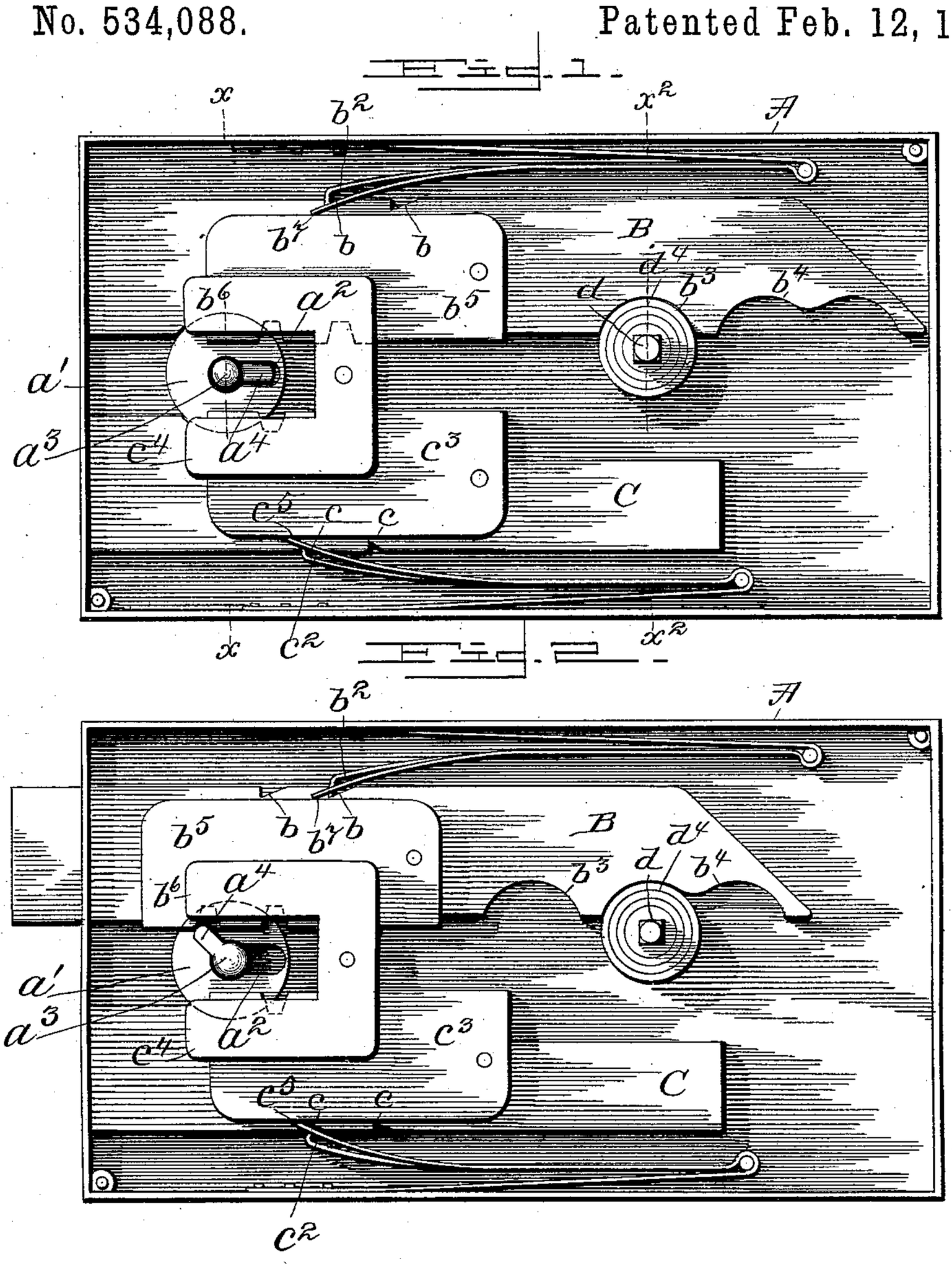
(No Model.) 2 Sheets—Sheet 1.

I. SUMMER.

COMBINATION LOCK.

No. 534,088. Patented Feb. 12, 1895.



Witnesses.
H. Holgate.
W. H. Pumphrey.

