

(No Model.)

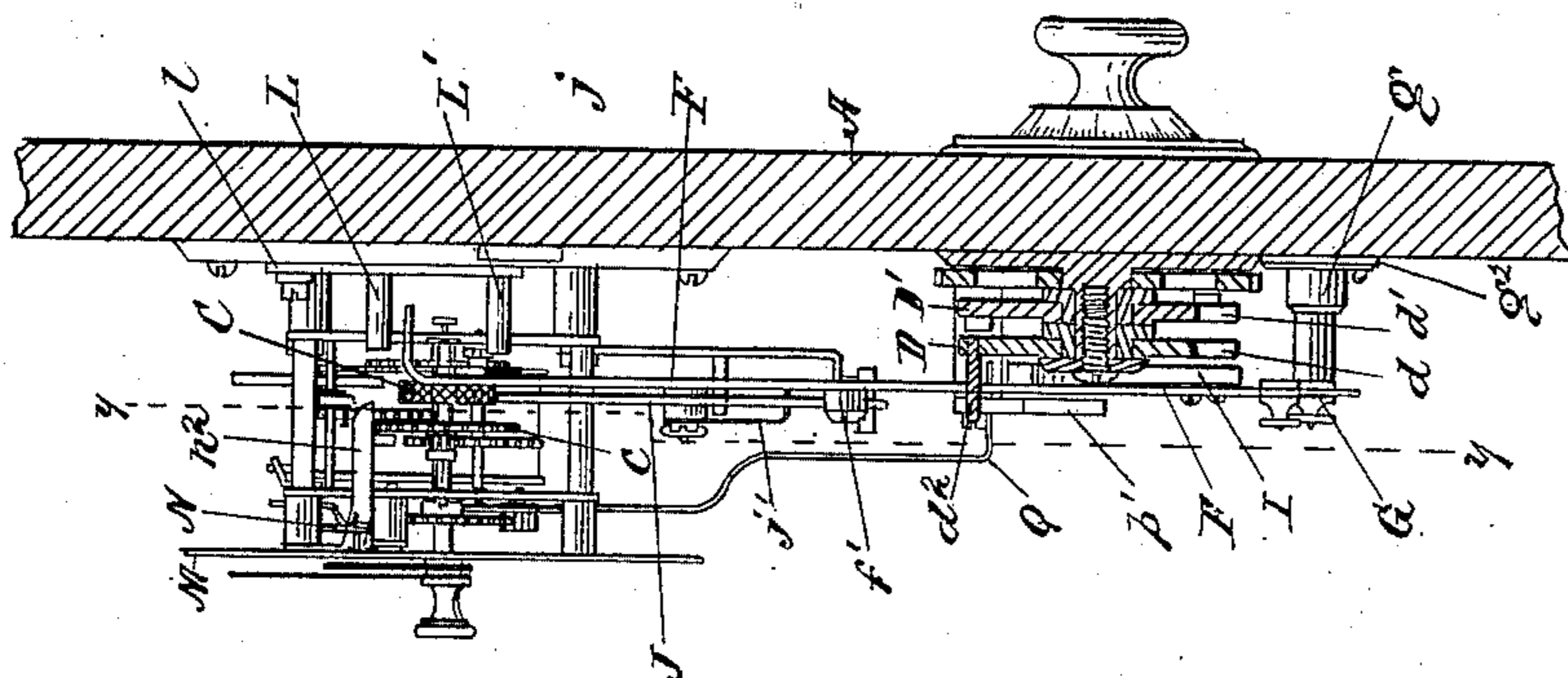
2 Sheets—Sheet 1.

