(Model.) 2 Sheets—Sheet 1

H. F. NEWBURY.

TIME LOCK.

No. 262,094. Patented Aug. 1, 1882.

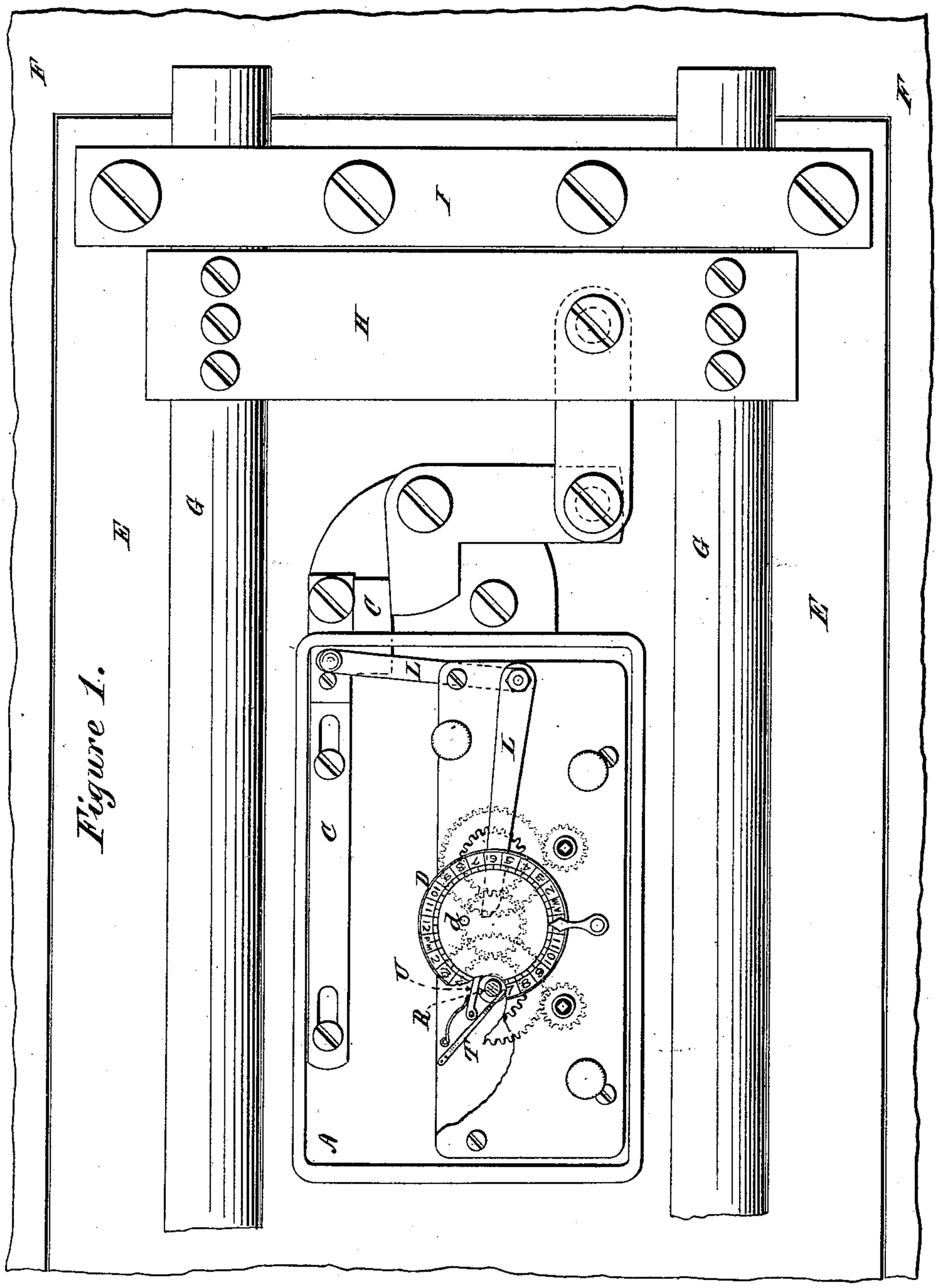

Figure 1.

Witnesses:
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Saml. A. Duncan

Inventor:
Henry L. Newbury

(Model.) 2 Sheets—Sheet 2.

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Figure 2.