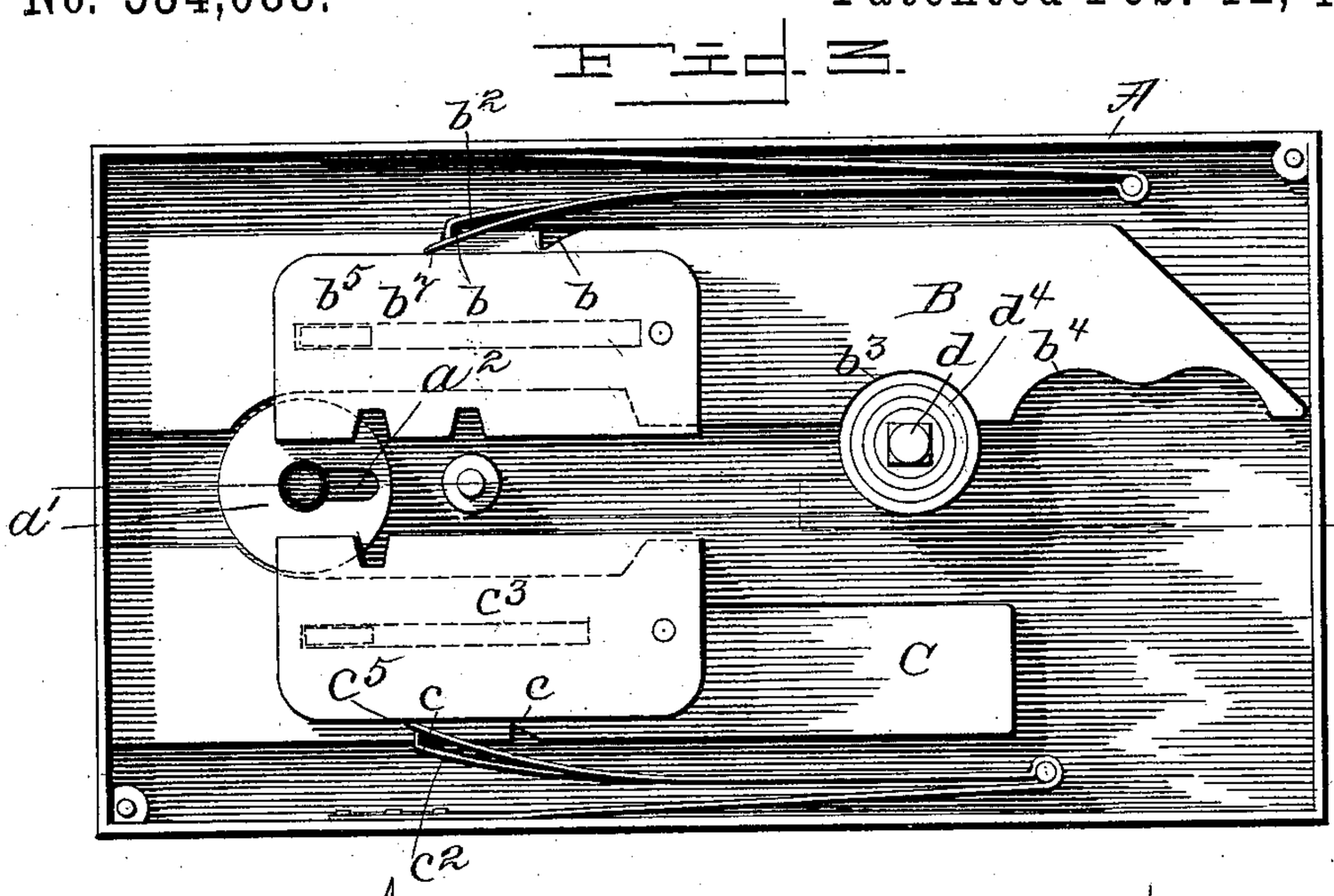
Inventor,
Israel Summer
by Geo. H. Holgate
his Attorney.

