(Model.) 2 Sheets—Sheet 1.

G. R. BOYCE.

COMBINATION LOCK.

No. 363,110. Patented May 17, 1887.

Fig. 1

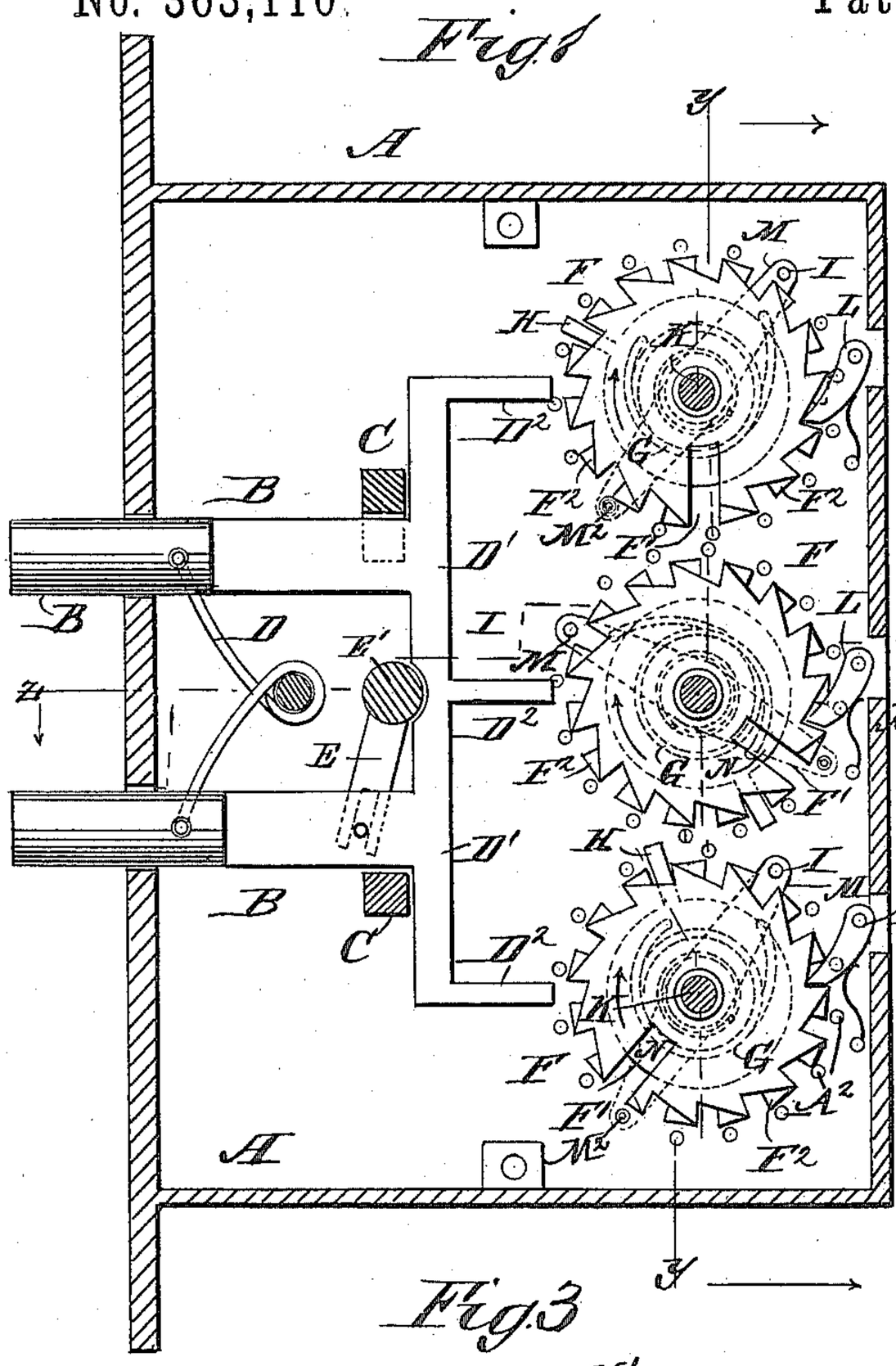


Fig. 2.

