

(No Model.)

2 Sheets—Sheet 1.

J. A. BEXELL & V. O. PETERSON.

COMBINATION LOCK.

No. 510,234.

Patented Dec. 5, 1893.

Fig. 2

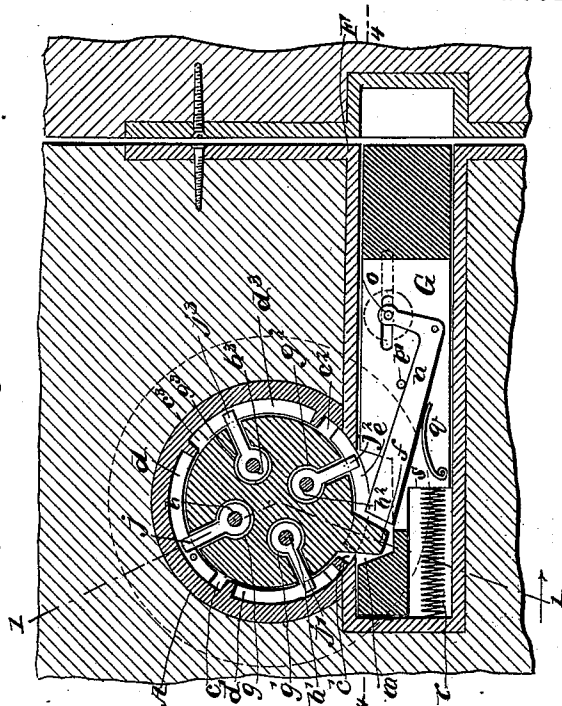


Fig. 4

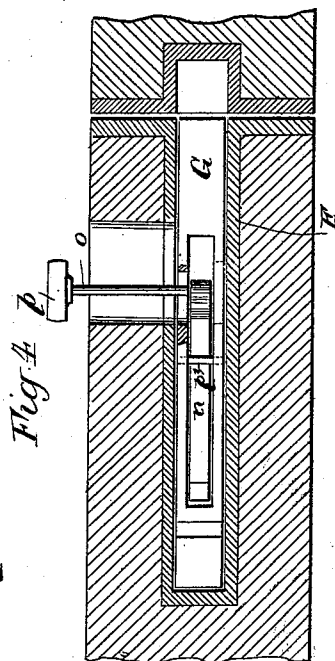


Fig. 1

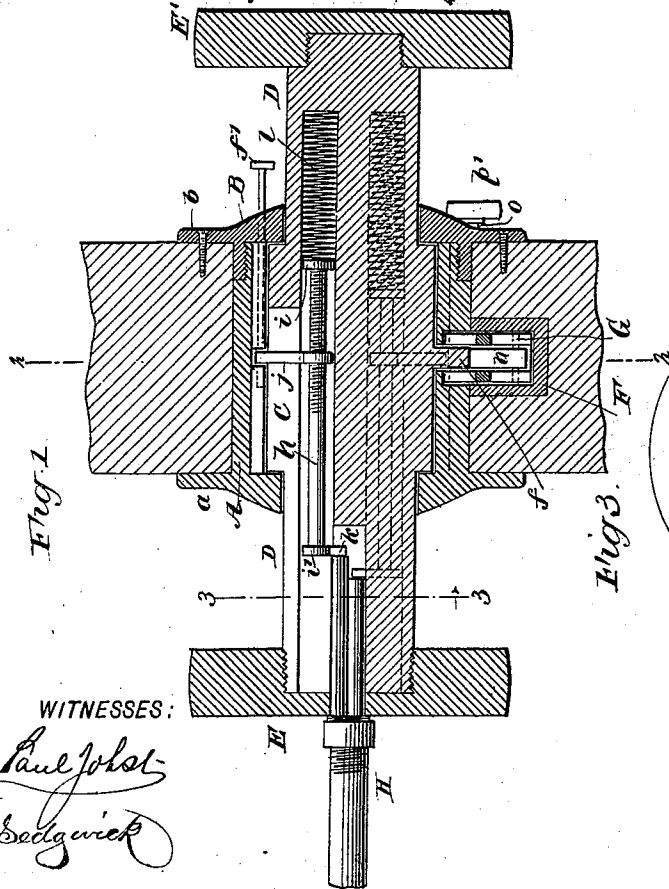
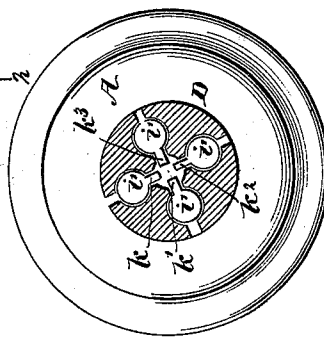


Fig. 3



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Fig 5.

