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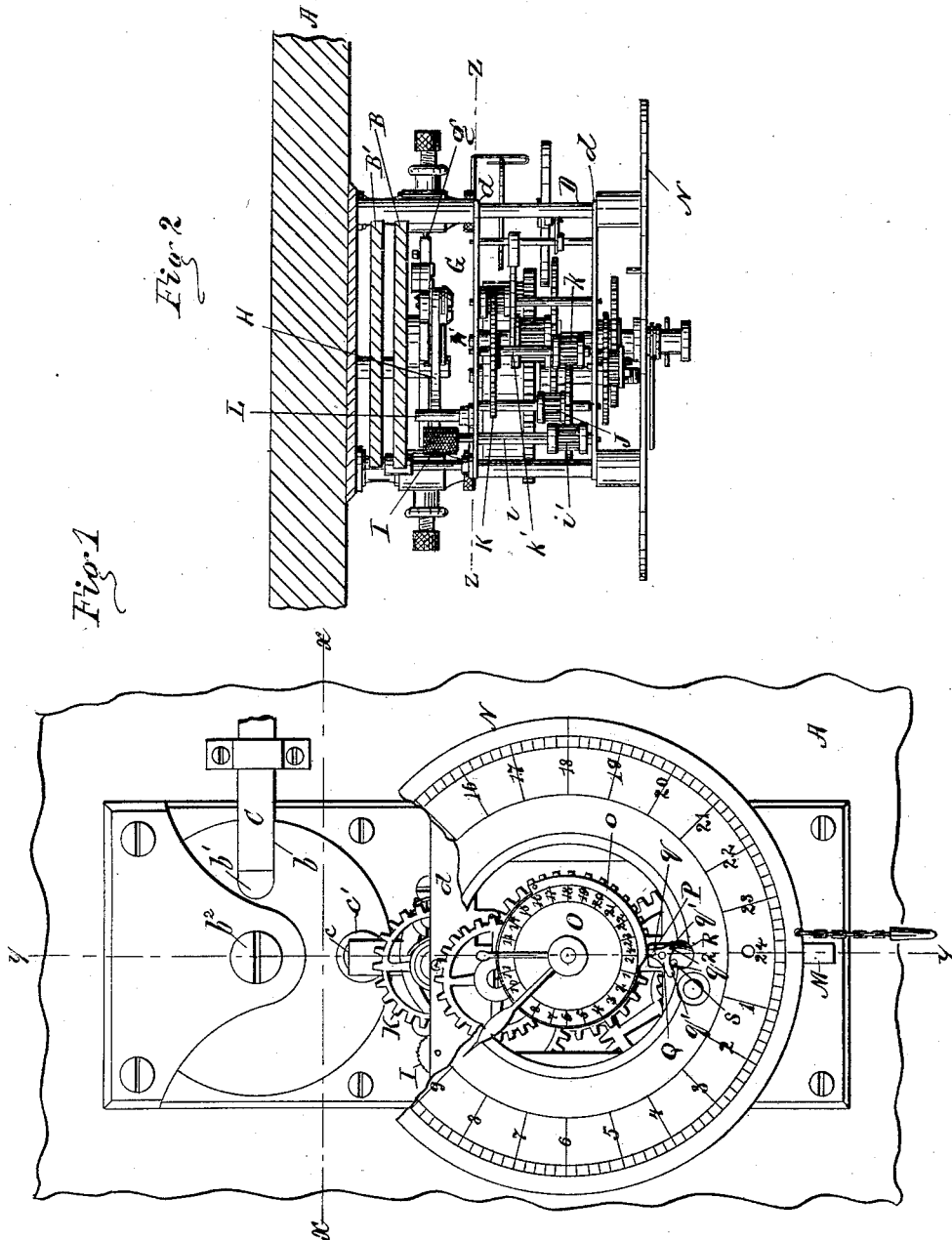
3 Sheets—Sheet 1.

J. B. YOUNG.

TIME LOCK.

No. 346,010.

Patented July 20, 1886.



Witnesses
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(Model.)