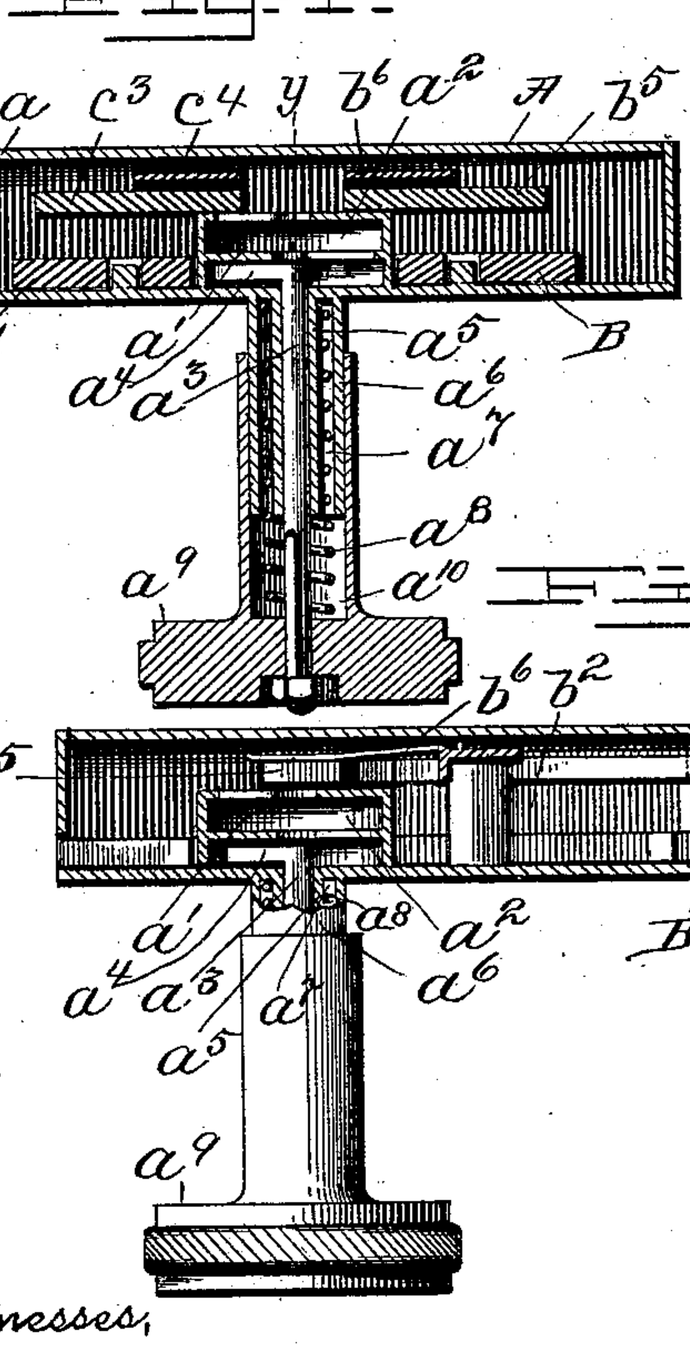
(No Model.) 2 Sheets—Sheet 2.