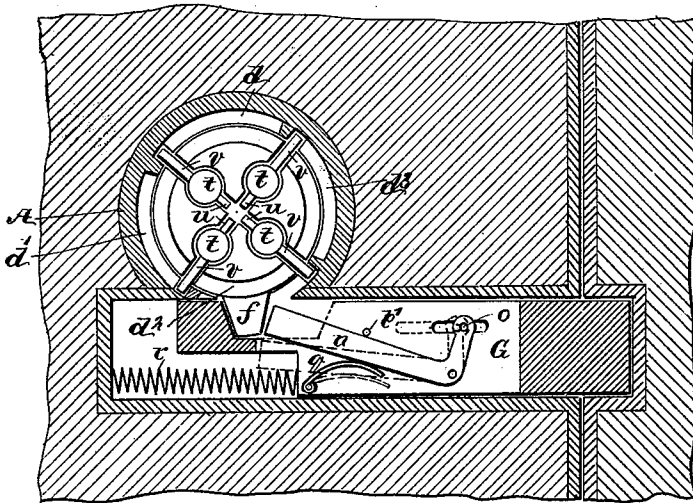


Fig 6.

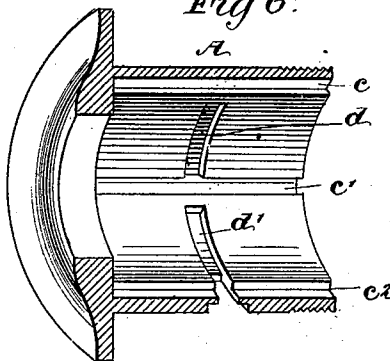


Fig 8.

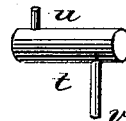


Fig 7.

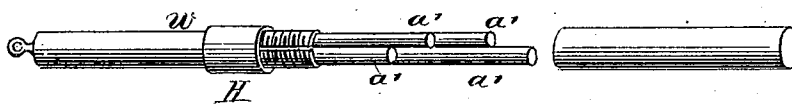


Fig 9.



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UNITED STATES PATENT OFFICE.

JOHN A. BEXELL AND VICTOR O. PETERSON, OF ROCK ISLAND, ILLINOIS.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 510,234, dated December 5, 1893.

Application filed June 20, 1893. Serial No. 478,221. (No model.)

To all whom it may concern:

Be it known that we, JOHN A. BEXELL and VICTOR O. PETERSON, both of Rock Island, in the county of Rock Island and State of Illinois, have invented a new and Improved Combination-Lock, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a longitudinal section of our improved lock, taken on line 1—1 in Fig. 2. Fig. 2 is a transverse section taken on line 2—2 in Fig. 1. Fig. 3 is a transverse section taken on line 3—3 in Fig. 1. Fig. 4 is a sectional view on the line 4—4 in Fig. 3. Fig. 5 is a vertical transverse section of a modified form of the lock. Fig. 6 is a sectional view of part of the lock casing. Fig. 7 is a perspective view of one form of key. Fig. 8 is a perspective view of one of the tumblers; and Fig. 9 is a perspective view of a key of modified form.

Similar letters of reference indicate corresponding parts in all the views.

The object of our invention is to construct a simple, compact and inexpensive combination lock which may be inserted in a door in place of the ordinary lock.

Our invention consists in the combination of a cylinder inserted in the door, an enlarged knob spindle carrying the followers, and a bolt provided with a latch for convenience in unlocking from the inside of the door without necessitating the use of a key, all as will be hereinafter more fully described. The body of the lock is formed of a hollow cylinder A, furnished with a flange *a* which is designed to rest against the face of the door, and a cap B, screwed on the end of the cylinder and provided with a flange *b*. To the said hollow cylinder is fitted a hub or nut C, which is formed integrally with the knob spindle D, to the ends of which are fitted the knobs E E'. The inner surface of the cylinder A is furnished with four longitudinal grooves *c*, *c'*, *c²*, *c³*, and from the said grooves, at or near the mid-length of the cylinder A, are formed grooves *d*, *d'*, *d²*, *d³*, at right angles to the grooves *c*, *c'*, &c., and in the side of the cylinder A, adjoining the bolt casing F, is formed a slot *e*, through which projects the lug *f*, which is formed on or attached to

the hub C, for moving the bolt G in the bolt casing.

The spindle D and hub C are provided with four longitudinal holes *g*, *g'*, *g²*, *g³*, in which are placed rods *h*, *h'*, *h²*, *h³*, having on opposite ends the heads *i* *i'*, fitted to the holes in the hub. The rods *h*, *h'*, *h²*, &c., are threaded, and upon the said rods are placed arms *j*, *j'*, *j²*, *j³*, which project through slots in the sides of the hub C, and into the grooves *c*, *c'*, &c., and the heads *i*, *i'*, &c., are provided with lugs *k*, *k'*, *k²*, *k³*, which project inwardly toward the center of the spindle D, the said spindle being perforated axially for a short distance either with a cylindrical hole, as shown in Fig. 3, or with a hole of cross shaped section, in the latter case the slots communicating with each other, as shown in Fig. 5. Between the heads *i*, *i'*, &c., and the ends of the holes in which they slide, are placed spiral springs *l*, and in the knob E is made a central aperture corresponding with the cross section of the key to be inserted.

