(Model.)

B. F. FLINT.

Time Lock.

No. 232,604. Patented Sept. 28, 1880.

Fig. 1

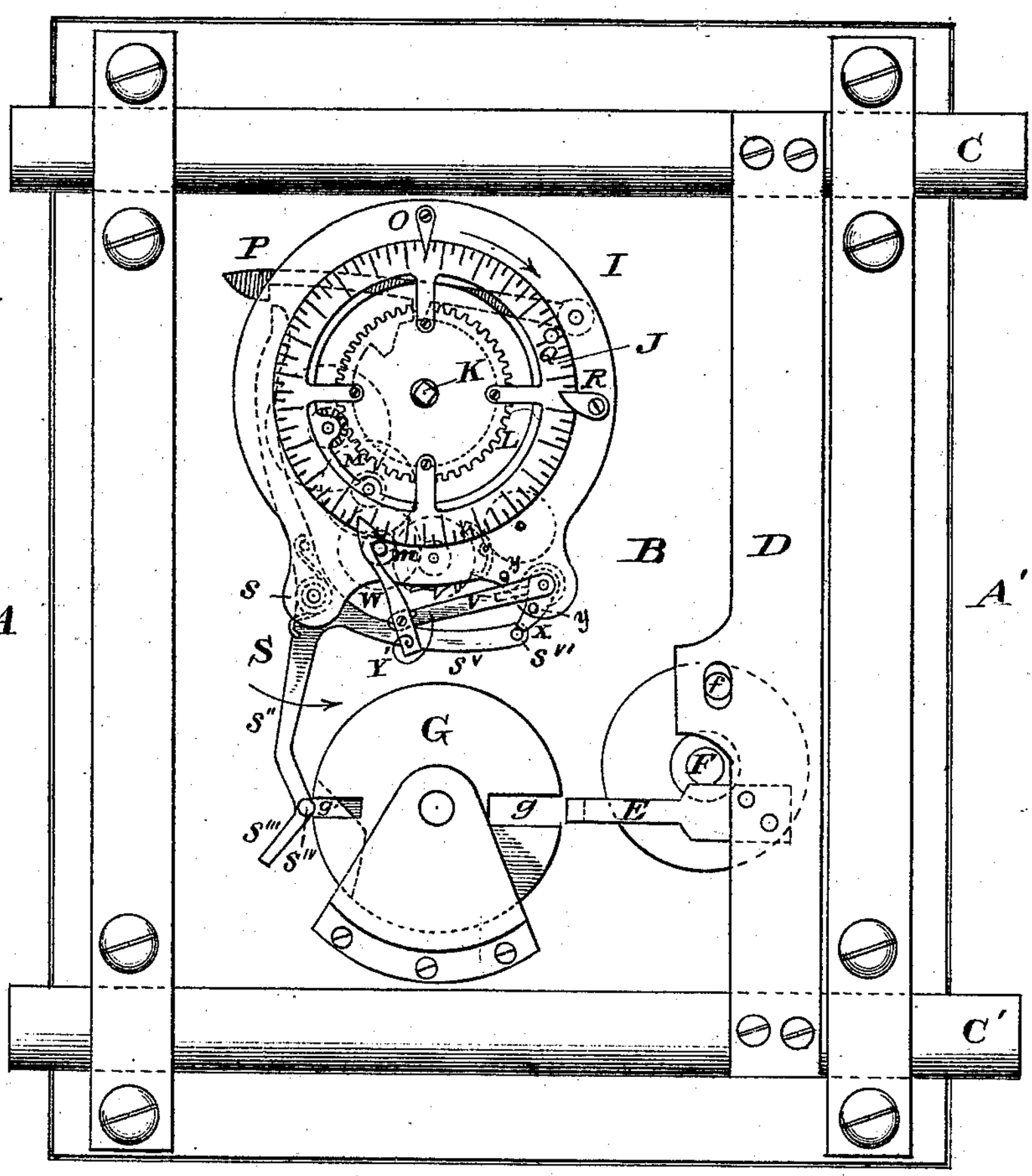


Fig. 2

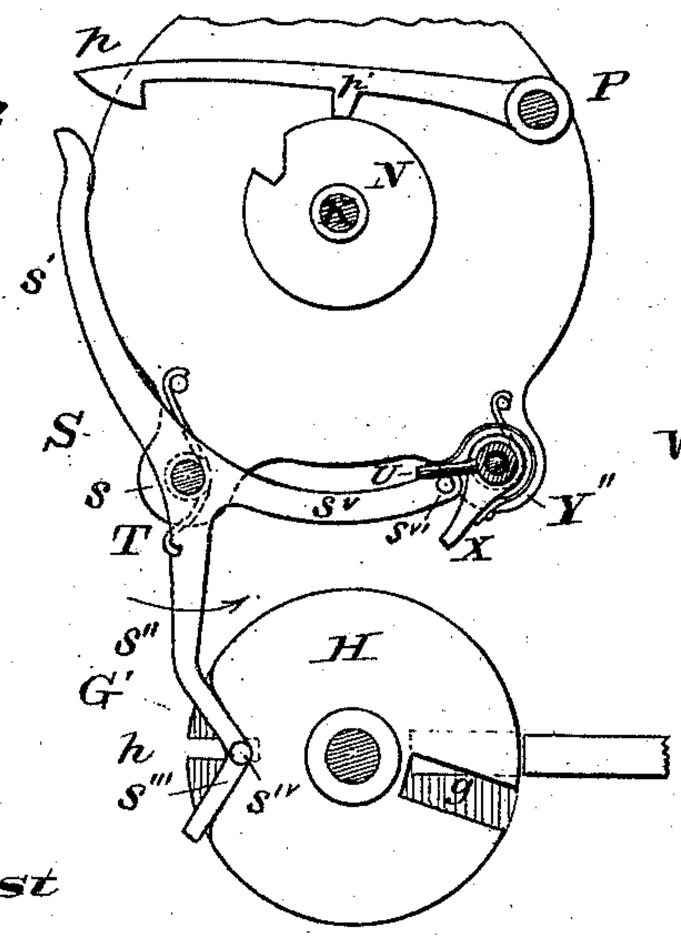


