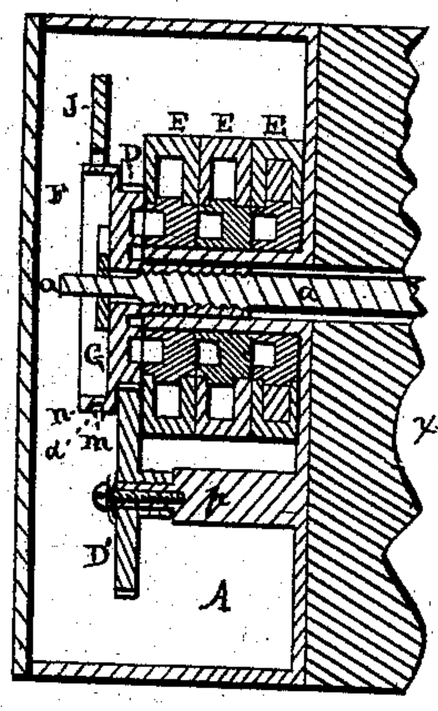
A. McBRIDE.

Combination-Locks.

No. 156,584. Patented Nov. 3, 1874.

FIG. V.



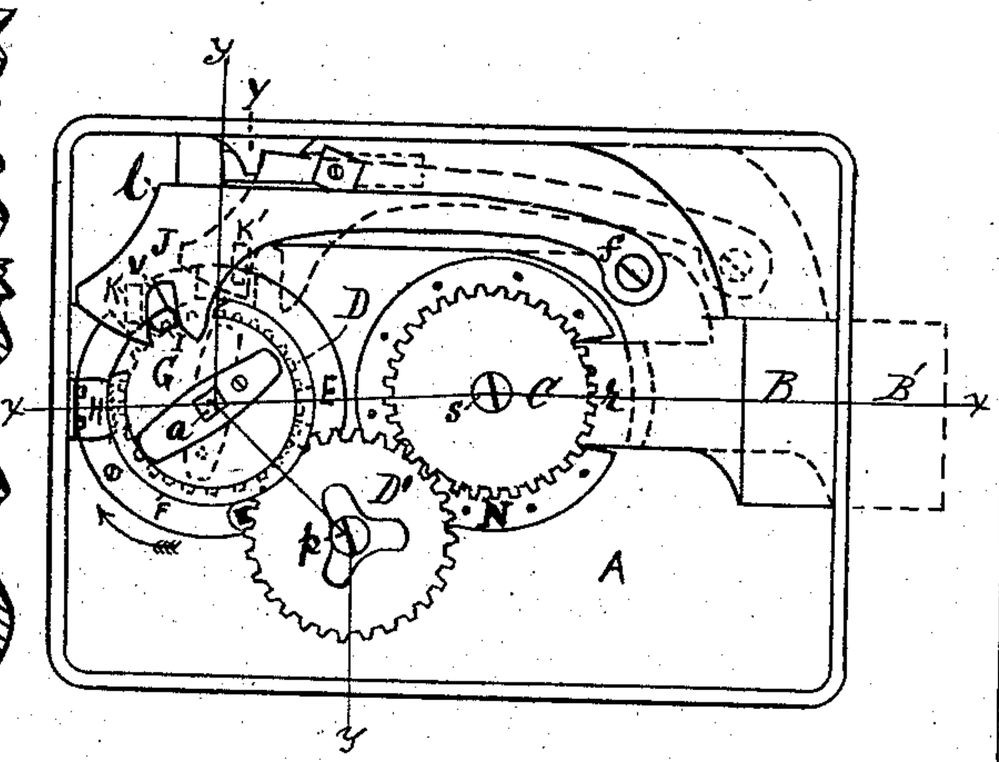


FIG. VI.