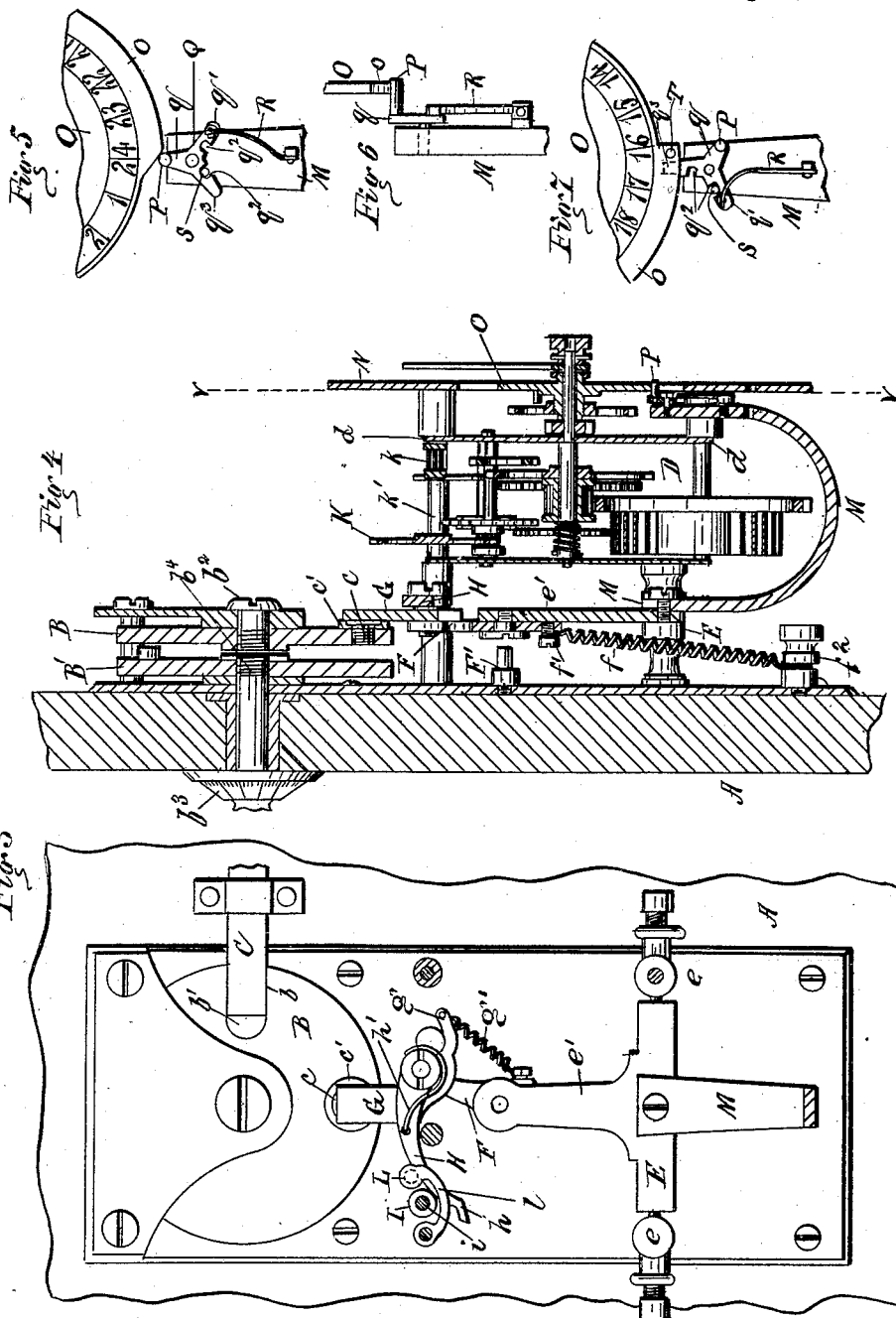
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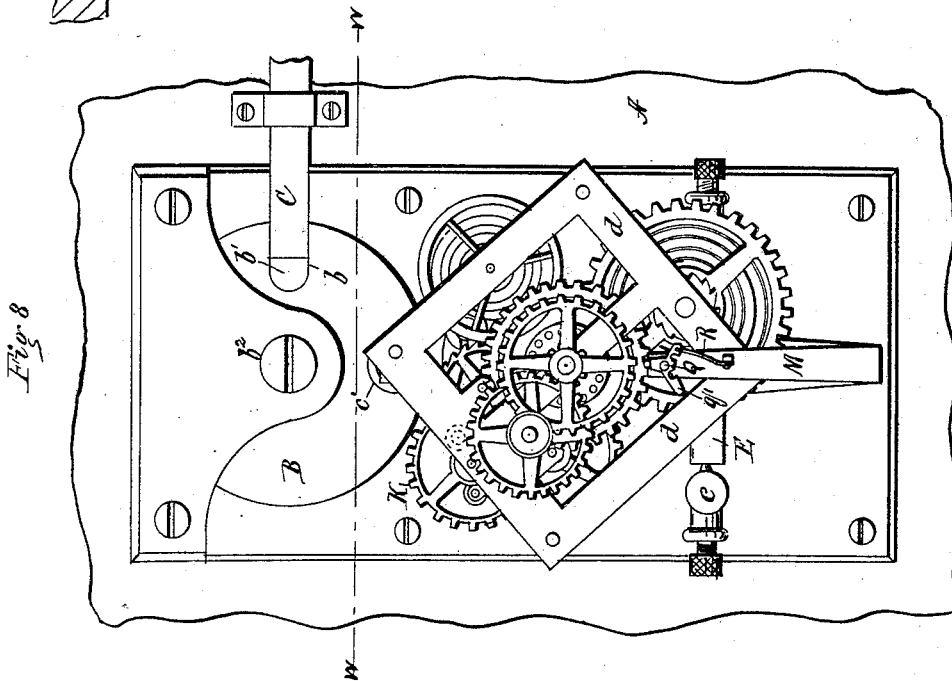