A. O. BEHEL.

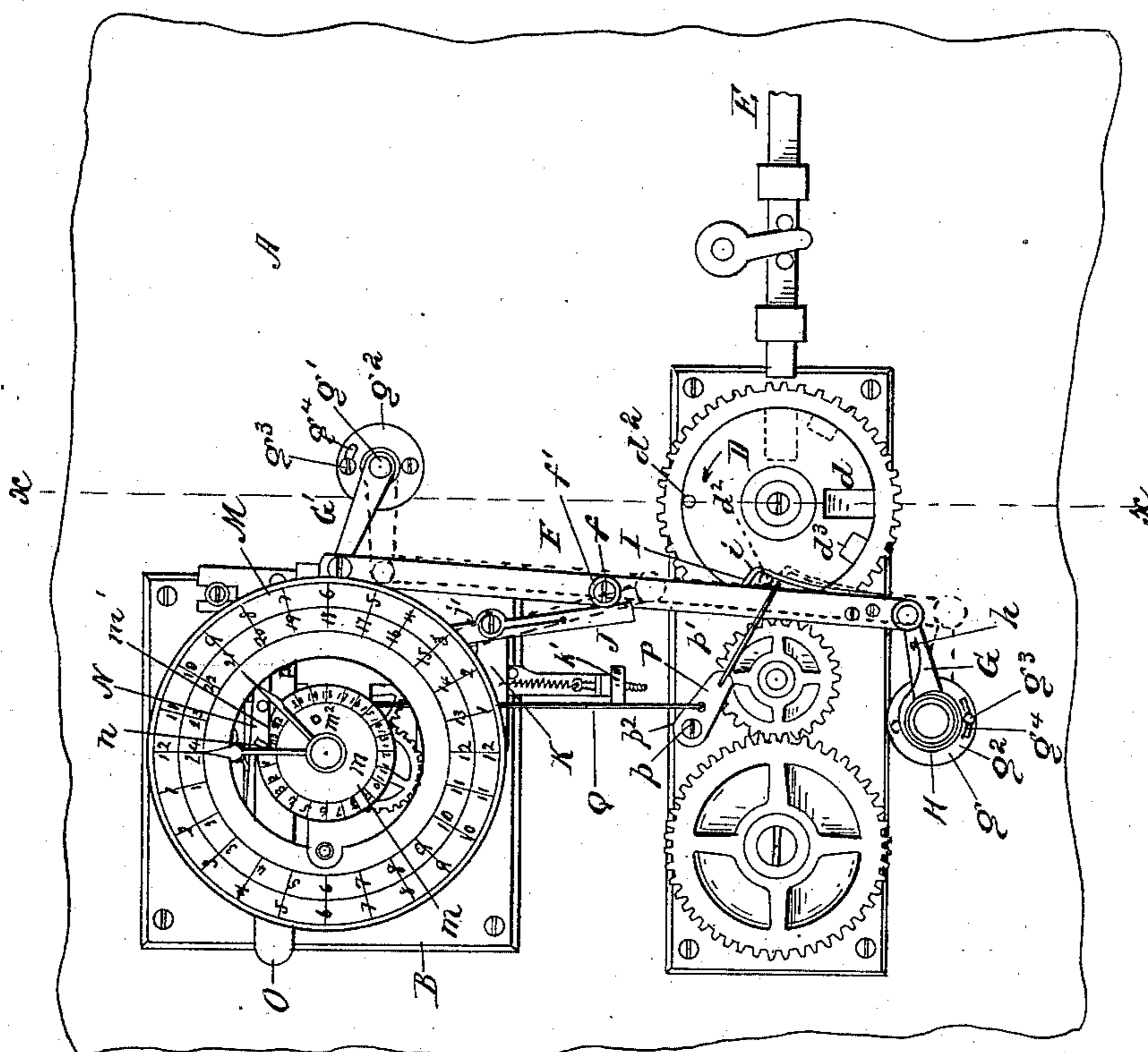
TIME LOCK.

No. 335,174.

Patented Feb. 2, 1886.



2022



Feb 1

*Witnesses*

McGoulies  
A. M. Best

*Inventor*

*Aquila O Behe*

By *Cornwall & Thacher*  
Attorneys



# UNITED STATES PATENT OFFICE.

AQUILLA O. BEHEL, OF ROCKFORD, ILLINOIS, ASSIGNOR TO JACKSON B. YOUNG, OF SIOUX FALLS, DAKOTA TERRITORY.

## TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 335,174, dated February 2, 1886.

Application filed May 1, 1884. Serial No. 130,010. (No model.)

*To all whom it may concern:*

Be it known that I, AQUILLA O. BEHEL, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Time-Locks, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents an inside elevation of a section of a vault or safe door with lock applied thereto, embodying my improvements; Fig. 2, a vertical section of the same, taken on the line  $x x$ , Fig. 1; Fig. 3, a section of the same, taken on the line  $y y$ , Fig. 2, and on an enlarged scale; Fig. 4, an elevation of the time-works, with a part of the dial broken away, and on the same scale as Fig. 3; and Fig. 5 an elevation of the stop-adjustment detached, and on the same scale as Figs. 3 and 4.