Fig. 3

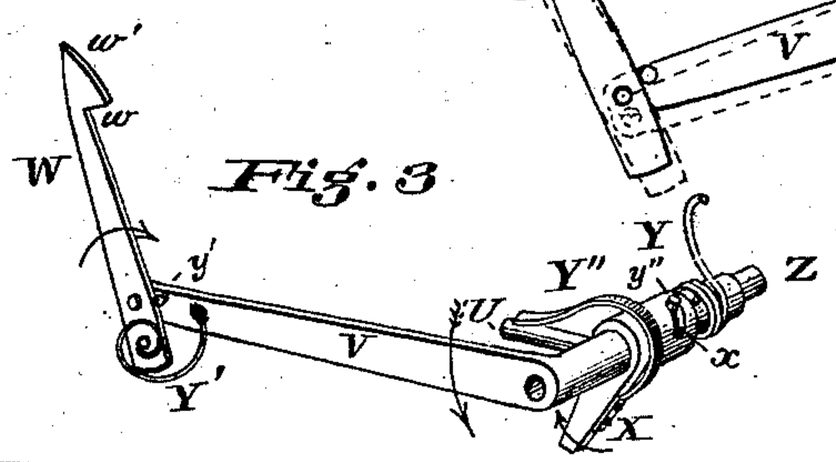
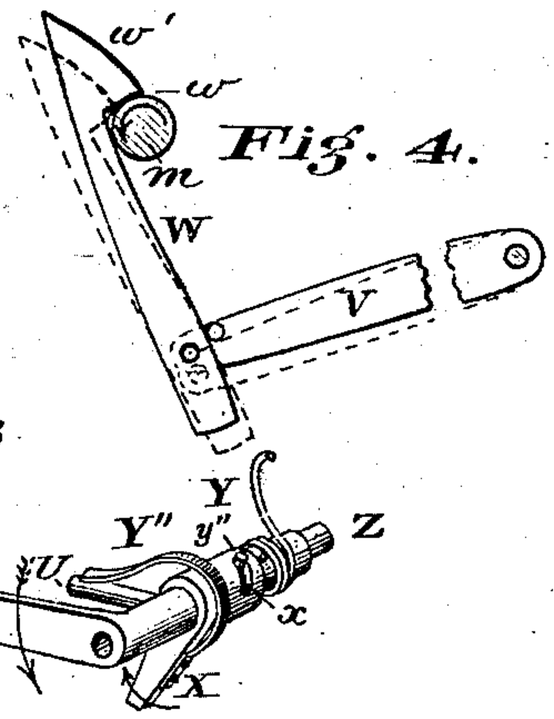


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 232,604, dated September 28, 1880.