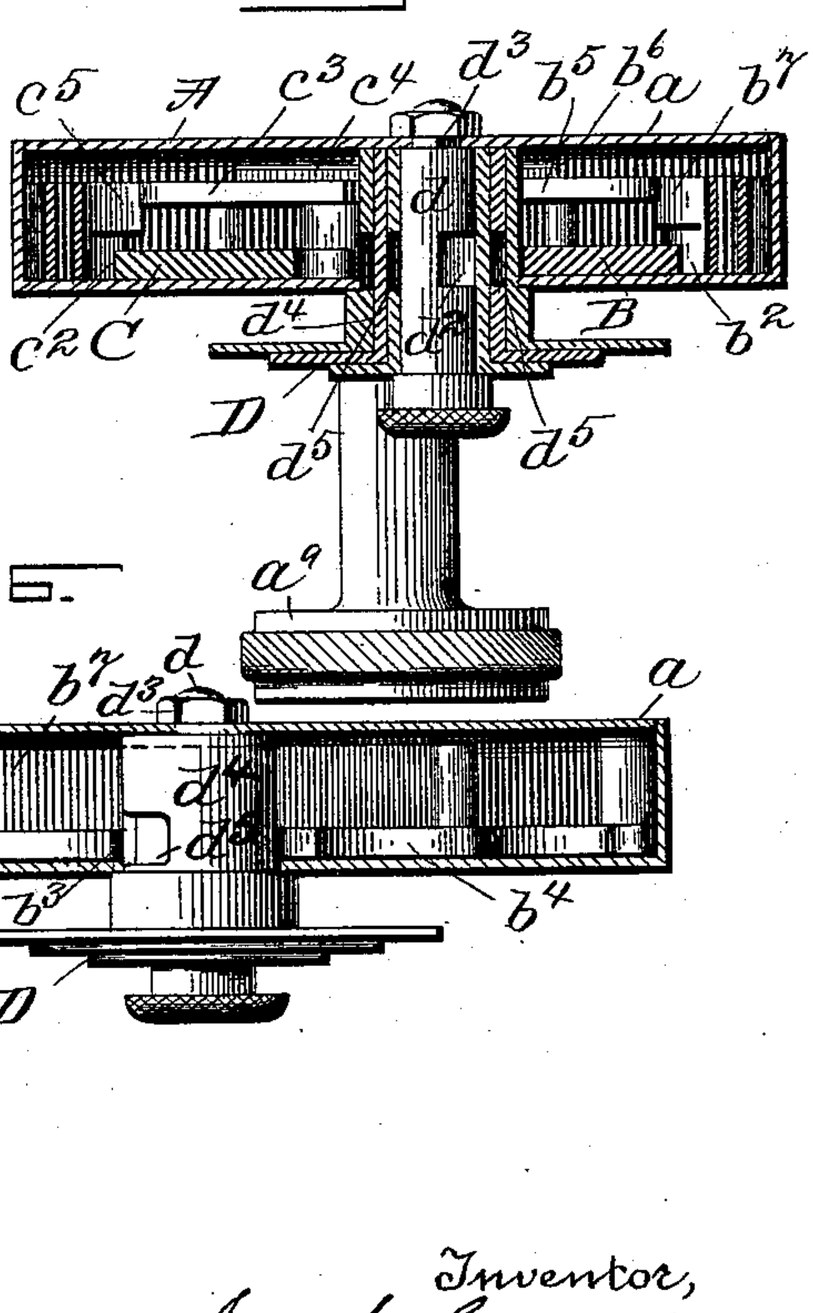
I. SUMMER.

COMBINATION LOCK.

No. 534,088. Patented Feb. 12, 1895.







Witnesses,
H. Holgate
W. H. Humphrey.

Inventor,
Israel Summer
by Geo. H. Holgate
his Attorney.

UNITED STATES PATENT OFFICE.

ISRAEL SUMMER, OF PHILADELPHIA, PENNSYLVANIA.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 534,088, dated February 12, 1895.

Application filed July 12, 1894. Serial No. 517,383. (No model.)

To all whom it may concern:

Be it known that I, ISRAEL SUMMER, a subject of the Czar of Russia, but now residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Combination-Locks, of which the following is a specification.

The invention relates to combination locks.

The object is to produce a lock, simple and inexpensive in construction, adapted for both general and private use, in being adjustable to operate, when desired, as a combination lock, and which, under any adjustment, will be controlled by concealed actuating mechanism, whereby unauthorized manipulation will be rendered difficult, if not impossible.

The invention is illustrated in the accompanying drawings, forming part of this specification, and in which like letters of reference indicate corresponding parts in the several views.