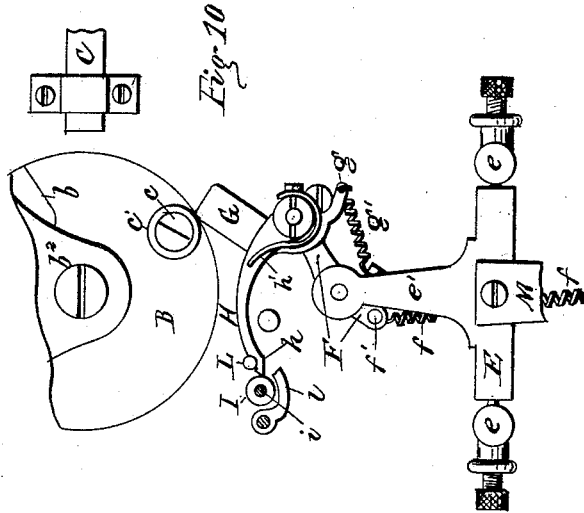
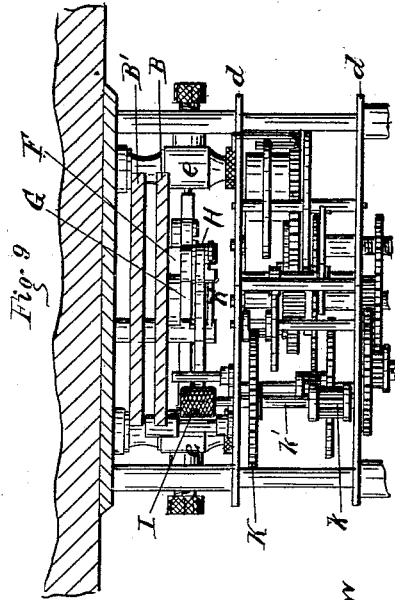
3 Sheets—Sheet 3.