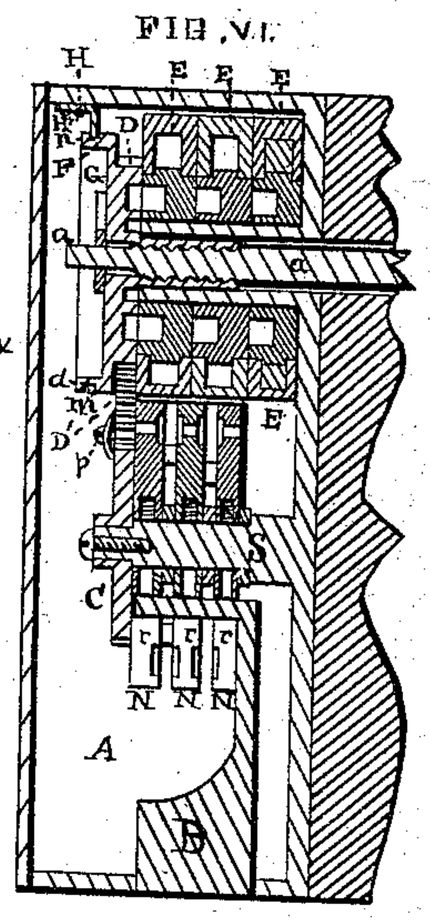


FIG. 1

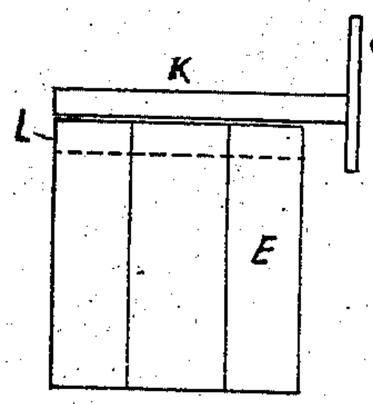


FIG. 4

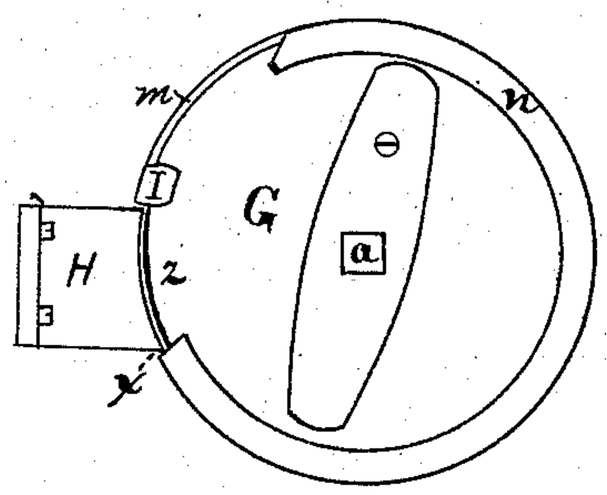


FIG. 3

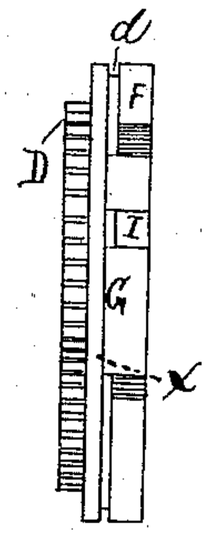


FIG. 2

Witnesses:
H. E. Metcalf.
C. A. Shaw.

Inventor:
Andrew McBride.

UNITED STATES PATENT OFFICE.

ANDREW McBRIDE, OF DONEGAL, IRELAND, GREAT BRITAIN, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHARLES LETTS, OF BOSTON, MASS.

IMPROVEMENT IN COMBINATION-LOCKS.

Specification forming part of Letters Patent No. **156,584**, dated November 3, 1874; application filed July 10, 1874.

To all whom it may concern:

Be it known that I, ANDREW McBRIDE, of Donegal, in the county of Donegal, Ireland, Great Britain, have invented a certain new and useful Improvement in Locks, of which the following is a description sufficiently full, clear, and exact, to enable any person skilled in the art or science to which my invention appertains to make and use the same, reference being had to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a rear elevation, showing my improved lock with the back plate removed, exposing the works. Fig. 2 is an edge view of the grooved driving-wheel. Fig. 3 is a side view of said wheel; Fig. 4, an edge view of the first series of disks, and the fence. Fig. 5 is a section through the line *y y*. Fig. 6 is a section through the line *x x* of Fig. 1.

Like letters refer to corresponding parts in the different figures of the drawing.

My invention relates especially to the class known as combination-locks; and consists of a novel construction and arrangement of the parts, as hereinafter more fully set forth and claimed.

