

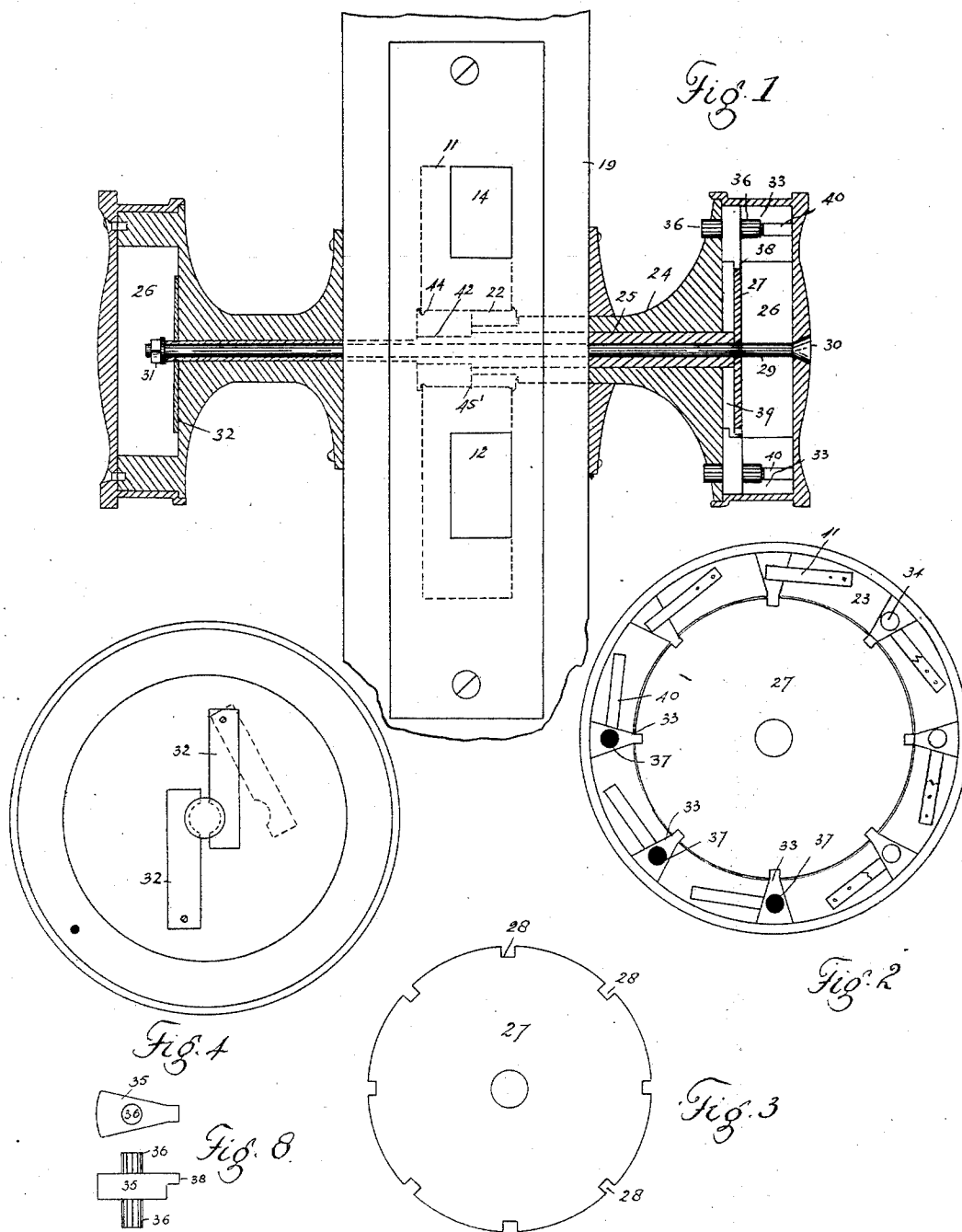
(No Model.)

2 Sheets—Sheet 1.

E. C. PENFIELD.
COMBINATION LOCK.

No. 468,429.