J. B. YOUNG.

TIME LOCK.

No. 346,010.

Patented July 20, 1886.



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UNITED STATES PATENT OFFICE.

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TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 346,010, dated July 20, 1886.

Application filed July 30, 1884. Serial No. 139,232. (Model.)

To all whom it may concern:

Be it known that I, JACKSON B. YOUNG, a citizen of the United States, and residing at Sioux Falls, in the county of Minnehaha and Territory of Dakota, 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 a front elevation of the time-movement and lock embodying my improvements attached to the back of a door or any other wall-support; Fig. 2, a sectional plan of the same, taken on the line *xx*, Fig. 1; Fig. 3, a vertical section of the same, taken on the line *zz*, Fig. 2; Fig. 4, a similar section taken on the line *yy*, Fig. 1; Fig. 5, a detail elevation, on an enlarged scale, of a device for interrupting the action of the time stop mechanism; Fig. 6, a side elevation of the same; Fig. 7, an elevation of the same similar to Fig. 5, but with the parts adjusted for action; Fig. 8, a vertical section taken on the line *vv*, Fig. 4, showing a modification in the arrangement of the time-movement and actuating-wheels; Fig. 9, a sectional plan of the same, taken on the line *ww*, Fig. 8; and Fig. 10, a vertical section similar to Fig. 3, but showing the parts in different position.

My invention relates to time-locks for vaults, safes, &c., in which mechanism is employed for automatically disarranging one or more of the tumblers of the lock at the point of setting, so as to prevent the adjustment of the tumblers to the required combination.

The present invention relates particularly to locks of this description, in which a yielding elastic stop or lever is employed to disarrange the tumblers; and my improvements relate to the construction and operation of this device, its connection with the time-movement, whereby it is automatically thrown into operative position when the time-movement is in action, the mechanism whereby it is adjusted into and out of operative position in relation to the tumblers being thrown out of operative position at a predetermined time, and mechanism by means of which the action of these adjusting devices may be interrupted, so as to run over a longer or shorter interval of time, as may be desired.

My invention is an improvement upon the

invention set forth and described in the application of Charles H. Shaffer, No. 132,846, filed May 26, 1884, to which reference is made for further information as to the general features of the invention, broadly considered.

I will proceed to describe in detail the construction and operation of mechanism by means of which I have practically carried out my invention 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. I have shown an ordinary tumbler-lock attached to the door, as usual. Only two tumblers, B B', are shown in the drawings; but of course any number may be used. These are provided with the usual notches or gates, *b b'*, and are mounted, the former upon the spindle *b²*, to which the actuating-disk *b³* is attached, on the outside of the door, and used in connection with the usual graduated dial, and the latter on a separate spindle, *b⁴*, arranged in line with the spindle *b²*, and supported from the interior of the door, in the manner shown in the drawings. The bolt C or stud of the main locking-bolt is mounted in any ordinary way and arranged to enter the gates of the tumblers when they are adjusted into proper position for this purpose.

The timer or time-works D may be of usual construction, consisting of all the well-known parts used in this connection, (which need not be described here,) and are mounted in a suitable supporting-frame, *d*, which is attached to the door or wall, and are shown in the drawings arranged just below the tumblers. On the inner face of the inner tumbler, B, is a pin or projection, *e*, arranged near the periphery of the tumbler, and preferably provided with an anti-friction roller, *e'*. A rock-shaft, E, is mounted horizontally on suitable pivot-bearings, *e*, and from it rises the vibrating arm or carrier *e'*, extending directly upward toward the tumblers in a plane just in front of them, but stopping short of the periphery of the tumblers. A lever, F, is pivoted to the back side of the upper end of this arm, the lower end of which projects down a little below the pivot, while the upper end extends considerably above the same, and is curved or bent to