Application filed May 3, 1880. (Model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. FLINT, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Improvement in Time-Locks, of which the following is a specification.

My invention is an improvement on those associated time and so-called "combination" locks in which, so long as the time-lock is running, it is impossible to open the safe-door, even though the tumblers of the combination be set up properly in gate for that purpose; and my improvement consists in an improved means whereby, in the event of the time mechanism stopping without discharging its proper function of removing the time-obstruction, a person cognizant of the proper formula may nevertheless relieve the part from the time-obstruction and open the lock.

In the accompanying drawings, Figure 1 is an elevation of a lock embodying my invention, the time-obstruction-removing mechanism being shown in operation. Fig. 2 is a view taken in a plane parallel to and somewhat in rear of Fig. 1, showing the time-obstruction in operation. Fig. 3 is a perspective view, showing a portion of my time-obstruction-removing mechanism. Fig. 4 illustrates the automatic casting off of the time-relief catch by the moving clock-work.

A represents the casing or jamb on the hinge side of the door, and A′ the jamb on the lock side of the door.

B represents the door of a bank-safe; C C′ D, customary safe-bolt work; E, tongue projecting from same; F, customary bolt-work arbor; *f*, the wrist-pin thereof.

G represents one of several similarly-gated disks or combination-tumblers. Each of these disks has two gates—to wit, a larger gate, *g*, for reception of the tongue E of the safe-bolt work in the act of unlocking the door, and a smaller gate, *g′*, for reception of a pin that projects from my time-obstruction lever, to be presently described.

H represents a disk, which is mounted on the same stud as the tumblers G, and which has a gate, *g*, similar to the gates *g* on the tumblers G, but which, instead of the smaller gates of said tumblers, has a deep V-shaped notch or indentation, *h*, to receive a corresponding V-shaped projection on the time-obstruction lever. There is in front of tumbler H not less than one ordinary double-gated tumbler, G, and in rear of said tumbler H at least another such tumbler, G′.

My time mechanism I has a dial, J, on one of the clock-arbors K, whose spur-wheel L is so geared to a customary train of clock-work, M, that said dial shall make a revolution in forty-eight hours; also, revolving with said dial is a notched disk, N, which, when the zero-mark on the dial reaches the index O, permits the descent of spurred latch P *p p′*. At the same juncture a projection, Q, from the dial, coming in contact with a stop, R, on the clock-frame, arrests the dial's rotation and stops the clock. One arbor, *m*, projects in front of the clock-face for engagement of the relief-catch, as hereinafter explained.

My time-mechanism obstruction is constructed as follows: S is a trifurcated lever, pivoted at *s*, and having a normal tendency to vibrate (in direction of the arrow) imparted to it by a spring, T. One branch, *s′*, of this lever extends upward to a height which just clears the latch P when said latch is riding upon the periphery of the notched disk N, as in Figs. 1 and 2, but so that when the said latch has dropped into the notch of the disk said branch stands in front of or engages behind the snub of said latch, according to whether said lever S occupies the position indicated in Fig. 1 or that shown in Fig. 2. Another branch, *s″*, of the lever S extends downward, and has a V-formed bend or projection, *s‴*, to fit and occupy the corresponding V-formed notch *h* in the tumbler H. Projecting laterally from the said bent portion of said branch is a pin, s^{iv}, adapted to occupy the smaller gates *g′* in tumblers G. Another branch, s^{v}, of the lever S extends horizontally underneath the clock-work, and has projecting laterally from its extremity a pin, s^{vi}, for a purpose to be presently explained.

Z is the shaft of my time-obstruction detent. From this shaft projects a short arm, U, and a long arm, V. To the extremity of the long arm V is pivoted a catch, W, having a square shoulder, *w*, and a snub end, *w′*. The

member W, I designate the "relief-catch." Sleeved on the shaft Z is an arm, X, whose slot *x* allows it a slight vibration upon the shaft Z. Springs Y Y′ Y″ give to the members Z, W, and X normal tendencies in direction of the respective arrows, and stops *y y′ y″* limit the motions of said members.