Patented Feb. 9, 1892.



WITNESSES:
G. J. Overland
Wm. M. Connell

INVENTOR
Edward C. Penfield
BY *A. J. V. V.*
ATTORNEY.

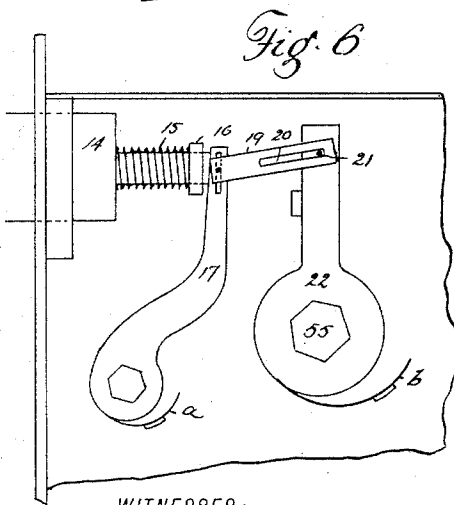
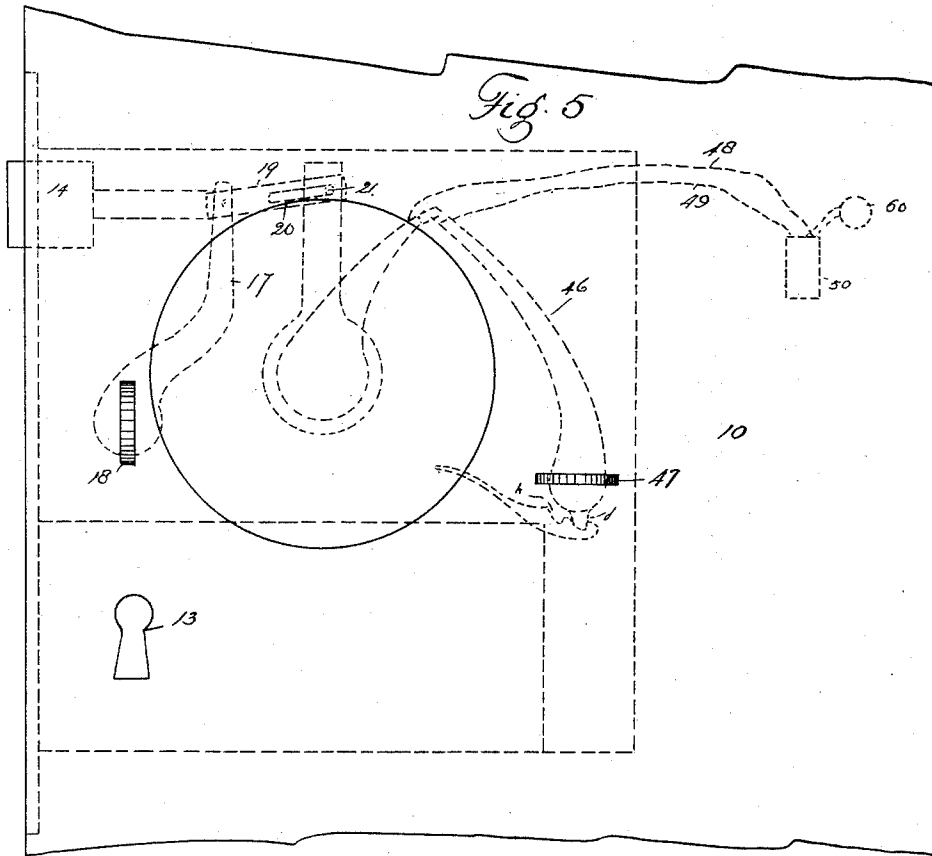
(No Model.)

2 Sheets—Sheet 2.

E. C. PENFIELD.
COMBINATION LOCK.

No. 468,429.