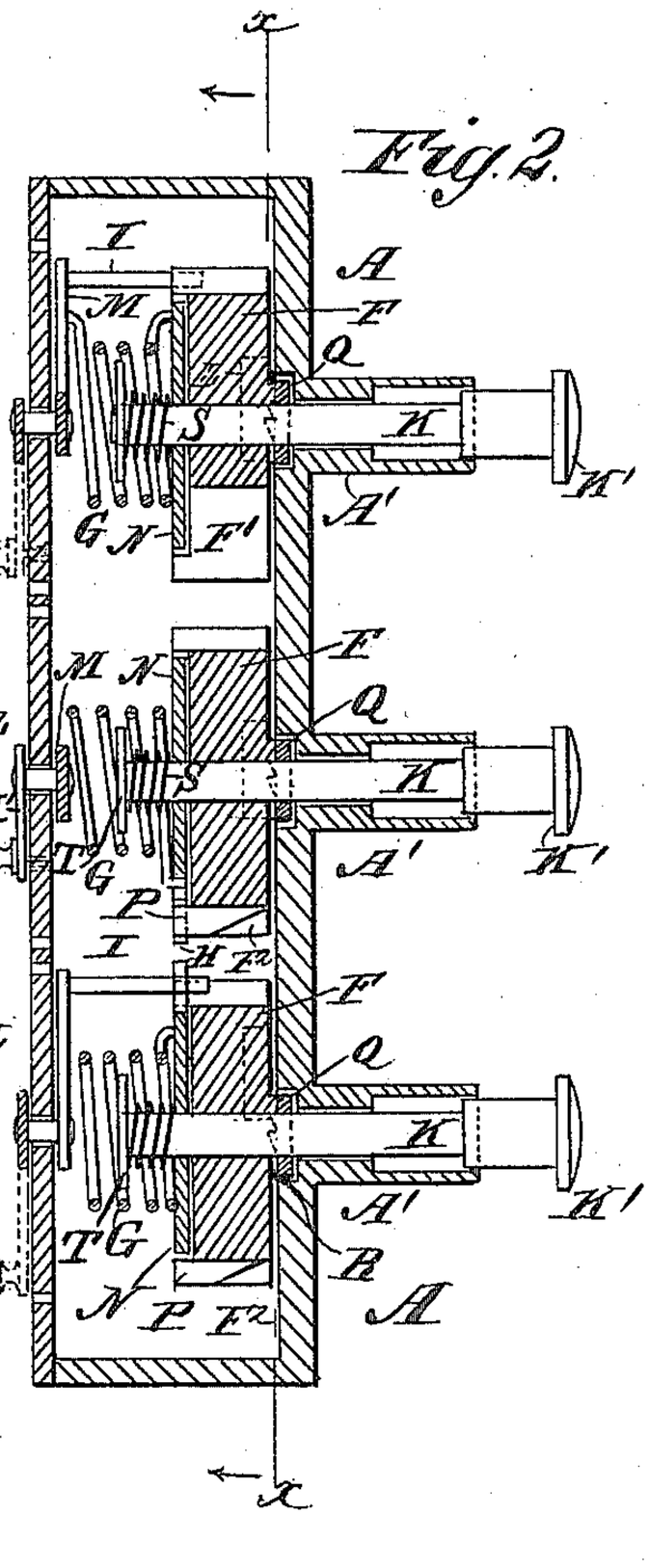
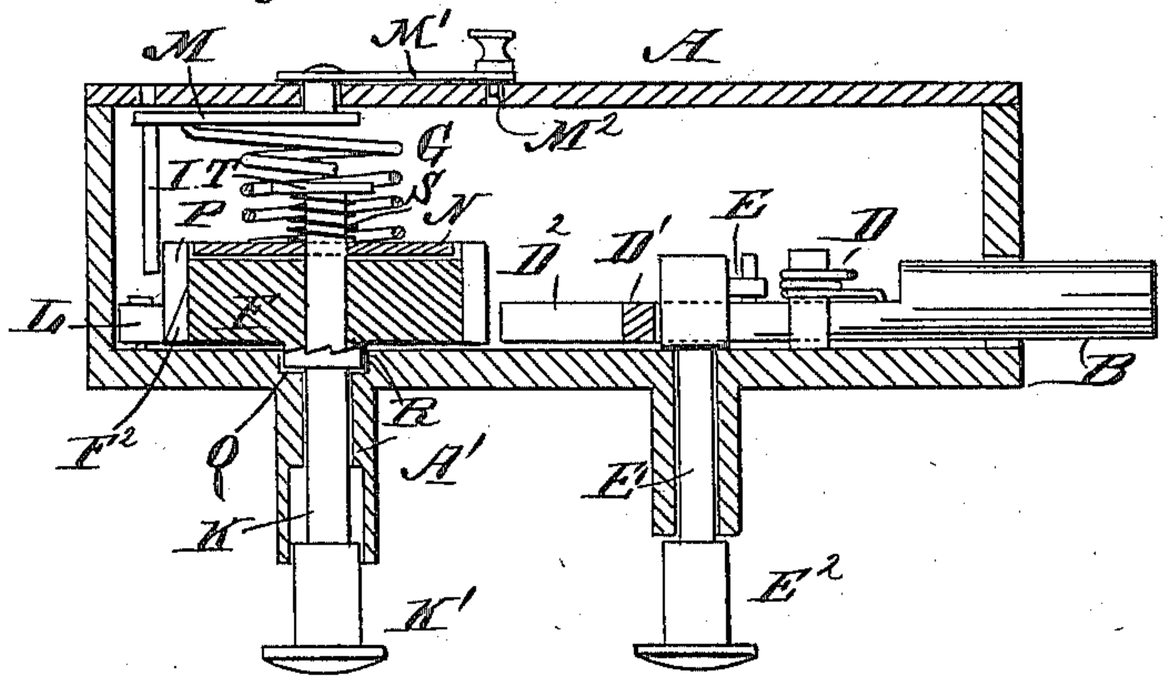