In the ordinary operation of the lock, the dial J having been set to a certain hour and the lever S being held out by the tumblers, the disk N, gradually rotating, allows the snub *p′* to drop into the notch in said disk so soon as the zero-mark on the dial corresponds with the index O, thus causing the catch *p* to engage outside the lever *s′* and hold the arm *s″ s‴* in an inoperative position, thereby allowing the tumblers to be set up to the ordinary combination. In winding up the time-movement again the snub *p′* slides out of the notch in the disk N, thereby liberating the lever S and allowing it to perform, when necessary, the functions hereinafter described.

While the time mechanism is set and its functions not yet discharged, the setting of tumbler H in gate with the tumblers in front thereof is followed (as soon as arbor-pressure is withdrawn from said tumbler H, which must occur in attempting to set the rear tumbler, G′,) by the springing of the V-projection of lever S into the V-notch of tumbler H, so as to turn the latter out of gate, and the bolt-work, of course, cannot then be retracted. (See Fig. 2.)

A further action of lever S is to throw the relief mechanism U V W X Z into the position shown in Fig. 2. If, now, the tumblers be again operated, the lever S will be thrown to the position shown in Fig. 1, and be held there by the engagement of its stud s^{vi} against the top of the yielding arm X, and if the time mechanism has stopped opportunity is thus afforded to set up the tumblers all in gate for retraction of the safe-bolt work; but if, on the other hand, the clock-work is in motion the rotation of the shaft *m* will release the catch W, as indicated by dotted lines in Fig. 4, in a much shorter time than the operator can set up the combination, and the lever S, by turning the tumbler H out of gate, as seen in Fig. 2, frustrates any attempt to retract the bolt-work.

I am aware that the result accomplished by the parts *m* and W has been obtained by means of a pawl and ratchet; but such devices have, as hitherto constructed, operated either to retard the movement or else to accelerate it, both of which are objectionable.

It will be seen that the catch W, engaging by its rectangular shoulder tangentially upon the summit of the arbor *m* and pressing radially, differs from the customary pawl, which engages by its point obliquely either on the ascending or descending edge of the ratchet; that my said device also differs in becoming instantaneously effective, and also instantaneously quiescent on contact with the arbor instead of slipping, as the pawl does and must do, around the periphery of the ratchet until it catches a tooth; that (while at least equally prompt in self-release from a moving clock-work) my device differs from the ratchet-movement in being free from any adverse influence on the clock-work, the pawl-and-ratchet device being, on the other hand, liable, if arranged in one position, to momentarily start a stopped movement and thus frustrate the efforts of the special opener, or, if arranged in the other position, to stop an already properly-moving clock.

A serious objection to the ratchet is the purely mechanical one that the teeth must be a certain size to be surely effective, and the larger they are the greater will be the amount of lost motion and slippage. This liability also necessitates a certain diameter of ratchet, because, if of very small diameter, the teeth will be too abrupt and the slip too violent.

Other obvious advantages over the pawl and ratchet are the comparative simplicity, compactness, ease of manufacture, greater certainty, and non-liability to derangement of my device.

I claim as new and of my invention—

1. The combination of the catch W of the time-relief mechanism with the cylindrical shaft or arbor *m* of the clock-work, operating to automatically cast off said catch by the rotation of the clock-work, in the manner set forth.

2. In combination with the arbor *m*, catch W, levers V, and arm or stop X, the lever S and notched disk H, substantially as set forth.

3. The time-relief mechanism, consisting of the catch W and lever V, pivoted together and connected by spring Y′, and arms U and X, connected by spring Y″ and shaft Z and spring Y, operating substantially as described.

4. The time-obstruction tumbler H, interposed between the combination-tumblers G G′, in the described combination, with the time-obstruction lever S, as set forth.

5. In combination with the lever S and tumbler H, the lever P, having catch *p* and snub *p′*, and the notched disk N, fastened to the dial-arbor, substantially as set forth.

In testimony of which invention I hereunto set my hand.

BENJAMIN F. FLINT.

Attest:
GEO. H. KNIGHT,
J. L. LOGAN.