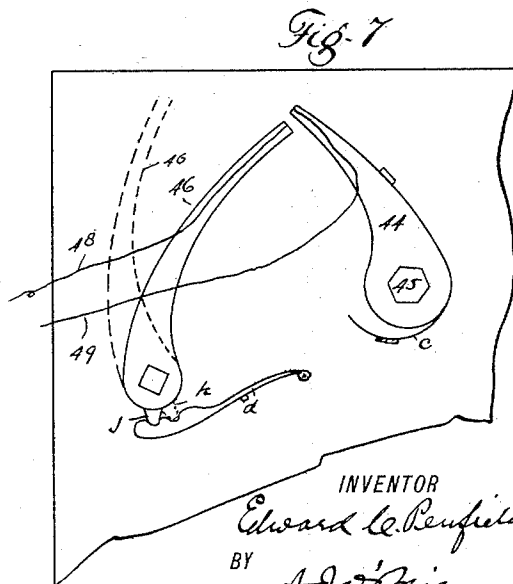
Patented Feb. 9, 1892.



WITNESSES:

C. J. Rollandit.

Wm. M. Connel



INVENTOR

Edward C. Penfield

BY

A. J. O'Brien
ATTORNEY

ATTORNEY.

UNITED STATES PATENT OFFICE.

EDWARD C. PENFIELD, OF DENVER, COLORADO.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 468,429, dated February 9, 1892.

Application filed January 20, 1891. Serial No. 378,401. (No model.)

To all whom it may concern:

Be it known that I, EDWARD C. PENFIELD, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Locks; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to a novel form and construction of combination door-locks; and its objects are to provide a door-lock which may be operated without the use of a key or other appliance outside of the mechanism itself, said mechanism being at the same time simple in construction, economical in cost, quickly and easily operated, reliable, durable, and efficient.

To these ends my invention consists of the features, arrangements, and combinations hereinafter described and claimed.

In the accompanying drawings is illustrated an embodiment of the invention.

In the drawings, Figure 1 is an edge view of a door, showing the locking-bolts, the knobs of the lock being shown in longitudinal section. Fig. 2 is an interior view of the outer knob. This view is obtained by removing the cap. Fig. 3 is a plan view of a disk located within the outer knob. Fig. 4 is an interior end view of the inner knob. This view is obtained by removing the cap. Fig. 5 is a view from the inside of the door, the mechanism, which is within being shown in dotted lines. Fig. 6 is an inner view of the mechanism, as seen after removing the inner side cap of the case inclosing the locking mechanism. Fig. 7 is an interior view of the inside of the case and the mechanism connected therewith. Fig. 8 shows a side and plan view in detail of one of the keys.

In the views, wherein similar reference characters designate corresponding parts of the mechanism, let the numeral 10 indicate a door. Within a suitable mortise formed in the edge of this door is set a case 11, inclos-

ing the locking mechanism. Of this mechanism 12 is the ordinary key-actuated locking-bolt, which is reached through the key-hole 13. My improvement has nothing to do with this ordinary locking mechanism. Hence the same is not shown in detail.

The numeral 14 designates the bolt, which is actuated by my improved mechanism. This bolt is provided with the usual spring 15 and guide-stop 16.

Pivotal secured to the outer extremity of the shank of bolt 14 is an arm 17, which may be operated from the inside of the door by the use of a key 18 in a manner similar to the ordinary night-latch. The rear extremity of bolt 14 is further connected with a link 19, provided with a slot 20, which receives a suitable pin 21, secured to the main arm 22, actuated by turning the outer knob 23, provided with a cylindrical tubular portion 24, which extends into the central portion of the lock, where it is fashioned to engage an angular opening 25, formed in the base of arm 22. Knob 23, when unlocked, turns freely upon a central hollow or tubular bar 25, which extends through the lock and from the outer to the inner knob, as shown in Fig. 1.