one side somewhat, as shown in Figs. 3 and 10 of the drawings. The upper end of a coiled spring, f , is attached to a pin, f' , on the lower end of this lever, while the lower end of this spring is attached and held by a clamping-screw, f^2 , or any other suitable device on the wall of the door. Just behind the pivot of the lever F is a stop-pin, F' , on the wall of the door, which limits the movement of the vibrating arm or carrier e' toward the door and tumblers, this pin being arranged so as to stop the carrier in about a vertical position, and the spring f and its attachments are so arranged that when the carrier is in this position the spring will also be in a substantially vertical position. The elastic stop or lever G , which is intended to disarrange the tumbler when it is adjusted into position, or to prevent such an adjustment, has a substantially straight arm, with a toe or finger, g , bent to one side at its lower end, said lever being pivoted to the upper end of the lever F , and to its toe or finger is attached one end of a coiled spring, g' , the other end of which is carried down and attached to the lever F near its lower end. The arrangement of these parts is such that in normal position the elastic lever G will be held upright about on a line with and in about the same plane as the vibrating arm or carrier e' , on which it is mounted, and in this position it will stand just in front of the inside tumbler, B , and directly in the path of the pin on the inner face thereof as the tumbler is rotated. The spring f operates to hold the vibrating arm or carrier and the elastic stop up into the vertical position in which the stop is operative, and at the same time it also operates to hold the supporting-lever F in vertical position in the other direction; but obviously the spring will yield to permit the vibrating arm or carrier to be swung outward from the tumblers, and also to permit the lever F to vibrate in the other direction to the right or left, or in a plane perpendicular to that of the movement first described, so that when the tumbler is rotated and the pin or projection thereon is brought against the stop the latter will be turned to one side by the continued movement of the tumbler, the spring yielding for this purpose; but as soon as the projection on the tumbler passes the end of the stop the latter will be returned to its normal position, unless there is something to prevent it. It will also be noticed that the elastic stop is attached to the lever F in such a way that it will yield either to the left or downward on its pivot, this movement being permitted in a direction opposite to that occasioned by the rotation of the tumbler in its proper direction, so that if the tumbler should be turned in such opposite direction and possibly strike the flexible stop on the end the stop will yield on its carrying-lever, and the latter will also yield to permit the projection on the tumbler to pass without injuring the parts in the least, and the springs will operate to bring them back into their op-

erative position at once. This yielding disarranging stop or lever is so arranged in relation to the inside tumbler and the pin or projection thereon that when the tumbler is rotated in the direction required to set it the projection on the tumbler will come in contact with the elastic stop a little before the gate of the tumbler is brought into the required position, and will not leave the stop until the gate has passed by this position. Obviously, then, at any time between the engagement of the tumbler with the stop and the releasing of the same, if the tumbler is left free to turn by releasing the spindle, the stop, on account of its elasticity occasioned by the action of the spring, will throw the tumbler back out of adjustment, and this will be the effect until the tumbler has entirely passed the setting-point; but it is obvious that it is necessary to hold this stop out of operative position at the required intervals when it is desired to open the door for access to the vault. This may be effected in either one of two ways: either the carrier may be vibrated outward from the tumblers, in which case the disarranging-stop will be thrown out of the path of the projection on the face of the tumbler, so that the latter can pass around behind it, or a device may be provided which will arrest the stop when it is turned to one side by the action of the tumbler, and hold it in this position until released, in which case of course the tumbler may be then rotated without being affected by the stop, and so may be properly set, the same as in the former case. I will first describe the latter device. A pawl or dog, H , is pivoted at one end to the carrying-lever F , this pivot, as shown in the drawings, being arranged between the stop and its pivot and just above the toe of the stop, as shown in Figs. 3 and 10 of the drawings. At the outer end of this pawl there is a slight bend outward and upward, so as to provide a finger, h , which, preferably, is beveled to make a tolerably sharp edge. A wheel, I , with a roughened surface is mounted on the end of a shaft, i , and arranged in position so that when the disarranging-stop is carried to one side by the rotation of the tumbler in its regular direction the finger of this pawl will engage with the serrated surface of the wheel just about at the point where the stop is released from the tumbler. Obviously this will dog the stop in its inclined or inoperative position, and hold it there if the wheel is stationary. The pawl H is provided with a spring, h' , one end of which is coiled around the pivot-pin and the other attached to the pawl beyond the pivot, being arranged to hold or throw the pawl up in a well-known way, and at the same time yielding to permit it to be thrown downward. Obviously this device will operate to hold the disarranging-stop out of action permanently so long as the wheel remains at rest, in which position the combination can be worked and the tumblers set as desired; but it will be seen at once that it is

desirable to provide for disengaging this pawl quickly, so that the disarranging-stop may return at once to its operative position when it is desired to prevent the proper setting of the tumblers to permit the operation of the lock. It is also obvious that if the serrated wheel is in motion at the time the pawl engages therewith its rotation will soon release the pawl, when of course the parts will return to their normal position. This it is the function of the timer to do, and for this purpose the shaft *i* is provided with a pinion, *i'*, with which a wheel, *J*, engages, that in turn is driven by a pinion, *k*, on the shaft *k'* of the second wheel *K*. When, therefore, the disarranging mechanism is in operative position and the timer is running, the combination of the lock can never be worked, for although at every turn of the tumbler the elastic stop is dogged in its inclined or inoperative position it will be held in such position but a moment, for the pawl will almost instantly be released from engagement with the wheel, thereby permitting the stop to return to its operative position under the action of its spring. Obviously, in order to secure the proper working of this disengaging mechanism, the finger of the pawl must engage with the surface of the wheel just at or a little below the horizontal plane of its axis, for if it engaged above this plane the wheel could not move the pawl, and the effect would be to stop the timer, and the disarranging-stop would remain thrown out of operative position.

