

No. 615,886.

A. E. ORMOND.
LOCK.

Patented Dec. 13, 1898.

(Application filed June 1, 1898.)

(No Model.)

2 Sheets—Sheet 1.

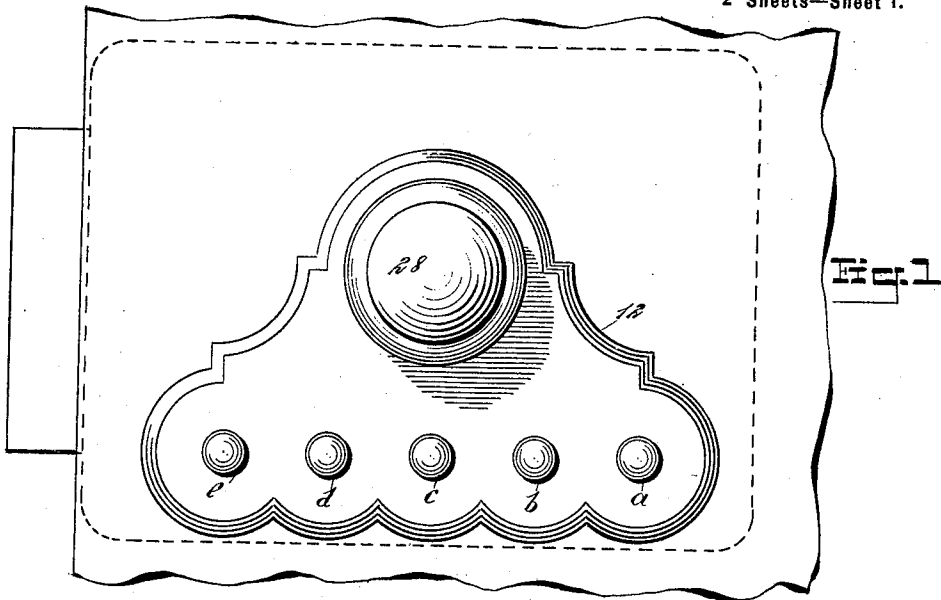
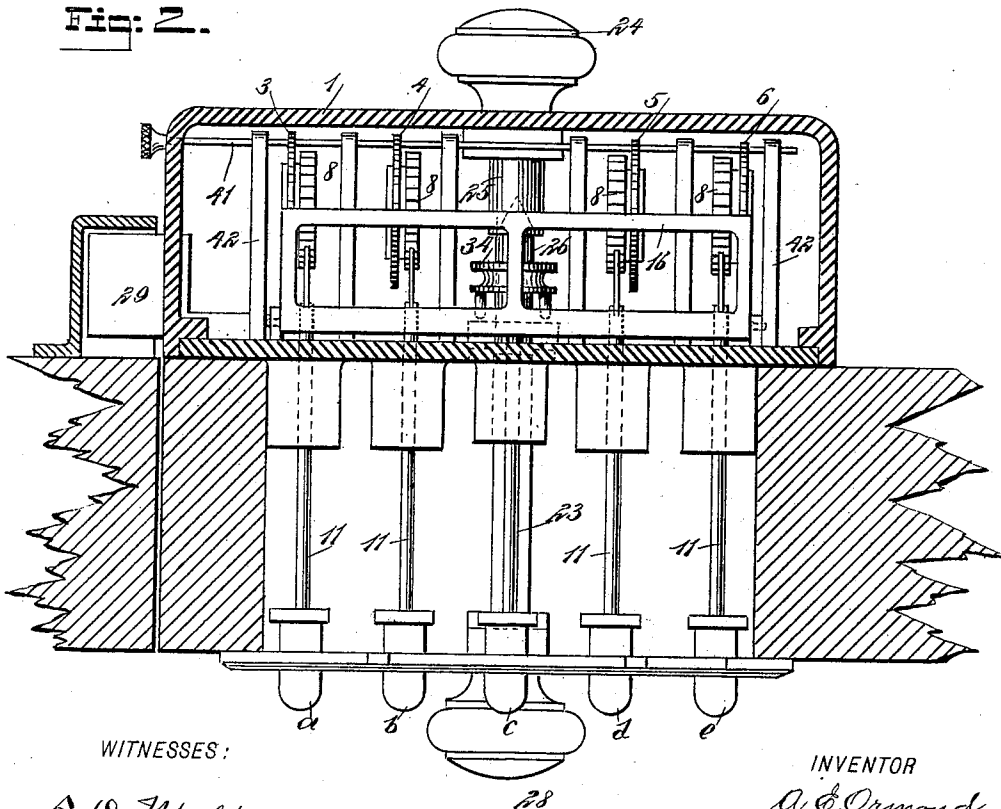


Fig. 2.