Each knob of my improved lock is hollow, as indicated by the numeral 26 26. Sleeve 25 extends from one of these openings to the other and projects a short distance into each. To the outer extremity of this sleeve 25 is rigidly secured a disk 27, provided with notches 28 in its periphery. Sleeve 25 is provided with a longitudinal opening, through which passes a bolt 29. The head 30 of this bolt is countersunk in the cap of the outer knob, the opposite extremity being threaded for the reception of a nut 31, which holds the bolt in place and engages a washer resting against the inner extremity of sleeve or tubular bar 25. This sleeve, with disk 27, is held in position and prevented from moving in either direction by means of two oppositely-disposed locking-arms 32 32, which are pivoted to the interior surface of the inner knob and engage a circumferential groove formed in the sleeve 25 and suitably located. Each pivotal arm 32 is provided with a concave recess to fit the cylindrical surface of the sleeve which it engages. It will thus be seen that

arms 32 and sleeve 25 maintain the disk 27 in its normal position within the space 26, which position is slightly raised from the bottom of said space, as shown.

5 Within the solid rim of the outer knob are formed the transverse recesses 33, provided with the removable keys 34. These keys consist of short bars 35, adapted to fit nicely within recesses 33, which are the entire depth
10 of the rim of the knob, as shown in Fig. 1. Bars 35 are provided with two cylindrical lugs 36 36. One of these lugs extends upward into recess 33, while the opposite one enters the opening 37 through the rear of
15 the knob, and projects through the said opening and out of the knob sufficiently to accomplish its function, as hereinafter described. Bars 35 occupy a radial position. The inner extremity of each of these arms is provided
20 with a narrow projection 38 of about the same thickness as disk 27 or a little less than half the thickness of bars 35. This projection is so located that when the keys 34 are in one position projections 38 engage the recesses in
25 disk 27, while when said keys are in the reverse position said projections do not engage the disk, but lie in the space 39 below the disk. Both these positions of the keys are illustrated in Fig. 1. It will be thus observed
30 that keys 34 are reversible and that either lug 36 may be placed in opening 37; also, that all or any number of the keys 34 may be so placed as to normally engage recesses 28 of disk 27; or these keys may be so placed that
35 no one of them shall engage the disk, as may be desired, since each key is independent of every other key. To one side of each recess 33 a channel 40 is formed in the solid rim of the outer knob, said channel communicating
40 with the said recess and being of such depth that the bottom of the channel shall be about on a level with the top of the inner lug 36 of the key. Within the bottom of each of these channels is located a small leaf-spring 41,
45 made fast at one extremity by a set-screw and of sufficient length to permit its opposite or free extremity to engage the top of lug 36 of the key. These springs maintain the keys in position, yet they yield readily to pressure
50 from without or upon the opposite or exposed lug of the key. It will thus be seen that if any of the keys are in the position engaging the disk said disk must move with the outer knob unless these engaging keys are
55 removed from the locking position. If disk 27 moves, it carries with it tubular bar or sleeve 25, to which the disk is rigidly secured, as before stated. Sleeve 25 is cylindrical, except a small central portion 42, which passes
60 through an angular opening 45, formed in the base of an arm 44. Part 42 of tubular bar 25 is fashioned to fit angular opening 45. The base of arm 44 engages the base of arm 22, the opening 45 being continuous with opening
65 55, the latter, however, being the larger.

The dotted line 45' in Fig. 1 marks the division between arms 22 and 44 and also indi-

cates the termination of extension 24 of the outer knob. Arm 44 is so located that its outer extremity is normally in close proximity
70 to another arm 46, which is normally stationary, but may be adjusted by the use of a key 47, so that it will not lie in the path of arm 44. This position is shown by dotted lines in Fig. 7.

75 Leading to the metal arms 44 and 46 are the circuit-wires 48 and 49, leading from a battery 50 or other source of electricity and connected with suitable alarm mechanism 60, which may be located in any desired portion
80 of the house. The source of electricity and the alarm mechanism may be arranged in the ordinary manner. It will thus be observed that if the outer knob of the door is turned while some of the keys 34 are in the locked
85 position or in engagement with disk 27 arm 44 will be permitted a slight movement before engaging arm 46, which contact closes the circuit in which the alarm mechanism lies. Arms 17, 22, 44, and 46 are normally held in
90 position by springs *a*, *b*, *c*, and *d*, respectively. Spring *d* is provided with notches *h*, adapted to receive a lug *j*, projecting from the lower extremity of arm 46. By the use of these
95 notches arm 46 may be retained in either position desired—that is to say, in the path of arm 44, as shown in full lines in Fig. 7, or out of the path of said arm, as shown by dotted lines.

