter particularly described. This dial-plate is formed with a central opening 24, and upon the outer side of the dial-plate is placed a ring 25, the outer margin of which slightly overlaps the margin of the opening 24 on the outer side thereof.

26 designates the outer tubular disk, which rests against the inner side of the dial-plate 23 and the outer edge or margin of which slightly overlaps the edge or margin of the opening 24 of said plate against the inner side thereof. The ring 25 and disk 26 are secured together firmly but removably by a suitable number of screws 27, three of which are shown and each of which is inserted from without through the ring 25 and into the disk 26. It will thus be seen that the tumbler-disk 26 always moves with the dial-plate 23, as though they were integral with each other, and it is to be observed that said plate and disk may be thus formed integral, if desired, although that just described is regarded as the preferred construction. The ring 25 is formed with a central opening 28, while the tumbler-disk 26 is formed with a like opening 29, these openings coinciding with each other and corresponding with the opening 24 of the

dial-plate 23. The tumbler-disk 26 is also formed with a radial recess 30, opening out at the outer margin of the disk, as shown, and the outer side or periphery of said disk is formed with a number of recesses 31, the purpose of these parts being hereinafter fully explained.

32 designates the smaller and outer dial-plate, the outer face of which is provided with combination marks or characters, preferably as hereinafter described. This dial-plate 32 is of concavo-convex form, and when in operative position it immediately overlies the larger dial-plate 23 and is placed with its convex side outward, as shown. The said dial-plate 32 is provided with a hub 33, which is preferably formed integrally with the plate, but in any event secured to the plate in such manner that the hub and plate shall invariably move together. This hub projects centrally through the plate 32, and at its outer end carries a suitable knob or enlargement 34, by means of which the hub and plate are rotated, as hereinafter described, to operate the combination. The opposite part of the hub 33 projects inwardly from the center of the plate 32, and at its inner end is formed an internally-screw-threaded longitudinal cavity 35. The inner end of this hub 33 is also externally screw-threaded throughout a portion of its length, as shown at 36, and is also formed with an enlarged portion beginning just outside of the screw-threaded portion 36 and terminating at the inner surface of the plate 32, thus forming an annular shoulder 37. The enlarged portion of the hub 33 extends inward through the openings 28 and 29 of the ring 25 and tumbler-disk 26, respectively.

38 designates the inner tubular disk, which is formed with a central circular opening 39 and also with a recess 40, opening out at the outer margin of the disk, as shown, and corresponding in purpose to that of the recess 30 of the disk 23. The sides or periphery of this disk 38 are also formed with a number of recesses 41, corresponding in position and function to the recesses 31 of the disk 26, before described. This tumbler-disk 38 surrounds the inner part of the hub 33, and its outer surface, adjacent to the margin of its opening 39, abuts against the inner side of the annular shoulder 37 of said hub 33.

42 designates a washer, which is concavo-convex in form, and which is constructed of somewhat resilient or springy material, and which, furthermore, is formed with a central opening 43. When in operative position this washer surrounds the inner or screw-threaded portion 36 of the hub 33, and its concave side is adjacent to the inner side of the tumbler-disk 38, against which latter, moreover, the edge or margin of the washer impinges. A nut 44 is screwed upon the threaded portion 36 of the hub 33, and when in proper operative position the inner side 45 of this nut impinges upon the center of the washer 42. This inner side or surface of the nut is formed con-

vex, and it will be seen that by virtue of this construction a direct and powerful pressure is concentrated upon the center of the washer and is effectively exerted in compressing the washer and developing its elastic pressure upon the disk 38. Thus the disk is held firmly in contact with the shoulder 37 of the hub 33, and the hub and disk are compelled to rotate together, and there can be no possibility of movement of the disk upon the hub. Consequently when the combination has been properly operated the recesses 30, 40 of the disks 26, 38 will invariably come into accurate register with each other.

46 designates the cap-plate or cover of the lock. This cap-plate or cover is of square or oblong rectangular form, as preferred, to correspond generally with the form of the face-plate 1. The margin of this cap or cover is turned at right angles to its body portion, and the part of said margin which coincides with the bolt 9 is formed with a recess 47 to receive said bolt. This recessed margin lies within the cross-piece 7 of the front plate, and at its angles of juncture with the contiguous margins are formed two recesses 48 to receive the enlargements 8 of the guides 5. These latter margins intervene at their edges between the inner sides of the guides 5 and the outer sides of the arms 13 of the bolt-slide 10. The margin opposite to that which is provided with the recesses 47 is provided at its ends with two recesses 49 to permit the passage of the ends of the arms 13 as the slide is moved, this latter margin resting against the inner side of the bridge-piece 6. This cap or cover is also formed with a hole or opening 50, through which extends the rear end of the hub 33. A screw 51, the stem of which is externally threaded, enters the cavity or bore 35 of the hub 33, and the head of this screw impinges upon the outer surface of the cap 46. Thus the screw 51 securely retains the cap in position, so that the interior mechanism of the lock is effectively protected.