In order to always secure the proper relative position of the pawl, a stop-pin, *L*, is mounted on one end of an arm, *l*, which is pivoted to the timer-frame at the other end, this stop-pin projecting out over the pawl, as shown in Figs. 3 and 10 of the drawings. The arm is held in frictional contact with a side piece of the frame, so that it remains in any position to which it is adjusted, but at the same time is free for ready adjustment up and down. This pin is adjusted so as to stop the pawl in its upward swing, caused by its spring and the side movement of the disarranging-lever, just before or as its finger reaches the horizontal plane of the axis of the serrated wheel, as shown in Fig. 10 of the drawings, in which position the finger engages with the surface of the wheel, but in such relation to the latter that the rotation of the wheel is not prevented, but will continue, and by its motion throw down the finger until it is disengaged therefrom, when the disarranging-stop, actuated by its spring, moves back into the position shown in Fig. 3 of the drawings, in which it is operative. With this device the throw of the pawl can always be nicely adjusted, so as to secure its engagement with the serrated wheel just at the proper point, and hold the pawl free from the wheel in all other positions to prevent friction. It will be noticed in this connection that with the operation of the devices described above, if it is desired to hold the disarranging-stop out of operative posi-

tion, the timer must be stopped; and it will also be noticed that the lock could never be opened until the timer ran down or was otherwise stopped, unless there is some provision for throwing the disarranging-stop out of operative position permanently in some other way. It is not desirable to stop the timer, and so I provide means for throwing the disarranging-stop out of its operative position by swinging its carrier away from the tumblers at any predetermined time, and hold it in this position as long as may be desired, but without interfering with the continued running of the timer. I have already described this carrier, consisting of the rock-shaft *E* and arm *e'* as pivoted, and its pivotal bearings are arranged so that the rocking of the shaft will move the arm to and from the tumblers. A lever, *M*, is fastened at one end to the rock-shaft, and is bent around underneath the timer, as shown in Fig. 4 of the drawings. Its free end is brought up just behind the graduated annulus *N* in front of the time-works, as shown in the same figure of the drawings. The annulus *N* is graduated into twenty-four-hour parts or hour-divisions, and constitutes a dial, which is secured to suitable supports, and is arranged, as usual, concentrically with the main shaft of the time-movement. Within this fixed dial is a timer-disk, *O*, which is mounted on the main shaft of the hour-hand and held thereto by friction, so as to turn therewith along with the hour-hand, but at the same time may be adjusted or turned on the shaft independently. This construction is similar to that used in alarm-clocks, and is so well known that a more specific description is not necessary here. The disk is also divided into twenty-four equal parts, answering, therefore, to a day-dial. At one side a cam-surface, *o*, is raised on the periphery of this disk, being extended along about the number of hour-divisions that are desired for free access to the vault during the day. The right-hand end of this cam is perpendicular, while the left-hand end is beveled or inclined, as shown in Fig. 1 of the drawings, and the left-hand end begins about at the graduation for the twenty-four-hour division and extends around backward to the right, as seen in the same figure. The free end of the lever *M* extends up about to the lower edge of the disk *O*, and is provided with a pin, *P*, which projects outward horizontally therefrom directly under the disk *O*, and in contact therewith, as shown in Fig. 4 of the drawings. These parts are arranged so that when the disarranging-stop of the carrier is in its normal position—that is, upright, so as to bring the parts into working position—the pin *P* will rest on the regular or smaller portion of the circumference of the disk. Obviously, then, when the cam or extended portion thereof comes in contact with the pin the latter will ride up on the incline, being forced down thereby, which movement will of course rock the shaft *E* and throw the disarranging-stop outward away

from the tumblers and out of the path of the projection thereon, which will now pass behind it, and so long as the cam on the disk remains in contact with the pin the parts will be held in this position and access may be had to the vault in the usual way. It will be understood that the timer is supposed to be running all the time, and so the disk will be carried around with the hour-hand once in every twenty-four hours, and when the cam has passed entirely over the pin the latter, actuated by the spring *f*, drops quickly at the right-hand end of the cam upon the smaller circumference of the disk, and the disarranging mechanism is immediately thrown into operative position again.