Fig. 3



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(Model.) 2 Sheets—Sheet 2.

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Fig 4

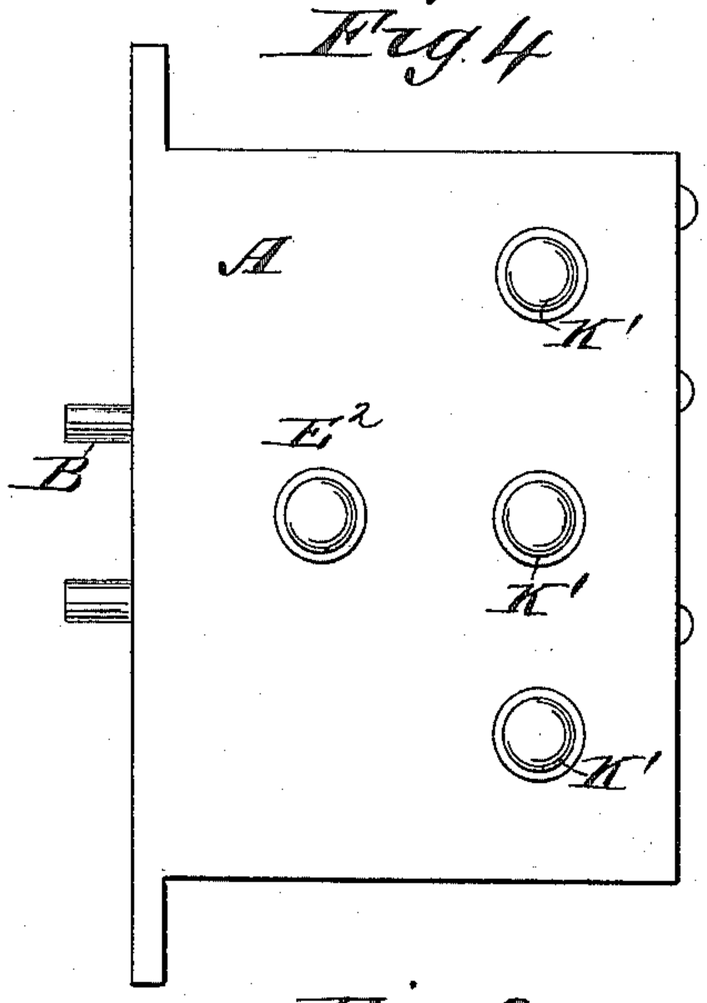
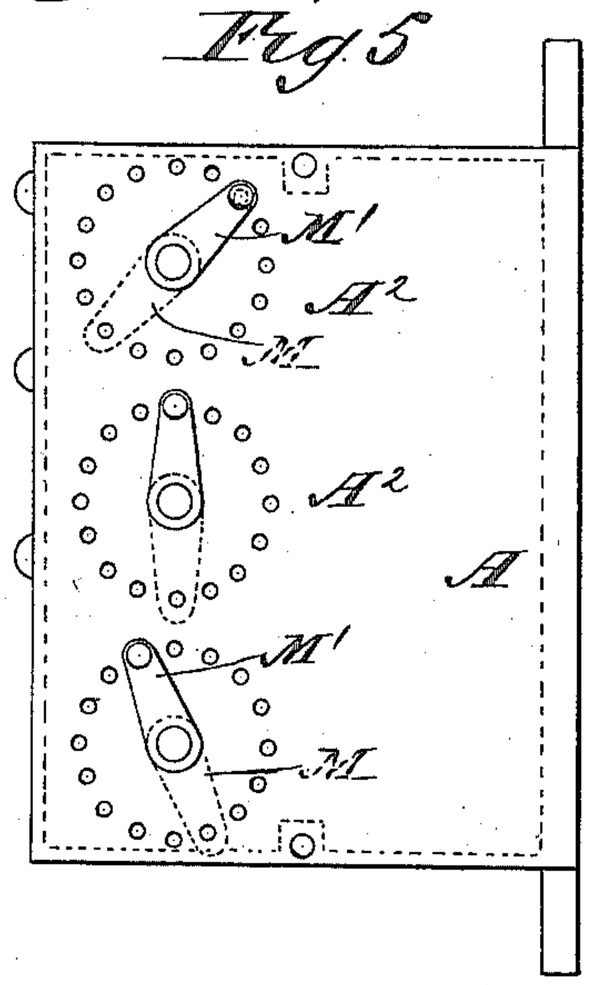