100 From the description heretofore given the use and operation of the mechanism will be readily understood. The person who is to use my improved lock sets "the combination," so to speak, by placing certain keys 34 so that
105 the projections 38 shall normally engage recesses 28 of disk 27, the other keys lying in a plane below the disk. The person who understands the combination has only to place a finger on the outer lug 36 of each of the
110 keys engaging the disk and then press thereon, when those keys will move against springs 41 far enough to release projections 38 from the disk. The outer knob can then be turned and the bolt 14 withdrawn from the locking
115 position. While, on the other hand, if a person who does not know the combination attempts to open the door, he will turn the knob enough to bring arm 44 into engagement
120 with arm 46 and sound the alarm mechanism. It will be observed that if the keys not engaging the disk are moved their projections 38 will be forced outward into engagement
125 with the disk or into the locked position, since normally a recess 28 is always in the path of a projection 38 of any key. Hence a person who does not understand which keys
130 to touch will not only fail to open the door but will also close an electric circuit and alarm the occupants of the house.

My improved mechanism may be used as
130 an ordinary lock by turning key 47 and throwing arm 46 out of the path of arm 44. In this case the outer knob may be turned at pleasure. The inner knob is always station-

ary, being used simply as a handle or convenient attachment to grasp in pulling the door open after the bolt 14 has been withdrawn, this bolt being only operated from the inside by the use of a key 18, connected with arm 17, as before described.

Having thus described my invention, what I claim is—

1. In a lock, the combination, with two hollow knobs connected by a spindle, of a continuous sleeve extending from the interior of one knob to the interior of the other and through which the spindle passes, the inner extremity of the sleeve being secured to the knob, permitting the sleeve to rotate, but preventing longitudinal action, the outer extremity of the sleeve being provided with a disk having a notched periphery and concealed within the knob, movable keys located within the outer knob and actuated from its exterior, said keys being adapted to engage the notches in the disk, a locking-bolt, an arm connecting the bolt with the continuous sleeve, whereby the turning of the sleeve withdraws the bolt, and a stop which prevents the turning of the outer knob and sleeve when one or more of the movable keys engage the disk, substantially as described.

2. In a lock, the combination, with two hollow knobs connected by a spindle, of a continuous sleeve extending from the interior of one knob to the interior of the other and through which the spindle passes, the inner extremity of the sleeve being secured to the knob by movable arms engaging a circumferential recess formed in the sleeve, permitting the sleeve to rotate, but preventing longitudinal

action, said sleeve terminating at its outer extremity in a disk concealed within the knob, movable keys located within the knob actuated from the exterior thereof and adapted to engage the disk, an arm connecting the sleeve with the locking-bolt, whereby the turning of the sleeve acts on the bolt, and a stop which may be so adjusted as to permit or prevent the rotation of the knob and sleeve when one or more keys engage the disk, substantially as described.

3. In a lock, the combination, with a bolt, a casing, and a spindle passing therethrough, of a hollow knob secured to the outer extremity of the spindle, the inner extremity of the spindle being secured in any suitable manner, a sleeve passing through the casing surrounding the spindle and terminating at its outer extremity in a disk concealed within the knob, movable keys located in the knob actuated from its exterior and adapted to engage the disk, an arm secured to the sleeve, a link connecting this arm with the locking-bolt, and a separate movable arm connected with the bolt and actuated from the interior of the door or casing, whereby the bolt may be withdrawn from the inside of the door, while the mechanism is exteriorly locked by the engagement of the keys with the disk, substantially as described.

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

EDWARD C. PENFIELD.

Witnesses:

WM. MCCONNELL,
G. J. ROLLANDET.