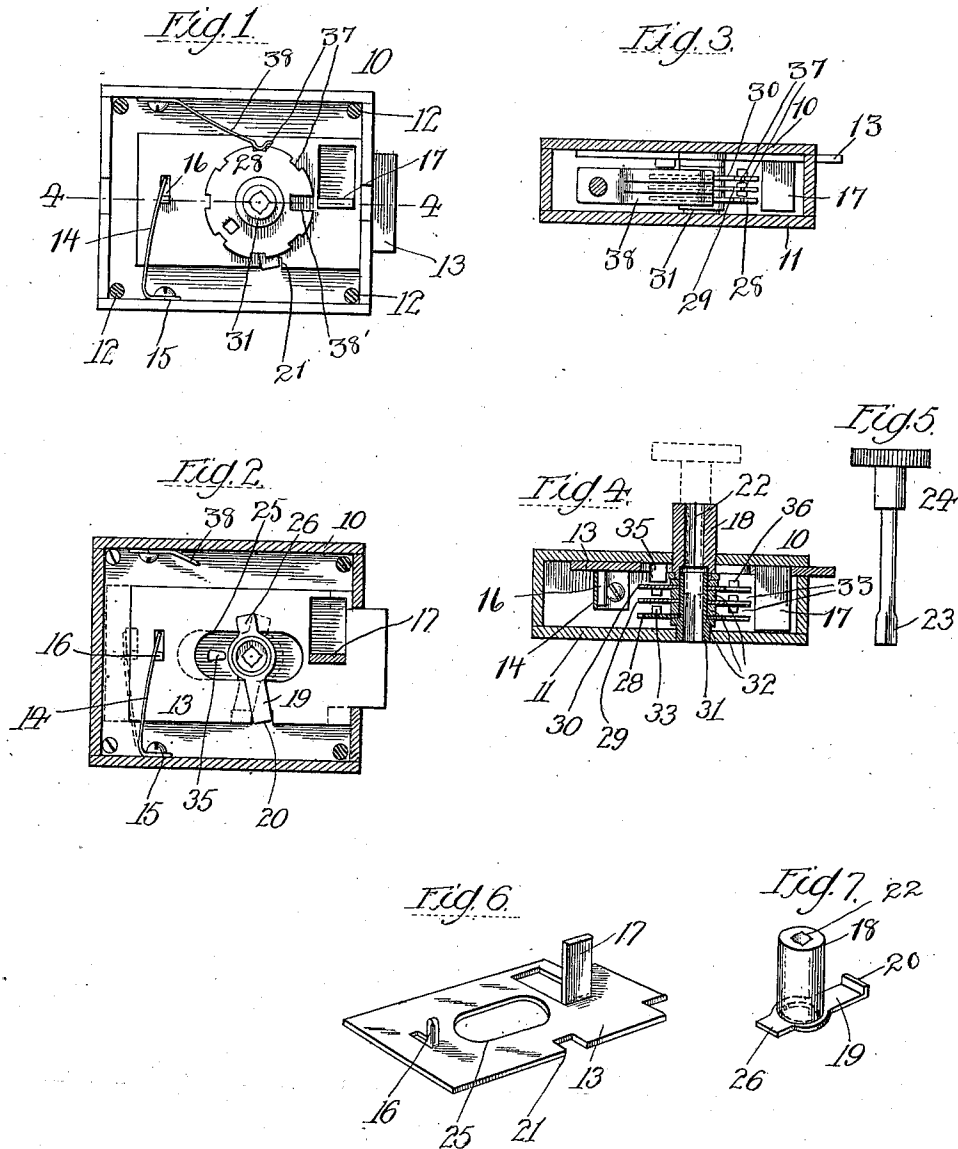


A. B. SMITH.
COMBINATION LOCK.
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996,151.

Patented June 27, 1911.



Witnesses:

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COMBINATION-LOCK.

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To all whom it may concern:

Be it known that I, ALLEN B. SMITH, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Combination-Locks, of which the following is a full, clear, and exact description.

The invention relates to combination locks, and more particularly to the type embodying a simple construction, *e. g.* those used for drawers and slot-machines. In locks of the type aforesaid, the cost of production is material because large quantities are used and one object of the invention is to provide a combination lock which can be produced at a low cost.

The invention also designs to provide a lock which is simple in construction.

The invention consists in the several novel features hereinafter set forth, and more particularly defined by the claim at the conclusion hereof.

In the drawings: Figure 1 is an elevation of a lock embodying the invention, the side-plate being removed. Fig. 2 is a similar view, the disks being also removed to show the bolt and bolt-shifter, and the case being shown in section. Fig. 3 is a plan view, the case being shown in section. Fig. 4 is a section taken on line 4-4 of Fig. 1. Fig. 5 is a detail of the key for operating the lock. Fig. 6 is a perspective view of the bolt. Fig. 7 is a perspective of the bolt-shifter.