My invention relates to time-locks for vaults, safes, &c. The object of the main part of my present invention is to disarrange one or more of the tumblers of the lock at the point of setting by the action of the time-works while running; and the improvement consists in the peculiar devices by means of which this result is effected, and also in devices by means of which the stop mechanism may be adjusted so as to operate at a longer or shorter interval of time, as may be desired.

I will proceed to describe in detail the construction and operation of the mechanism by means of which I have carried out my invention practically in one way, and will then point out definitely in the claims the special improvements which I believe to be new and wish to protect by Letters Patent.

In the drawings, A represents the door or wall on which the mechanism is to be mounted, and B a timer or time-works of any ordinary construction, which need not be particularly described here. A wheel, C, is mounted on a suitable shaft, which is driven by the time-works, having its periphery preferably roughened or serrated to insure the action which will be described presently.

A permutation-lock of any ordinary construction is applied to the door or wall in the usual way. In the drawings I have shown a

lock with two ordinary disk-tumblers, D and D', the former being the inner one. This is merely for illustration, however, as any number of tumblers may be employed. These tumblers are provided with the usual notches,  $d d'$ , in their periphery for the reception of the bolt E, the latter being of any form, construction, and arrangement suitable for the purpose. On the inner face of the tumbler D there is also a pin,  $d^2$ , located in this instance near the periphery of the tumbler and about opposite to the notch  $d$ . A rod or bar, F, is mounted at its respective ends on crank-arms G and G', and these arms are placed on suitable journals,  $g g'$ , so as to be free to swing. In the drawings they are arranged on opposite sides of the bar F, but this is simply to accommodate the timer, and is of no special importance. The parts just mentioned are so arranged that the bar F, by the swinging of the arms, will move back and forth in a plane about parallel to the inner face of the tumbler D. A spring, H, is coiled about the arbor of the lower crank-arm, G, with its free end arranged to act on a pin,  $h$ , near the outer end of this arm, the natural action of this spring being to throw up this arm, and with it the bar F, so that when left free to operate, the bar will be held by the spring in the position shown in full lines in Fig. 1 of the drawings. A spring, I, is attached to the bar F by one end, the other being free and bent to form a rather sharp curve,  $i$ , projecting out from the edge of the bar over the tumbler D. This spring, as shown in the drawings, is fastened to a block, which in turn is secured to the back side of the bar, and so the free end of the spring may be pressed inward behind the bar. The parts are so arranged that when this spring-bar is in its free position due to the action of the spring H the projecting-bend of the spring I will be about opposite to the notch  $d$  in the tumbler D when the latter is in proper adjustment to receive the bolt, and also so that this portion of the spring will stand in the path of the pin  $d^2$  as the tumbler is rotated. Obviously then with just the parts mentioned above the tumbler D could never be set, for suppose it to be rotated in the direction indicated by the arrow in Fig. 1 of the drawings, it will be seen that

the pin will come in contact with the spring I before the point of adjustment is reached, and that in its further movement it will act on the spring to depress the bar F, and that it will not escape from contact with the spring until after the point of adjustment is passed, and at the point of adjustment the spring, and in fact all the time from the moment the pin strikes the spring until it is about to be released therefrom, is constantly lifting on the pin by the action of the retracting-spring H, so that if the tumbler is released at any time before its pin leaves the spring on the bar F it will be immediately thrown back out of adjustment by the lifting action of the spring I on the tumbler-pin. As soon as the pin escapes from the spring the bar will, of course, at once be thrown up into its normal position, and the same effect will be produced when the pin of the tumbler is brought around into the same position again.

Now, to secure the objects which I have in view it will be seen at once that it is necessary to provide some device for holding the bar out of position to act on the tumbler, as described, at such times as it is desired to leave the lock free to be opened, and also to provide for operating this device by the timer so as to throw it out of engagement with the bar when the timer is running and it is desired to prevent the working of the combination. To effect these results I provide a long lever, J, pivoted near its middle to the free end of a supporting-arm, K, the other end of which is pivoted to the timer-frame or any other convenient support. On the bar F is a stop-pin, *f*, with which one end of the lever J is adapted to engage when the bar F is thrown down to its lowest point by the pin on the tumbler, as described above, and obviously it will hold it in this position until disengaged therefrom, so that under this arrangement the tumbler may be properly adjusted and set for the reception of the bolt. The other end of the lever J extends to the wheel C, so as to just engage therewith, and is preferably beveled or somewhat pointed to make a dog, *j*. A spring, *j'*, is coiled around the arbor of this lever, with its outer end attached to the lower portion of the lever, so that its tendency will be to throw this end of the lever inward and cause it to engage with the stop-pin on the bar F. This movement will of course vibrate the other or dog end of the lever and cause it to be brought in contact with the wheel C, this position being shown in Fig. 3 of the drawings. In order to insure with certainty the engagement of the lever-dog with its actuating-wheel, I have, as described above, mounted this lever on a pivoted support, and, obviously, the lifting-force of the bar will operate to force the lever upward to engage with the wheel. To prevent too forcible action or shock in this direction, a retracting-spring, *k*, is attached at one end to the support K, and arranged to act in an opposite direction to the