Fig 5



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UNITED STATES PATENT OFFICE.

GEORGE R. BOYCE, OF ORANGE, NEW JERSEY.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 363,110, dated May 17, 1887.

Application filed December 24, 1886. Serial No. 222,470. (Model.)

To all whom it may concern:

Be it known that I, GEORGE R. BOYCE, of Orange, in the county of Essex and State of New Jersey, have invented a New and Improved Combination-Lock, of which the following is a full, clear, and exact description.

My invention has for its object to provide an improved combination-lock, which can be quickly set to any combination desired, is easily locked and unlocked, and is very simple in construction.

The invention consists in the construction, combination, and arrangement of parts, as hereinafter fully described, and particularly pointed out in the claims.

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

Figure 1 is a front sectional view of my improved combination-lock on the line *x x*, Fig. 2. Fig. 2 is a cross-sectional view of the same on the line *y y*, Fig. 1. Fig. 3 is a cross-sectional view on the line *z z*, Fig. 1. Fig. 4 is a front elevation of the lock on a reduced scale. Fig. 5 is a rear view of the same.

In the lock-casing A the usual bolt, B—in the present case a double bolt—is mounted to slide between guides C, and is normally held projected by means of a spring, D, and is retracted when released by means of a key, E, which may be removable, or a permanent key with spindle E′ and head E², as shown.

The double bolt is attached to a transverse bar, D′, carrying prongs D², in number corresponding to that of the setting-wheels F, as shown—three. The bolt is locked when projected by its prongs D² striking against the peripheries of the setting-wheels F, and when retracted said prongs enter deep radial slots F′ in the wheels F, brought into proper position therefor. The peripheries of the setting-wheels are normally presented to the prongs D², to lock the bolt, by means of coiled springs G, which tend to turn the wheels in the direction indicated by the arrows, the position of the releasing-slots F′ with respect to the bolt-prongs being determined by lugs H, projecting from the peripheries of the wheels, striking against stop pins or projections I. The setting-wheels, maintained in this locking position by the tension of the coiled springs G, are turned forward against such tension to present their releasing-slots to the bolt-prongs by means of attached spindles K, projecting through necks A′ in the front of the lock-casing, and having turning heads or knobs K′.