Figure 1, is a view in elevation, of one embodiment of the invention, the front plate of the casing being removed, to illustrate more clearly the arrangement of the mechanism, showing a lock having two bolts, movably mounted within the casing, each being notched, to receive spring retaining pawls, and provided with pivoted notched tumblers, spring held, against vertical and lateral play, an apertured projection, centrally between the bolts, through which an actuating key is adapted to be passed, to engage the notches of the tumblers, and thereby effect a disengagement of the pawls, as the bolts are advanced or retracted, and combination mechanism controlling one of the bolts, comprising a series of concentric sleeves, forming part of the combination disks, assembled, one within the other, upon a central spindle, the inner end of which, is reduced by being squared, to enter an opening in the casing, and threaded to receive a clamp nut. Fig. 2, is a similar view, showing the main locking bolt, that is, the bolt controlled by the combination mechanism, partially advanced, and the actuating key, just passing out of engagement with a notch of the tumbler. Fig. 3, is a similar view, the springs upon the tumblers being removed, showing by dotted lines, the slots of the bolts, and studs of the casing projecting into the slots, forming guides for the bolts. Fig. 4, is a view, in transverse vertical section, taken on a line x—x, of Fig. 1, showing, centrally within, and secured to or forming part of the bottom plate of the casing, a hollow projection, divided interiorly, by a partition, into an upper and a lower chamber, central apertures through the walls of the chambers, the apertures being elongated, in opposite directions, to permit the passage of the web or bit of a key, the stem of which, is slidingly mounted in a tubular projection of the casing, and squared and threaded, at its outer end, to fit into a corresponding opening of a knob, and receive a nut, whereby the key and knob are secured rigidly together, the knob being also slidingly mounted upon an outer tubular projection, concentric with and inclosing an annular space around the inner tubular projection, in which, a spiral spring is seated, in a manner, to act upon the knob and force it outward; showing, furthermore, the locking-bolts on opposite sides of the hollow projection, and the spring held, notched tumblers, above the locking bolts, to which they are pivoted. Fig. 5, is a similar view, taken on the line x^2—x^2, of Fig. 1, showing the combination disks, and their sleeve like extensions concentrically arranged, one within the other, upon a non-rotatable spindle, which is held rigid to the casing, by being squared and threaded, to enter a square opening and receive a clamp nut, the notches of the spindle and sleeves, which, on being aligned, permit passage of the main bolt, also the locking bolts on opposite sides of the sleeves, the pivoted tumblers upon the bolts, and the springs engaging the bolts and tumblers. Fig. 6, is a view, in vertical, longitudinal section, taken on the line y—y, of Fig. 4, showing the main locking bolt, the combination disks, and their notched sleeves mounted upon a non-rotatable spindle, the chambered projection between the bolts, and the key within the lower chamber thereof, free to rotate, out of engagement with the bolts.

In the drawings: A, represents an inclosing casing, for the mechanism of a lock, provided with a removable upper plate a, a hollow projection a', within the casing, divided interiorly, by a partition, into upper and lower chambers a^2. Movable through elon-

gated openings in the walls of the chambers, is a key a^3, having at its inner end, a right-angled projection or web a^4, the elongation of the openings in the upper walls of the chambers, being oppositely disposed, thereby necessitating successive rotations of the key, in opposite directions, in its passage through the chambers. The key is slidingly mounted within a tubular projection a^5, of the lower plate of the casing, and around which, a second fixed tube a^6, is concentrically arranged, inclosing an annular space a^7, to receive a spiral spring a^8, which is designed to act upon, by forcing outward a knob a^9. This knob is socketed at a^{10}, and slidingly mounted upon the outer tubular projection, and provided with a squared opening, to receive a squared portion adjacent the end of the key, the end being threaded for a nut, by which, it is secured rigidly, to turn with the knob.

B, and C, represent locking bolts, arranged, one on each side of the chambered projection, and notched at b, c, to receive spring retaining pawls b^2, c^2, whereby the bolts are yieldingly held in a retracted or advanced position.

The bolt B, which is the main bolt, is cut away at its edge, near the inner end, forming notches b^3, b^4. The notch b^3, being the forward notch, is approximately semi-circular, and the rear notch, b^4, of an increased length or double, for a purpose to be explained. Pivoted to this bolt B, is a notched tumbler b^5, movable upon or above the upper face of the chambered projection and being normally held against vertical and lateral play, and with the notched edge thereof, adjacent the opening in the projection, by plate springs b^6, b^7.

The bolt C, which is the auxiliary bolt, is also provided with a notched tumbler c^3, and similarly mounted, by being pivoted to move on or above the hollow projection, and held against vertical and lateral play, by springs c^4, c^5, with the notched edge thereof, adjacent the opening.