lifting force just described. The other end of the spring is attached to an adjustable screw, *k'*, by means of which the retractile force of the spring may be regulated. Preferably a small roller, *f'*, is put on the stop-pin *f*, to facilitate the engagement and disengagement of the lever and bar.

The time-works are constructed and arranged so as to revolve the wheel C in the direction indicated by the arrow in Fig. 3 of the drawings, by which its effect is to press outward the dog end of the lever, and obviously the effect of this wheel when in motion will be to vibrate the lever and cause it to disengage at once from the stop-pin on the arm F, thereby releasing the latter, when it will at once be thrown up, as heretofore described, and will be in position to prevent the setting of the tumbler D, as already explained. When it is desired to throw this mechanism out of action, the time-movement not being in operation, as already explained, the bar is thrown down, the lever will engage with the stop-pin thereon, and these parts will stand in the position shown in dotted lines in Fig. 1 of the drawings, and the tumbler D may then be properly adjusted and set before the pin will come in contact with the spring on the arm. When, however, it is desired to bring this mechanism into action, so as to prevent the setting of the tumblers, the timer is of course put in operation and set, the spring-bar is released from the lever and is thrown up, taking the position shown in full lines in Fig. 1 of the drawings.

As already explained, if the tumbler D is turned around, it cannot be left at the setting-point, for then the bar will operate to at once turn it out of adjustment, and if it is turned still farther around will throw the bar down until the pin escapes from the spring and the dog-lever engages with the stop-pin on the bar, as shown in dotted lines in Fig. 1 of the drawings. This position will be only momentary, for the dog end of the lever is at once brought into contact with the actuating-wheel C, when, as already explained, the lever is at once disengaged from the bar and the latter rises again to assume its stopping position, and this action will be repeated over and over again as often as the tumbler is turned and so long as the timer is running; but when the timer stops the tumbler is turned around until the bar is thrown down to permit the dog-lever to engage therewith, when of course the latter retains its position and holds the bar permanently out of action, and the tumbler may then be set. In order to retain the bar F within a limited movement, one end is bent inward slightly, as shown in Fig. 2 of the drawings, and is arranged between two stop-pins, L and L', placed such distance apart as may be desired for the throw of the bar, and these pins are on a plate, *l*, which is fastened to any suitable support by slot and screw, so as to be adjustable, thereby providing for the accurate adjustment of the

throw of the bar to bring the stop-spring into just the position required. It is desirable also to provide for the lateral adjustment of this bar F, as it must be arranged with reference to the pin on the tumbler with great nicety. I provide for this by attaching the journals  $g$  of the crank-arms to disks  $g^2$ , which are fastened to the wall by means of screws or pins  $g^3$ —one on each side of the journals—and on one side is a slot,  $g^4$ , through which the fastening screw or pin passes, so that by loosening this screw the disk may be turned slightly about the other as a pivot, thereby setting the journals in or out a little, as may be required to bring the bar into the exact position demanded.