A is the body or case of the lock, and *a* the spindle connected with the knob and index mechanism on the face of the same, which are of the usual construction, and not shown. Disposed upon the spindle *a* are a series of permutation disks or tumblers, E, also of the ordinary construction, and arranged and operated in the ordinary manner. Upon the inner end of the spindle there is attached a driving-wheel, G, Fig. 2, provided with a groove, *d*, around its periphery, and with the gear D upon its inner side. Projecting laterally from the inner face of the gear D, there is a short stud, (not shown,) which intersects as the gear is revolved with a similar stud (not shown) on the outer face of the adjoining disk E, and through which the disks on the spindle *a* are moved consecutively in the ordinary manner. The outer face of the driving-wheel is recessed or sunk, leaving a rim, *n*, Fig. 3, and this rim is cut away in two places, *m z*, down to the plane of said outer face, leaving the stud or projection I. The main part of the wheel G is also transversely slotted or slightly cut away entirely across its edge at *x*, the slot corresponding in length with the cut *z*. Attached to one end of the case A there is a dog or projection, H, constructed of thin sheet metal to work in the groove *d*. Arranged upon the stud *s* is a series of auxiliary permutation disks or tumblers, N, corresponding with the disks E, and outside of the disks N, upon the same stud, there is a gear-wheel, C, having a spur or stud (not shown) upon its inner face, which spur intersects with a corresponding spur or stud (not shown) on the disk contiguous to said gear-wheel, and through which the disks N are consecutively actuated in the usual manner. An intermediate gear-wheel, D′, is disposed upon a stud, *p*, and intersects with the gears D and C. The disks N are correspondingly slotted transversely across their edges to admit the projection *r* of the bolt B, which bolt is provided with the fence-lever J, pivoted at *f*. The free end of said lever has a fence, K, projecting laterally from its inner side, and resting upon the disks E, which disks are provided with corresponding transverse slots in their edges to admit said fence when the lever falls. The spindle *a* is so constructed and arranged as to be moved longitudinally by means of its knob a sufficicient distance to disconnect the gears D and D′, but the endwise movement of the spindle cannot take place while the dog H is in the groove *d*, and only when the space or slot *x* in the wheel G is brought opposite said dog. This construction and arrangement of the parts insures the proper and timely operation of the disks N, as the gears D and D′ can thus be caused to intersect at the proper point only.

From the foregoing, the nature and operation of my invention will be readily obvious to all conversant with such matters.

In using my improvement, the spindle *a* is first turned by means of its knob until the space *x* is brought opposite the dog H, and is then pulled outwardly until the gears D and D′ are caused to engage. The auxiliary disks N are then consecutively operated by turning the knob to the right and left, in accordance with a certain key or combination previously noted or agreed upon, in the usual manner. After all of the auxiliary disks N have been

properly set, the spindle is pushed in sufficiently to cause the gears D and D′ to disengage, thus enabling motion to be communicated to the disks E independently of the disks N, which may then be turned, by means of the spindle *a*, after the manner described for the disks N. The free end of the lever J has a notch, *v*, in its lower edge, into which the stud I passes when the fence K falls into the slots in the edges of the disks E. When the stud I is in said notch the bolt B can be moved in or out by turning the knob to the left or right, as the case may be, providing the slots in the disks N correspond in position, and are opposite the projection *r* of the bolt B; otherwise the bolt cannot be actuated, as will be readily obvious. The dotted lines B′ and K′ represent the position of the parts when the bolt is shot.

It will be seen that, while the two series of disks afford a double protection, the disks N may be readily disconnected, and the disks E only used when desirable; also, that the combination of numbers for the disks N may be held by one person, and the combination for the disks E by another, thus affording an additional safeguard where several persons have access to the safe or vault to which the lock is applied. There is a projection or stop, *y*, in the upper part of the case A, against which the end *l* of the lever J strikes when the fence K is not in the slots in the disks E, or when the loose end of the lever is raised. This stop prevents the bolt from being accidentally or purposely withdrawn at an improper time by the friction of the fence K on the disks E, or otherwise.

Having thus described my invention, what I claim is—

1. In a combination-lock, the driving-wheel G, provided with the slot *x*, stud I, groove *d*, and gear D, in combination with the tumblers E, auxiliary tumblers N, gear-wheel D′, and bolt B, substantially as and for the purpose set forth.

2. In a combination-lock, the gears D D′ and C, and tumblers E and N, in combination with the fence-lever J, stop *y*, and the projection *r* on the bolt B, substantially as and for the purpose set forth.

3. The driving-wheel G, provided with the gear D, stud I, slot *x*, and groove *d*, in combination with the projection H, substantially as and for the purpose specified.

ANDREW McBRIDE.

Witnesses:

H. E. METCALF,

C. A. SHAW.