D, represents the combination disks, which are mounted upon a spindle d, notched at d^2, and squared adjacent its end to fit into a square opening in the casing, where it is secured by a nut d^3, engaging the threaded end of the bolt or spindle. Integral with each of the disks, is a sleeve d^4, which are assembled concentrically upon the spindle, one within the other, each sleeve being notched at d^5, in a manner, whereby, on becoming aligned, by a proper adjustment of the disks, a passage will be cleared, to allow a free movement of the main bolt.

In use, as for example, where the lock is applied to the door of a safe, room, or other private compartment, the main bolt may be held retracted, by an adjustment of the disks, causing the sleeves thereof, to lock into the first notch of the bolt, and persons, properly instructed in the manipulation of the concealed key, by means of the exposed knob, may readily advance or retract the auxiliary locking bolt, which will then operate independent, and of itself, afford security against unauthorized access to the compartment.

When it is desired to protect the compartment, against persons having a knowledge of the movements required to operate the auxiliary bolt, the main bolt may be thrown, on setting up the combination, to effect an alignment of the notches of the sleeves, by the key engaging the notched tumbler, during its rotation, the bolt being held in its advanced position, by the sleeves locking into the second notch thereof. On continued rotation of the key, by means of the knob, the web thereof will engage the succeeding notch of the tumbler of the main bolt, and if the combination be properly set, and the bolt free to move, will cause it to be again thrown forward, into a suitable socket or keeper, thereby insuring great strength and rendering the connection secure against attacks. When fully advanced, by reason of the double or enlarged notch, the main bolt may hold, by the sleeves locking therein.

During each revolution of the key, its web or bit must necessarily pass over the elongated opening in the chambered projection and unless guarded against, will be drawn through, into the upper chamber, by the action of the spring of the knob. Should the key be rotated a second time, when in the upper chamber, its web will drop through the opening in the dividing wall or partition into the lower chamber. If, for any reason, the key be left in engagement with the tumblers, before the main bolt could be fully retracted, the webbed end thereof, would be drawn into the upper chamber, where it would be free to rotate out of engagement.

Having described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A lock having two bolts, one of which is controlled by combination mechanism, and an actuating device, common to and held normally free to move out of engagement with the bolts, as specified.

2. A lock having two bolts, one of which is controlled by combination mechanism, and an actuating device common to and held normally out of engagement with the bolts, by being spring seated, as specified.

3. A lock having two bolts, one of which is controlled by combination mechanism, and an actuating device common to and held normally free to rotate out of engagement with the bolts and adapted, by successive step up movements, to be brought into engagement, as specified.

4. A lock having two bolts, normally held by spring pawls, and provided respectively, with pivoted tumblers, one of the bolts being controlled by combination mechanism, and a key, rotatably mounted, common to the bolts,

and adapted, by successive step up movements, to be brought into engagement with the tumblers, as specified.

5. A lock having two bolts and engaging spring pawls, spring held tumblers, pivoted to the bolts, combination mechanism controlling one of the bolts, and a concealed key held normally free to rotate out of engagement, within a chambered projection adjacent the tumblers, as specified.

6. A lock, comprising a bolt, a chambered projection, adjacent to the bolt, and an actuating device rotatable within the chambers and movable through openings in the walls thereof, whereby an engagement is effected with the bolt, as specified.

7. A lock, comprising a bolt, a chambered projection adjacent to the bolt, and a spring held actuating device rotatable within the chambers and movable through openings in the walls thereof, whereby an engagement is effected with the bolt, as specified.

8. A lock, comprising a bolt having a notched tumbler pivoted thereto, a chambered projection adjacent to the bolt, and a spring held actuating device rotatable within the chambers and movable through openings in the walls thereof, whereby an engagement is effected with the tumbler, as specified.

9. A lock, comprising a bolt having a notched tumbler pivoted thereto, retaining spring for the bolt and tumbler, a chambered projection adjacent the free end of the tumbler, and a bolt actuating device having an angular extremity, rotatable within the chambers and movable through openings elongated in different directions in the walls thereof, whereby the actuating device is adjusted to the plane of the tumbler, as specified.

In testimony whereof I have affixed my signature in the presence of two subscribing witnesses.

ISRAEL SUMMER.

Witnesses:
GEORGE MCCURDY,
E. B. WILLIAMS.