It will be seen from this description above, in which I have not mentioned any particular construction of the pin P, that the disarranging mechanism will be thrown out of working position some time the next day after the works are set and the door closed. It is desirable, however, to provide means by which a longer interval may elapse at times—say, for instance, to run over Sunday. To accomplish this result, I make the pin P movable or adjustable by mounting it on one arm of a three-armed or triangular pin-holder, Q, which is pivoted at its central portion to the end of the lever M. The arm *q*, on which the pin is placed, is of course in its normal position upright, so as to project the pin up under the disk, as shown in Fig. 5 of the drawings. The other two arms, *q'* *q''*, are provided each with a notch, *q''*, in their lower edges, and to the end of the arm *q'* is attached one end of a spring, R, the other end of which is fastened to the lever M. A small pin, S, is also arranged on the lever M a little to the left of and below the pivot of the pin-holder Q, and so that the notch in one or the other of the arms *q'* *q''* will engage with this pin, according to the position of the holder Q. When these parts are in normal working position, the spring R is nearly straight, as shown in Fig. 5 of the drawings, in which position it operates to hold the arm *q'* outward, and so keep the pin P up where it will engage with the cam on the disk. The small pin S prevents the holder from being turned around too far in this direction; but if the holder Q is turned around to the right the spring R will bend to permit this vibration, and the parts may be brought into the position shown in Fig. 7 of the drawings, where the holder has been turned around until the arm *q'* has been stopped by the small pin S. It will be seen that now the pin P is thrown down out of the path of the cam on the disk, so that the latter will pass over it without coming in contact therewith, and so the disarranging mechanism will not be thrown out of position. It is evident that the spring R will also operate to hold the holder in this position also. It will be seen, however, that the arm *q''* is thrown up just behind the disk and overlaps a little the periphery of the cam portion thereof, as shown in Fig. 7 of the draw-

ings. A pin, T, is secured to the inside of the disk just at the right-hand end of the cam thereon, so that as the disk is rotated, if the parts are arranged as shown in Fig. 7 of the drawings, this pin will come in contact with the arm *q''* just as the end of the cam is passing by, thereby throwing the holder around to the left again and bringing the parts into the position shown in Fig. 5 of the drawings, the pin P being thus turned into contact with the disk, but just behind the cam thereon, and so when the disk is brought around again by the time-works the pin will engage with the cam and throw the disarranging mechanism out of position, as already explained. If, then, it is desired to keep the disarranging mechanism in working position over an extra day, when the time-works are set the holder Q is turned around by hand into the position shown in Fig. 7 of the drawings, when obviously at the predetermined moment the next day the pin P will be out of position, and so there will be no disturbance of the parts, but subsequently will be brought into position, as already described, so that the second day, or twenty-four hours after the cam is first brought into the position for engagement therewith, the parts will all be in operative position and the results obtained already described, and the door may be opened.

The pivoting of the disarranging stop or lever G to its carrying-lever F, which in turn is pivoted to the carrier, prevents the disturbance or injury of the parts by suddenly throwing back the tumbler after it has passed the stop. Suppose, for instance, the parts are in the position shown in Fig. 10 of the drawings, the tumbler is just about to be released from the stop and the pawl to engage with the serrated wheel. Now, if the tumbler be turned quickly a little farther around and then quickly turned back, the projection thereon might be brought against the end of the stop before the pawl is disengaged from the wheel, which requires a few moments, and if the stop were rigid the mechanism might be broken or injured so as to be inoperative, and entrance to the vault then effected. The pivoting of the stop and providing it with a spring which permits it to yield backward will obviously prevent any such result. This construction is not absolutely necessary, however, for if the stop were beveled at its end on its back edge probably all danger of injury from this operation would be prevented and the stop pivoted directly to the carrier.