WITNESSES:

D. W. Mott
C. R. Ferguson

INVENTOR

A. E. Ormond

BY

Munn
ATTORNEYS.

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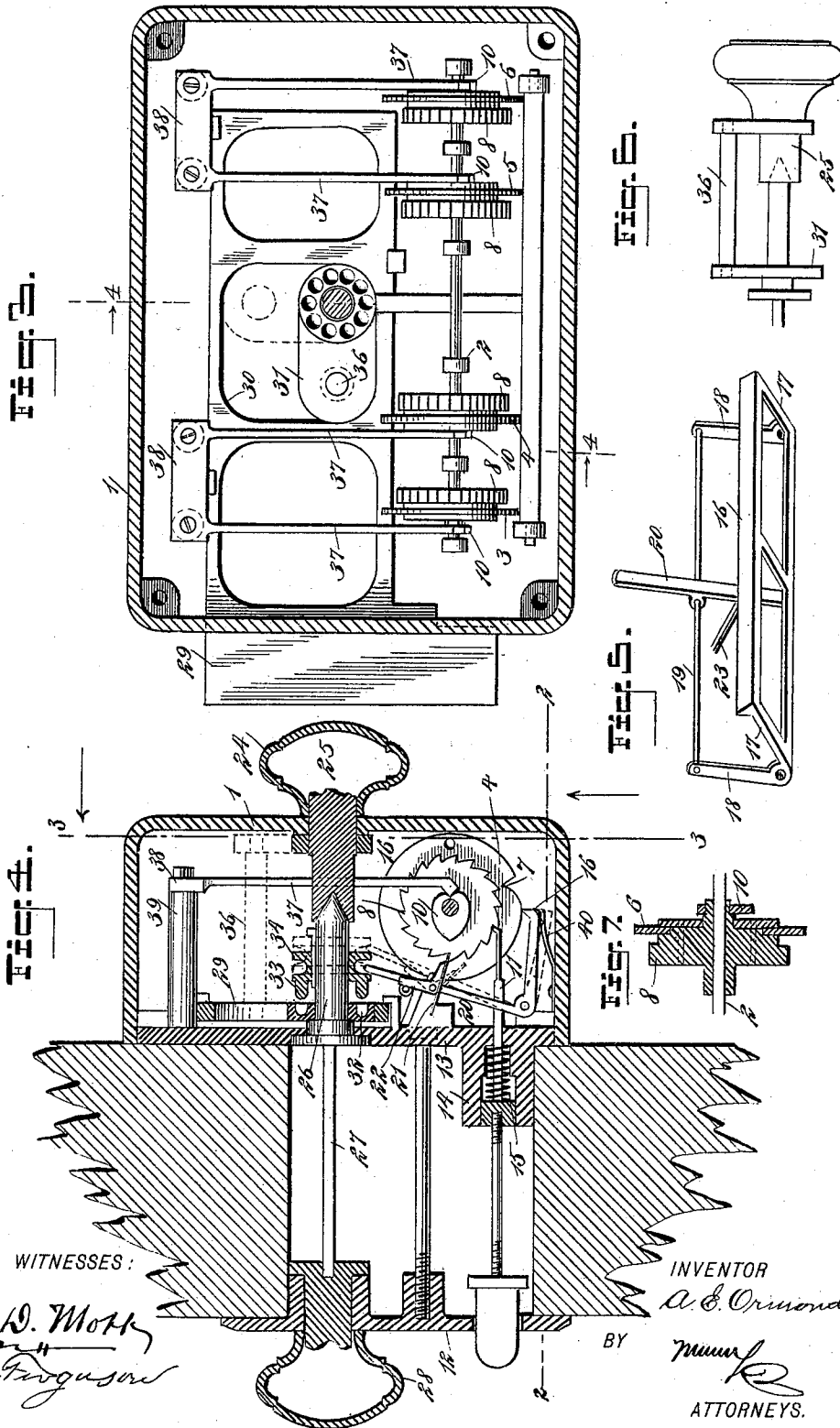
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D. D. Mott
C. R. Ferguson

INVENTOR

A. E. Ormond

BY

Mumford
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALBERT EDWARD ORMOND, OF WINNIPEG, CANADA, ASSIGNOR OF ONE-FOURTH TO JAMES G. BENNETT, OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 615,886, dated December 13, 1898.