The forward parts of the setting-wheels are formed with peripheral ratchet-teeth F², which are engaged by spring-pawls L, pivoted to the front plate of the casing, by which the wheels, on being rotated, as above stated, are prevented from being turned back by the tension of the springs G. The amount which each setting-wheel must be turned to bring it from its original position of rest into position to release the corresponding bolt-prong can thus be determined by the audible click of the spring-pawl L; but an ordinary index and numbered dial may be employed, if desired. In order to again lock the bolt after being released and return the setting-wheels F to their original locking position, I arrange the ratchets on said wheels movably with respect to their respective pawls by mounting the turning-spindles K to slide lengthwise in their guide-necks A′, whereby the setting-wheels can be pushed forward to disengage their ratchets, when they will be immediately returned to their original position by the tension of the springs G. On then releasing the operating-spindles the springs G also serve to press back the wheels into engagement with their pawls L.

The outer part of each neck A′ is formed with a recess to receive a corresponding enlargement on the spindle K, and limit and guide the movement of the same.

In order to vary the positions of the stop pins or projections I, and thus change the position of rest of each wheel and the degree of rotation necessary to present the releasing-slot to the bolt-prong, I attach each stop pin or projection to a pivoted arm, M, which can be variously adjusted by a crank-arm, M′, attached to the pivotal pin of the arm M outside the rear casing-plate. For holding the arm M in such adjustment it is provided with an end stud or pin, M², which is sprung into engagement with one of a circular series of apertures, A², in the casing-plate. These apertures may be numbered, if desired, to indicate the combination to which the lock has been set. In addition to this adjustment of the stop-pin, I generally prefer to provide for the independ-

ent adjustment of the stop-lug H on each setting-wheel. This I accomplish by forming it on a collar, N, loosely surrounding the spindle K, and pressed upon the wheel by the spring G. The lug H is locked in its various adjustments by engaging it with notches P, formed in the crown of the wheel. In this way the true meaning of the figures indicating the combination may be altered, for the purpose of deception.

Each coiled spring G is connected to the setting-wheel by being attached to the stop-lug H, adjustable thereon, and is connected to the casing by being attached directly to the swinging arm M, carrying the stop-pin, so that whatever adjustment is made of the stop-pin I or stop-lug H the normal tension of the spring will remain the same. To further increase the difficulty in solving the combination, I connect the operating-spindle K of each setting-wheel adjustably to the same by mounting it loosely therein and providing it with a clutch-collar, Q, which is normally held in engagement with a corresponding clutch-collar, R, on the wheel by a coiled spring, S, interposed between a collar, T, on the inner projecting end of the spindle and the wheel.

By drawing the operating-spindle out slightly it is disconnected from the wheel, and may be variously adjusted relatively thereto, so as to prevent one's noting the motion of the setting-wheel by marks on the turning head or knob.

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

1. In a combination-lock, the combination, with the bolt, the setting-wheels, pawls dogging the wheels, and means for disengaging the pawls, of stop projections and stop-lugs in the casing and on the wheels, adjustable relatively to each other, and coiled springs connected at each end with said stops, substantially as shown and described.

2. In a combination-lock, the combination, with the bolt, the spring-acted setting-wheels, pawls dogging the same, and means for disengaging the pawls, of stop-lugs on the wheels, pins or projections engaging the stops, movable arms carrying the pins or projections, and crank arms or handles for adjusting said movable arms, substantially as shown and described.

3. In a combination-lock, the combination, with the bolt, the setting-wheels, and headed spindles for turning the same, of a stop pin or projection in the casing, loose collars on the wheels, surrounding the spindles and carrying stop-lugs which rest in notches in the wheels, and coiled springs connected with the said stop-lugs and bearing upon their carrying-collars, substantially as shown and described.

4. In a lock, the combination, with the setting-wheel and the pawl and ratchet for dogging the same, the setting-wheel being adapted to be pressed inward to release the ratchet from the pawl, of an operating-spindle passed loosely through the setting-wheel, and having a collar or projection on its inner end, a spring interposed between said collar or projection and the setting-wheel, a clutch-collar on the outer face of the setting-wheel, and a clutch-collar on the outer part of the operating-spindle projecting through the setting-wheel, substantially as shown and described.

GEORGE R. BOYCE.

Witnesses:
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JAMES J. FARRELL.