In operating the combination to which the lock may be set, in order to open the door or receptacle, the larger dial, when first rotated, carries the smaller dial with it; but the smaller dial must be capable of rotation independently of the larger dial, and in order to insure this simultaneous rotation of the two dials we provide the lock with the spring 52. (Shown detached in Fig. 13.) This spring 52 is of spiral form, and its front end rests upon the inner or reverse surface of the face-plate 1, while its opposite end rests against the inner surface of the cap-plate 46. When the cap is in position, it compresses the spring 52, and the pressure of this spring against the cap 46 is borne by the screw 51. From this screw 51 the pressure is transferred to the hub 33, and thus the dial 25 is pressed firmly against the outer face of the dial 23, so that when the dial 23 is rotated it carries the dial 25 with it. At the same time, however, the spring 52 exerts pressure against the inner

side or surface of the face-plate 1, and this pressure is transferred to the inner surface of the dial 23. Consequently after the dial 23 has been rotated the dial 25 can be rotated independently of said dial 23, there being sufficient frictional contact between the dial 23 and the outer surface of the face-plate to retain the dial 23 in fixed position during the rotation of the dial 25. The knob 34 constitutes the means for rotating the dial 25, as before stated, while the dial 23 is provided with a suitable number of studs or pins 53, which project outwardly from the outer surface of the dial near its edge and afford convenient means for the manipulation of the dial.

By reference to Figs. 1 and 5 it will be seen that both the dial 23 and the dial 25 are provided with a set of alphabetical characters arranged in circular series upon the outer surface of each dial near its edge. Thus when the combination is to be operated to open the receptacle, the two predetermined letters constituting the combination are brought beneath each other at a certain point on the face-plate 1—as, for example, the point marked by the arrow-head 54. The two recesses 30 40 will thus be brought into register, so that the bolt 9 can be retracted by the pin or stud 19 to open the receptacle. As thus arranged the characters only could be employed to form the opening combinations, and in order to increase the number of combinations which may be formed by the lock we interpose between each letter on each dial and the next succeeding letter to the right thereof first a longer mark, as 55, and then a shorter mark, as 56. Thus there is to the right of each letter a longer mark and to the left a shorter mark. By virtue of this arrangement not only the letters themselves but the marks and letters can be used. Thus the combination may be either "B" and "A," or it may be "A short" and "B long," or other obvious variations thereof. When the combination includes "A short," the short mark before "A" is brought to the point 54, and if it be "B long" the long mark after "B" is brought to such point, and so on. Thus the combinations are capable of great extension in number without increasing the number of letters on the dials.

It has already been stated that when the combination is properly operated the recesses 30 and 40 of the disks 26 and 38 are brought into register with each other, and that the bolt 9 can then be retracted for opening the receptacle. In order to effect this action, the inner end of the bolt 9 is formed or provided with an extension 57, which works in the offset or recess 3 in the face-plate 1, and thus assists in properly directing the movements of the bolt and its slide. Moreover, the inner end of this extension is formed or provided with four projections 58, which are arranged in pairs, the one pair above or to the rear of the other. One pair of these projections engages the recesses 31 of the disks 26, while the

other pair of said projections engages the recesses 41 of the disk 38. By virtue of this arrangement the rotation of the disks is arrested as soon as retracting-pressure is applied to the bolt 9 through its pin 19, and thus the disks are caused to retain their proper relative positions.

From the above description it will be seen that we have produced a simple and inexpensive form of combination or permutation lock, which is strong and durable and very compact in construction, and which is capable of being set to a great variety of combinations, and is also capable of application to a great variety of receptacles.

By referring to Figs. 2 and 11 it will be seen that we have provided means for securing the lock to the door or other similar structure in such manner that the securing devices shall not be visible or accessible from the outer side of the lock. To this purpose the rear side of the face-plate 1 is provided with two or any other suitable number of loops or staples 58, the ends of which do not, however, extend through the said face-plate. To each of these loops is attached one end of a bolt 59, an eye 60 on the outer end of the bolt embracing the loop. The opposite end of each bolt is externally screw-threaded to receive a nut 60, and when the lock is properly attached the bolts pass through the door or other structure to which the lock is applied and the nuts 60 are screwed upon the projecting inner ends of the bolts. It will thus be seen that the attaching devices for the lock are entirely concealed from the front of the lock, so that the block cannot be cut off of the door from the outside.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. An improved permutation-lock comprising a suitable casing or housing, a revoluble hub or arbor extending through said casing, a screw entering the rear end of the hub and connecting the same with the back of the casing, a number of dials surrounding the hub outside of the casing, and a spiral spring inclosed within the casing and surrounding the hub and extending its pressure upon the casing and dials to insure the separate and simultaneous rotation of said dials, substantially as set forth.

2. An improved permutation-lock comprising a slotted face-plate, a sliding bolt having a stud or projection working through the slot of said face-plate, and a pivoted catch pivoted upon the face-plate and located in the line of movement of the bolt and engaging its stud, substantially as set forth.

3. An improved permutation-lock comprising one or more loops located upon the reverse side of the face-plate of the lock and concealed from its outer side, a corresponding number of bolts attached each at one end to each loop, and nuts screwed upon the opposite ends of said bolts, substantially as set forth.

4. An improved permutation-lock comprising a suitable fixed casing or housing, a revoluble hub or arbor extending through said casing, a screw entering the rear end of said
5 hub and connecting the same with the back of the casing, a pair of disks, one of which is movable with said hub or arbor and the other of which is movable upon the same, said disks having each a radial recess and a number of
10 circumferential circularly-arranged depressions, and a locking-bolt mounted movably in

the casing or housing and having at its inner end a pair of lugs or projections to engage said depressions, substantially as set forth.

In testimony whereof we affix our signatures 15
in presence of two witnesses.

JOHN H. MORRIS.
HENRY MORRIS.

Witnesses:

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