Application filed June 1, 1898. Serial No. 682,294. (No model.)

To all whom it may concern:

Be it known that I, ALBERT EDWARD ORMOND, of Winnipeg, in the Province of Manitoba and Dominion of Canada, have invented new and useful Improvements in Locks, of which the following is a full, clear, and exact description.

This invention relates to combination-locks for doors; and the object is to provide a lock that may be freely operated by the knob at the inner side of the door, but which cannot be operated from the outside without first manipulating a predetermined combination.

I will describe a lock embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is an outside elevation of a lock embodying my invention. Fig. 2 is a transverse sectional view substantially on the line 2 2 of Fig. 4. Fig. 3 is a sectional side view, substantially on the line 3 3 of Fig. 4, with certain parts omitted. Fig. 4 is a transverse sectional view substantially on the line 4 4 in Fig. 3. Fig. 5 is a perspective view of a dog employed. Fig. 6 is a plan view showing the connection between the inner knob and the bolt-throwing plate, and Fig. 7 is a section of one of the tumblers and its coacting parts.

The lock comprises a casing 1, designed to be secured on the inside of a door. Arranged within the casing is a shaft 2, on which tumblers 3, 4, 5, and 6 are loosely mounted, so as to rotate on said shaft. Each tumbler consists of a disk having a notch 7 at one side. Secured to each tumbler-disk is a ratchet-wheel 8, and also secured to each tumbler-disk is a heart-cam 10.

Engaging with each ratchet-wheel 8 is a push-rod 11. These push-rods extend outward through an opening in the door, and each has a push-button or finger-piece extended through a hole in an outside plate 12. I have here designated these push-buttons or finger-pieces as *a*, *b*, *d*, and *e*. The push-rods extend through the back plate 13 of the

lock-casing and also through barrels 14 on said back plate, and arranged within each barrel is a spring 15, which bears at one end against the inner wall of the barrel and at the other end against a collar on the push-rod. These springs are designed to force the push-rods to their outer or normal position.

Mounted to swing in the casing and designed to move into the notches of the several tumblers is a dog 16, which is mounted on horizontally-disposed arms 17, and from a pivotal point of these arms 17 arms 18 extend upward and are connected at their upper ends by a rod 19, which is also connected to a shifting-rod 20, arranged in line with the longitudinal center of the dog 16.

Engaging with each of the ratchet-wheels is a click-spring 21, the base portion of which is secured in a fixed portion of the casing, and bearing upon each spring is an angle-lever 22, the upwardly-extended member of which bears against the rod 19. As a means for rocking the dog 16 out of engagement with the tumbler disks, I employ a push-rod 23, which bears against the shifting-rod 20 and extends outward and has a push-button or finger-piece *c* on its outer end. This push-rod is similar to the push-rods before described, and it may be termed the "combination-starting" rod, while the others may be termed the "combination-operating" rods.

A knob 24 at the inner side of the door has its shank 25 extended through the front wall of the casing 1. Extended through the back plate 13 is a shaft 26. This shaft 26 at its end within the casing has a bearing in the shank 25, as plainly indicated in Fig. 4. The shaft 26 is connected by means of a rod 27 with a knob 28 at the outer side of the door. Movable in the casing is a locking-bolt 29, having an opening 30, within which a bolt-shifting plate 31 is movable. This bolt-shifting plate is loosely mounted on the shaft 26, and it has a series of openings 32 designed to receive pins 33 on a collar 34, which is mounted on the shaft 26. This collar 34 is designed to be rotated with the shaft 26; but it is, however, mounted to slide longitudinally of said shaft, so that it may be moved into and out of engagement with the plate 31. The collar

34 is provided with an annular channel into which the upper end of the shifting-rod 20 passes.

Extended outward at right angles from the shank 25 of the knob 24 is an arm 35, from which a rod 36 extends to a connection with the bolt-shifting plate 31, this connection being near its free end. By this arrangement it will be seen that the shifting-plate may be swung to move the bolt by rotating the inner knob 24 and without imparting motion to any other part of the lock. Engaging with each heart-cam is a spring-finger 37. These several spring-fingers extend downward from plates 38, secured to studs 39, extended from the back plate 13.