The bolt G in the casing F is provided with an elongated notch *m* for receiving the lug *f* projecting from the hub C. The said bolt is slotted longitudinally, and in the slot of the bolt is pivoted a latch *n*, the said latch consisting of a right angled lever, the shorter arm of which is provided with a stud *o*, which extends through a slot in the side of the bolt, and also in the side of the bolt casing, and is provided with a knob *p*, while the longer arm of the said lever is held normally in the notch *m* and in the path of the lug *f*. The upward movement of the latch is limited by the stop pin *p'*, and it is held normally in an elevated position by the spring *q*, one end of which is fixed to the bolt G, the free end being arranged to press on the under surface of the latch *n*. The lower portion of the inner end of the bolt G is cut away to form a chamber for the spiral spring *r*, which abuts against the end of the casing F, and presses against the shoulder *s* of the bolt.

In the lock shown in Fig. 5, instead of employing rods *h*, *h'*, &c., in the longitudinal holes of the spindle, we use short cylinders *t*, like that shown in Fig. 8, with studs *u*, *v*, projecting therefrom in lieu of the lug *k* and arm *j*. Although the principle involved in this lock is the same as that shown in Figs. 1 and

2, in this form of lock the combination cannot be changed without replacing the cylinder *t*. In other respects the two forms of lock are the same.

5 The key H, used in operating the lock shown in Figs. 1, 2 and 3, is shown in Fig. 7. The key H is provided with a handle *w*, in which are inserted wires *a'* of different lengths, which are adapted to engage the lugs *k*. The
10 said wires *a'* are clamped in the handle, and may be loosened and adjusted when it is desired to change the combination of the lock. When the key is inserted in the key-hole in the knob E, the rods *h*, *h'*, *h*², &c., are pushed
15 in against the pressure of the springs *l*, and the lengths of the different wires of the key are such that each wire forces in the rod which it engages until the arms *j*, *j'*, &c., carried by the said rods are opposite the grooves *d*, *d'*,
20 *d*², *d*³, when the knob may be turned, bringing the lug *f* into engagement with the rear side of the notch *m*, thus withdrawing the bolt from its socket. When the key is withdrawn, the spring *r* forces the bolt G forward,
25 thus turning the hub C until the arms *j*, *j'*, &c., reach the longitudinal grooves *c*, *c'*, &c., of the lock casing, when the springs *l* force the rods *h*, *h'*, &c., forward, carrying the arms *j*, *j'*, *j*², *j*³, along in the grooves *c*, *c'*, *c*², *c*³, thus
30 locking the parts so that the lock cannot be operated from the outside without again inserting the key; but by turning the latch *n* down by means of the knob *p*, the bolt may be disengaged, and may be moved back independently of the locking mechanism. When
35 the bolt is released, the spring *r* carries it forward, when the latch *n* again engages the lug *f*.

The key shown in Fig. 9, is adapted to operate the lock shown in Fig. 5. The said key
40 is cross-shaped in cross section, and when the said key is inserted in the lock, it pushes back the cylinders *t* by engaging the studs *u* until the studs *v* are opposite the grooves *d*, *d'*, *d*²,
45 *d*³, when the knob spindle may be turned and the lock operated in the manner already described.

To prevent the unlocking of the lock by a key from outside, and also to prevent locking until desired, a rod *f'* is inserted in a hole
50 in the cylinder A, and extends across the path of one of the arms *j*, *j'*, &c., thereby preventing the cylinder A from being turned.

As the rods *h*, *h'*, &c., with the parts attached thereto, and the cylinders *t* and studs
55 *u* and *v* projecting therefrom constitute followers to be operated by the keys, we have in our claims adopted the term "follower" as covering both of these forms.

We do not limit or confine ourselves to the
60 exact form and construction herein shown and described, as we may desire to use a larger or smaller number of followers, and this will necessitate a change in form of other portions of the lock, also a change in the form
65 of the key.

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

1. In a combination lock, the combination
70 of a hollow cylinder provided with internal grooves parallel with the axis of the cylinder, and also at right angles thereto, a longitudinally perforated and slotted hub and spindle placed in the cylinder and provided with
75 spring-pressed followers fitted to the longitudinal perforations and adapted to work in the grooves of the cylinder, and a key constructed to act on the followers to force them to unlocking position, substantially as speci-
80 fied.

2. In a combination lock, the combination
of a knob spindle provided with a hub and bolt-moving lug, and containing sliding fol-
85 lowers as described, and a bolt arranged to be operated by the lug on the hub of the knob spindle, as herein specified.

3. The combination, with the lock-bolt and knob-spindle hub provided with a bolt-operating lug, of a spring-pressed angled latch
90 pivoted to the bolt and adapted to engage the bolt-operating lug, substantially as specified.

4. In a combination lock, the combination,
with the longitudinally apertured and grooved knob spindle, of threaded rods *h*, *h'*, *h*², *h*³,
95 provided with heads *i*, *i'*, the heads *i'* being provided with lugs *k*, *k'*, *k*², *k*³, the adjustable arms *j*, *j'*, *j*², *j*³ placed on the threaded portions of the rods, and a key for engaging said
100 lugs, substantially as specified.

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Witnesses:

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