The timer is provided with a setting mechanism similar to that of an ordinary alarm-clock, and I need not stop here to enter into a full description of it, but merely refer to certain of the parts which are necessary to an understanding of some additional improvements which I have made. In this mechanism M is the dial, which is annular, and  $m$  the stop-disk, which is carried around once in twenty-four hours and is provided with a notch,  $m'$ . A stop-lever, N, is arranged as usual inside of the dial, and is provided with a stop-pin,  $n$ , projecting out, so as to ride on the periphery of the disk  $m$ , and actuated by a spring,  $n'$ , which operates to hold the lever down upon the disk. The free end of the lever is bent inward to form an arm,  $n^2$ , which is arranged to drop directly into the gear-wheel  $c$  on the shaft of the wheel C, thereby stopping the works whenever the lever drops by reason of the pin dropping into the notch in the disk. The disk  $m$  is a twenty-four-hour disk; but sometimes it is of course desirable to have the timer run more than twenty-four hours—for instance, over Sunday. To accomplish this I provide a stop-slide, O, supported on suitable guide pins or ways of any description, horizontally back of the disk and just below the stop-pin on the lever N. This slide is cut away at one end on its upper edge, as shown in Fig. 5 of the drawings, so that the remaining portion  $o$  is considerably higher than the level cut-away portion  $o'$ , and in the lower edge of the slide is a notch,  $o^2$ . This slide is loose on its supports within the limits of the slots  $o^3$ , made in it, and is arranged so that when slipped back to its farthest limit the higher surface  $o$  will be entirely back of the stop-pin, and so will present no obstacle to the dropping of the latter into its notch in the disk; but when slipped forward to its full extent this higher portion  $o$  will be brought underneath the pin, thereby holding it in about the same position that it occupies on the general periphery of the disk, and preventing it from dropping into the notch in the latter until removed.

In order to remove the slide out of the way of the stop-pin, a small pin,  $m^2$ , is arranged on the inside of the disk in a position to en-

gage with the notch  $o^2$  in the lower edge of the stop-slide, and thereby push the latter back as the disk revolves. When the timer is set to run more than twenty-four hours, this stop-slide is pushed in underneath the stop-pin, and when the disk is carried around such portion as is left of its periphery to bring the notch for the first time under the stop-pin the slide will prevent the dropping of the latter, and the disk will make another full revolution, which will require fully twenty-four hours, and during this revolution the pin on its inside will be brought into connection with the notch on the slide, removing it out of the way, so that when the notch in the disk is again brought under the stop-pin the latter will fall and stop the works.

In this connection I have also devised an additional device for preventing the adjustment of the tumblers, which is arranged to act in combination with the mechanism already described, but not in mechanical connection therewith, so that if for any reason the time-works should stop before the moment at which it is set, or for any other reason the stop-bar should be carried down and held in this position out of the way of the tumbler, this additional device will be in position to operate and effectually prevent the setting of the latter. This device consists of a spring, P, mounted on a suitable journal,  $p$ , and projecting out in a nearly horizontal position, so that its free end will extend slightly over the edge of the tumbler D and be in the path of the pin thereon, as shown in Fig. 3 of the drawings. This device is preferably made in two parts—one a straight flat spring,  $p'$ , fastened at one end to a rigid arm,  $p^2$ , which acts as a holder and is mounted loosely on the pivot-pin. A rod, Q, is connected at one end to the spring or its holder, while the other end is connected to the stop-lever of the time-works, so that when the latter is raised by the stop-disk the spring will be in the position shown in Fig. 3, and stand in the way of the pin on the tumbler, but when the lever drops into its stopping position by reason of its pin dropping into the notch in the disk, this spring will obviously be dropped also and will assume the position shown in Fig. 1 of the drawings, in which it is out of the way of the pin at the point of adjustment and will not interfere with the setting of the tumbler. The arrangement of this spring is such that when in this raised position (shown in Fig. 3 of the drawings) the pin on the tumbler will strike it some time before the setting-point is reached, and will not be released therefrom until after this point is passed by the tumbler. Obviously, the spring will act, therefore, in a similar way to the spring on the bar F, to prevent the setting of the tumbler, and as it is not connected to the bar F, if by any accident the timer should stop before the notch in the disk is brought under the pin of the stop-lever, thereby permitting the bar F to be car-

ried down and held in position by its lever, this spring P will still remain in operative position and prevent the setting of the tumblers. At the same time when the timer is  
 5 stopped in the regular way the spring is thrown down out of the way and will therefore not interfere with the proper adjustment of the tumblers when the bar F is depressed and fastened in this position for this purpose.

10 In order to provide for opening the vault or safe in case an accident such as suggested above occurs, a secondary private combination may be made known only to some one person, which may be operated, notwithstanding the spring P. This may be accomplished  
 15 by making a second notch,  $d^2$ , in the tumbler D, a little back of the notch  $d$  of the main combination. This notch  $d^2$  should be so arranged that it will not be brought into setting position in front of the bolt until just after the pin  
 20 on the tumbler is released from the spring P. Obviously, then, if an accident occurs stopping the timer before the hour intended, the working of the main combination is still prevented,  
 25 but at the same time there is a possibility of opening the lock by the one person having the second combination, and so prevent the destruction or injury of the mechanism.