It will be noted that the dog 16 is held yielding against the periphery of the tumbler-disks by means of a spring or springs 40. It may be assumed that the tumbler operated by the inward movement of the push-button *a* represents units, the next one operated by the push-button *b* represents tens, the next one operated by the push-button *d* hundreds, and the next one operated by the push-button *e* represents thousands, giving nine thousand nine hundred and ninety-nine combinations, which of course may be increased to any number by increasing the number of tumbler-disks and their operating parts.

The combination is set in the following manner: Having decided upon a combination—say “1234”—the center push-button *c* is first pressed inward. This movement by pushing on the shifting-rod 20 will move the dog 16 out of engagement with the several tumbler-disks, as indicated in dotted lines in Fig. 4. This same movement will tilt the angle-levers 22, so that the springs 37 operating on the heart-shaped cams will impart rotary movement to the tumbler-disks. The spring-fingers 37, that may be bearing on the curved portions of the heart-shaped cams, will cause the several tumbler-disks to rotate to a zero-point—that is, until the points of the spring-fingers engage in the notches of the heart-shaped cams. Now the changing-pin 41 (shown in Fig. 2) is inserted and the push-button *a* is pressed four times, the push-button *b* three times, the push-button *d* twice, and the push-button *e* once. The changing-pin 41 is then withdrawn and the lock is ready for use. To unlock, the push-button *c* is pressed once, which, as before described, moves the dog 16 out of engagement with the tumbler-disks, so that they may all be thrown to zero by means of the spring-fingers 37, as before described. The push-buttons *e*, *d*, *b*, and *a* are pressed once, the push-buttons *d*, *b*, and *a* once, the push-buttons *b* and *a* once, and the push-button *a* once. This operation will bring the notches 7 of the several tumbler-disks in line with the dog 16, so that the spring 40, by moving the dog into said notches, will at the same time rock the shifting-rod 20, which will move the collar 34

on the shaft 36 and cause the projections 32 to pass into the openings in the plate 21, after which the bolt 29 may be moved by rotating the outer knob 28. After opening the door the several tumbler-disks are to be again turned to zero by pushing inward on the push-button *c*, and upon closing the door the inner knob may be operated to move the locking-bolt into its keeper.

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

1. A lock, comprising a casing, a series of notched tumbler-disks mounted to rotate on a shaft in said casing, a spring-pressed dog designed to enter into the said notches, a push-rod for operating said dog in one direction, a ratchet-wheel on each tumbler, push-rods engaging the said ratchet-wheels, heart-cams connected to the tumblers, spring-fingers engaging the said heart-cams, a shaft having connection with a knob at the outer side of the door to which the lock may be attached, a collar mounted to rotate with but movable longitudinally on said shaft, a shifting-rod engaging with said collar and movable with a movement of the dog, a bolt, and a bolt-shifting plate adapted for locking engagement with the collar, substantially as specified.

2. A lock, comprising a casing, a bolt movable in said casing, a shifting-plate for said bolt, a shaft extended inward to the casing and through said shifting-plate, a knob for turning said shaft, a collar on said shaft and adapted to be moved into engagement with the shifting-plate, a dog operating to move the collar, and tumblers for controlling the movement of said dog, substantially as specified.

3. A lock, comprising a series of notched tumbler-disks, means for imparting a step-by-step rotary movement to said tumbler-disks, a spring-pressed dog controlled by said tumbler-disks, a bolt-actuating plate, an outer knob, a clutch operated by a movement of the dog to put said outer knob in operative connection with the plate, and an inner knob having connection with said plate, whereby the bolt may be operated by rotating said inner knob, substantially as specified.

4. In a lock, a series of independent notched tumbler-disks, a shaft on which said tumbler-disks are mounted to rotate, a ratchet-wheel connected to each tumbler-disk, push-rods engaging the said ratchet-wheels, a heart-cam connected to each tumbler-disk, and spring-fingers engaging the said heart-cams, the said fingers operating to rotate the disks by bearing on the periphery of the cams, substantially as specified.

ALBERT EDWARD ORMOND.

Witnesses:

W. H. H. GRAHAM,
H. A. DE LONG.