The lock is usually inclosed in a case or box 10 comprising a removable side plate 11, which is secured to the box by screws 12. A bolt 13 is slidably mounted against one wall of the case and is spring-pressed into locking position by a spring 14 secured to the case as at 15 and engaging an inwardly bent portion 16 of the bolt. The bolt is preferably formed of a plate of metal which can be cut or stamped into the desired form. The bolt is provided with a stop or abutment 17 which is projected into position adjacent the controlling disks which prevent the bolt from being drawn except when the disks have been brought into proper position. Stop 17 is formed by bending a portion of the bolt at substantially right-angles thereto.

The bolt-shifter comprises a hub 18 mounted in the case 10, and an arm 19 having its outer end bent laterally as at 20 to engage a notch or recess 21, cut in one of the

edges of the bolt. Said arm is rigidly secured to said hub and the hub is provided with a non-circular bore or channel 22 which is adapted to receive a correspondingly shaped stem 23 of a key 24. The bolt is also provided with an elongated slot 25, the edges of which engage the hub of the bolt-shifter and thereby the bolt is guided longitudinally. The bolt-shifter is also provided with a tail-piece, or extension 26, which, together with arm 19, holds the bolt in position adjacent the wall of the case, and also holds the hub of the shifter against outward displacement. The shift of the bolt is controlled by a series of disks or tumblers 28, 29 and 30, which are rotatable independently of each other on an arbor 31, one end of which is journaled in plate 11, and the other end of which is journaled in a bearing formed at the inner end of the bolt-shifter. A channel, corresponding in shape to the channel 22 of the bolt-shifter, is formed in said arbor to adapt the arbor for rotation by a key such as is used for operating the bolt-shifter. Disk 28 is rigidly secured to the arbor so as to be rotated in either direction by said arbor. Disks 29 and 30 are loosely mounted on the arbor, washers 32 being interposed where necessary to hold the disks in properly spaced relation. The several disks of the series are respectively provided with lugs or abutments 33 whereby movement will be imparted from disk 28 to disk 29 and from disk 29 to disk 30. A fixed stop 35 is adapted to be engaged by a stop 36 on disk 30 to arrest the movement of the disks.

It will be readily understood that by variation of the location of the stops on the disks, the combination of steps necessary to set the disks into position to permit a bolt to be drawn can be made. Each disk is provided with a series of peripheral notches 37 with which a detent 38 engages to denote to the operator the number of spaces which a disk has been turned. The detents for all of the disks are preferably formed of a strip of spring-metal, slitted to form a detent for each disk which is independently responsive to one of the disks. One of the peripheral notches of each disk is formed of sufficient depth or extended to form a recess or way 38' for the stop 17 of the bolt. Normally the edges of the disks obstruct the inward movement of stop 17 and prevent retraction

of the bolt. When the recesses 38' of the several disks are brought into alinement and into position to receive stop 17, the bolt can be retracted against the force of spring 14.

- 5 The operation of the lock will be as follows: Assuming the disks to be in position to prevent the bolt from being retracted, the polygonal end 23 of key 24 is inserted into arbor 31, as indicated by dotted lines in Fig. 4. The key is then turned in one direction until stop 36 encounters the fixed stop 35. Upon rotating the key alternately in opposite directions, the predetermined number of steps, the recesses 38' of each of the disks will be successively brought into alinement and into position to permit stop 17 to enter and the bolt to be retracted. Key 24 will then be partially withdrawn to bring terminal 23 into channel 22 of the bolt-shifter. 20 By turning the key, the bolt can be retracted against the force of spring 14.

- From the foregoing it will be seen that the construction throughout is a simple one and the several parts can be cut or stamped from sheet-metal which effects a material saving of cost in production. By forming a stop on the bolt and recesses in the disks, the employment of intermediate parts is avoided. The entire bolt can be stamped

from a plate of metal and the disks can be similarly formed. The abutments on the disks are formed by cutting out and bending a portion of the disks laterally and by locating the abutments at different points with respect to recess 38' many different combinations can be established for the lock.

The invention is not to be understood as restricted to the details described since these can be modified without departing from the spirit and scope of the invention.

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

In a combination lock, the combination of a rotatable disk having a series of peripheral notches and a recess therein, detents for engaging said notches, a slidable bolt provided with a stop adapted to enter said recess to permit said bolt to be withdrawn and having a recess therein, and a pivoted bolt shifter comprising an arm having a portion thereof bent to extend into the recess in said bolt and adapted to receive a key.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."