In the description above the serrated wheel I is mentioned as mounted on a separate shaft, which is driven from the shaft of the second wheel. I prefer, however, a modification of this arrangement, which is simpler and cheaper, and is shown in Figs. 8 and 9 of the drawings. In this modification the time-works and frame in which they are mounted are turned around to the left somewhat, as shown in Fig. 8 of the drawings, so as to bring the shaft of the second wheel into the proper position to

mount the serrated wheel directly thereon, as shown in Fig. 9 of the drawings, and in the proper position for the engagement of the pawl therewith, as already described. This of course saves some parts and makes the construction a little simpler and cheaper. It is obvious, too, that the particular arrangement of the lever M is arbitrary, for it may be brought around at one side, or, in fact, arranged in any position convenient, so as to bring it near the operative disk, wherever the latter is located, and this lever M may be made in one piece with the rock-shaft or other part of the carrier, provided, always, it is so constructed and arranged that its vibration will vibrate the carrier.

Many other modifications may be made in details of the construction which I have specified, and shown in the drawings, without departing from the main idea of my invention; hence I do not wish to be understood as limiting myself to the precise devices described above, nor to the specific construction and arrangement of said devices as herein detailed; but I wish to be understood as including within my invention such mechanical changes as can be made without effecting a radical change in operation.

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

1. In a time-lock, the tumbler provided with a projection, in combination with a yielding disarranging stop or lever, a vibrating arm or carrier, to which the stop is attached, and a spring constructed and arranged to hold the carrier in position where the stop is operative, substantially as described.

2. In a time-lock, in combination with a yielding disarranging-stop and a vibrating arm or carrier on which the stop is mounted, a spring constructed and arranged both to hold the carrier in operative position and to return the stop to operative position when vibrated on the carrier, substantially as and for the purposes set forth.

3. The arm or carrier adapted to vibrate to and from the tumblers, in combination with the lever pivoted to the carrier and the disarranging-stop pivoted to the lever, substantially as and for the purposes set forth.

4. The vibrating arm or carrier, in combination with the lever F, the spring *f*, the disarranging-stop G, and the spring *g'*, substantially as and for the purposes set forth.

5. The tumbler B, provided with a projection, *c*, in combination with the lever F, and the disarranging-stop G, pivoted thereon and provided with a spring, whereby it is made yielding and elastic, the spring-pawl H, pivoted to said lever, provided with a finger, *h*, the wheel I, having a roughened surface, and the timer D, substantially as and for the purposes set forth.

6. The vibrating carrier, in combination with the lever F, pivoted thereto, the spring *f*, the disarranging-stop G, pivoted to the lever F, the spring *g'*, the spring-pawl H, provided with the finger *h*, the roughened wheel I, and the timer, whereby the latter is driven, substantially as and for the purposes set forth.

7. The elastic vibrating disarranging-stop, in combination with the spring-pawl H, the roughened wheel I, and the pivoted friction-arm L, and stop-pin L thereon, substantially as and for the purposes set forth.

8. In a time-lock, the tumbler B, provided with a projection, *c*, the pivoted elastic disarranging-stop G, the lever F, the vibrating stop-carrier E', the spring *f*, the lever M, the pin P, cam-disk O, and timer D, substantially as and for the purposes set forth.

9. The vibrating disarranging-stop carrier, in combination with the lever M, the pin P, the three-armed pin-holder Q, pivoted to the lever, the spring R, the pin S, and the cam-disk O, substantially as and for the purposes set forth.

10. In a time-lock, the disarranging devices adapted to permit unlocking at a predetermined hour, in combination with the timer-disk having a cam projection thereon, and an adjustable lever provided with two or more arms, one of which engages with the projection on the timer-disk on its first revolution to bring the second or opening arm into operative position to engage the said disk projection on the next revolution, substantially as and for the purposes set forth.

11. The vibrating disarranging-stop carrier and the lever M, attached thereto, in combination with the pin P, the three-armed pin-holder Q, the spring R, the timer-disk O, having a cam projection thereon, and the pin T on said disk, substantially as and for the purposes set forth.

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Witnesses:

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