I have thus described mechanism in full by  
 30 which my invention may be carried into practice; but I do not wish to be understood as limiting myself in all particulars to the especial devices here named and illustrated by the drawings, or their particular arrangement  
 35 and adjustment here shown and set forth, for in many parts changes may be made in many of the devices by substituting others which will perform the same work or by changing the arrangement and adjustment of those  
 40 which are here shown and described, while at the same time the main idea of my invention is retained in full.

I have shown and described my improvement arranged to operate in connection with  
 45 only one of the tumblers, but obviously it may be constructed and arranged to operate upon more than one, if desired.

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

1. In a time-lock, a permutation-tumbler provided with a stop projection, in combination with an elastic or yielding stop arranged to throw the tumbler out of setting position  
 55 by its elastic force, a holder arranged to arrest and hold the stop out of operative position, and a time-movement arranged to release, when running, the holder and permit the stop to return to its operative position, substantially as and for the purposes set forth.

2. In a time-lock, a permutation-tumbler provided with a stop projection, in combination with an elastic or yielding stop arranged to throw the tumbler out of setting position  
 65 by its elasticity, a spring or springs operating to return and hold the stop in operative position,

a holder arranged to arrest and hold the stop in an inoperative position when displaced by the tumbler, and a time-movement arranged to release the holder when the timer is running, substantially as and for the purposes set forth. 70

3. In a time-lock, a permutation-tumbler provided with a stop projection, in combination with an elastic or yielding stop arranged to throw the tumbler out of setting position by its elasticity, a dog or pawl arranged to arrest and hold the stop in an inoperative position, a wheel arranged to operate the dog or pawl to release the stop, and a time-movement  
 80 arranged to drive said wheel, substantially as and for the purposes set forth.

4. The tumbler D, provided with pin  $d^2$ , in combination with the movable bar F and the spring I, attached to the latter, substantially as  
 85 and for the purposes set forth.

5. In a time-lock, the tumbler D, provided with a pin,  $d^2$ , in combination with the reciprocating bar F, the spring H, arranged to hold the bar in operative position, and the stop-spring I, attached to the bar, substantially as  
 90 and for the purposes set forth.

6. The bar F, in combination with the stop-spring I, attached thereto, the spring-arms G G', carrying the bar, the spring H, arranged to  
 95 hold the bar in operative position, and the tumbler D, provided with the pin  $d^2$ , substantially as and for the purposes set forth.

7. The time-movement, in combination with the tumbler D, provided with a pin,  $d^2$ , the reciprocating bar F, provided with a stop-pin,  $f$ , the stop-spring I, carried by the bar, the lever J, the wheel C, driven by the time-movement, and the spring H, arranged to throw the bar into operative position when released from the  
 100 lever, substantially as and for the purposes set forth. 105

8. The time-movement, in combination with the wheel C, driven thereby, the lever J, the pivoted support K, to which the lever is attached, the adjustable retracting-spring  $k$ , the bar F, and the actuating-spring H, arranged to throw the bar into operative position, substantially as and for the purposes set forth. 110

9. In a time-lock, the time-movement, in combination with the notched disk  $m$ , the stop-lever N, provided with a pin,  $n$ , and the arm  $n^2$ , the gear-wheel  $c$ , and the actuating-wheel C, substantially as and for the purposes set forth. 115

10. In a time-lock, the notched disk  $m$ , provided with a pin,  $m^2$ , in combination with the stop-lever N, provided with pin  $n$ , and the stop-slide O, constructed and arranged to operate substantially as and for the purposes set forth. 120

11. The notched disk  $m$ , in combination with the stop-lever N, the pivoted spring P, the connecting-rod Q, and the tumbler D, provided with pin  $d^2$ , substantially as and for the purposes set forth. 125

12. The bar F, carrying the stop-spring I,

in combination with the swinging arms G G' on which the bar is mounted, and the disks  $g^2$ , to which the arms are attached, slotted as described, and whereby the pivots of the arms may be adjusted, substantially as and for the purposes set forth.

13. In a time-lock, the movable bar F, carrying the stop-spring I, in combination with its

actuating-spring H, the plate  $l$ , and the adjustable stops L L', within the limit of which the bar is permitted to move, substantially as and for the purposes set forth.

AQUILLA O. BEHEL.

Witnesses:

JAMES FERGUSON,  
GEO. S. ROPER.