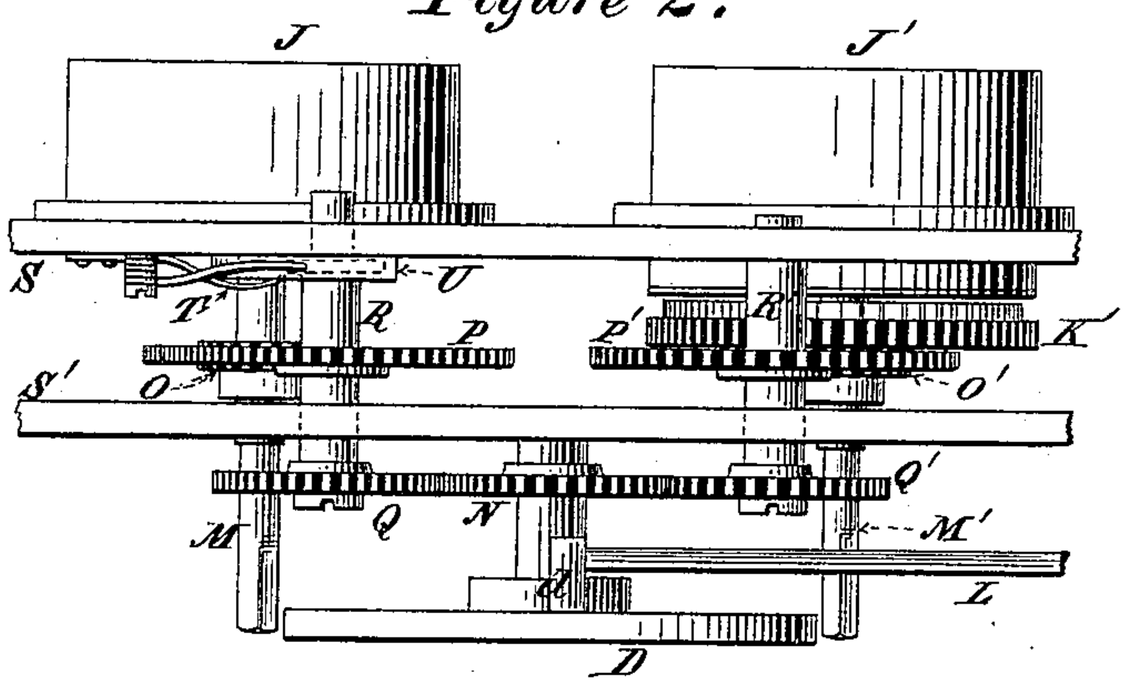


Figure 3.

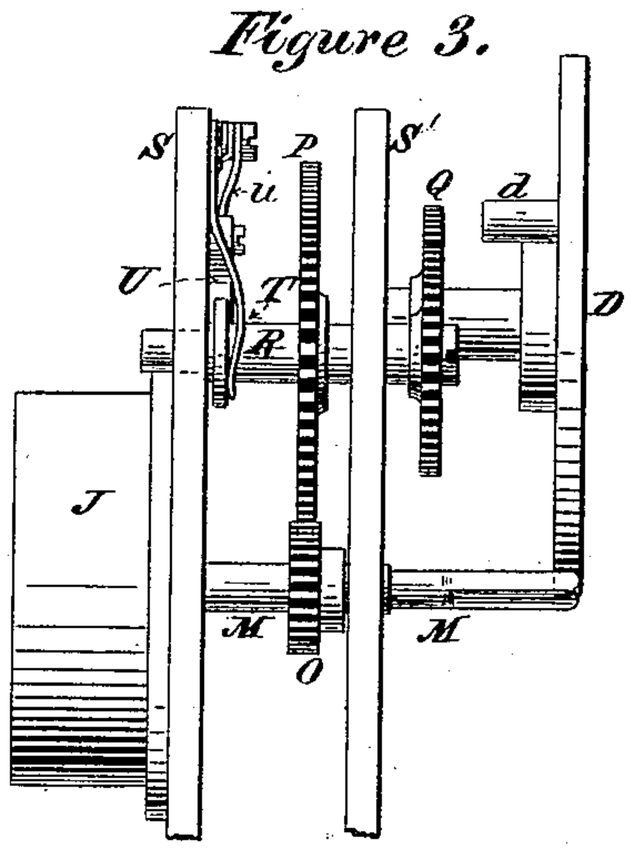


Figure 4.

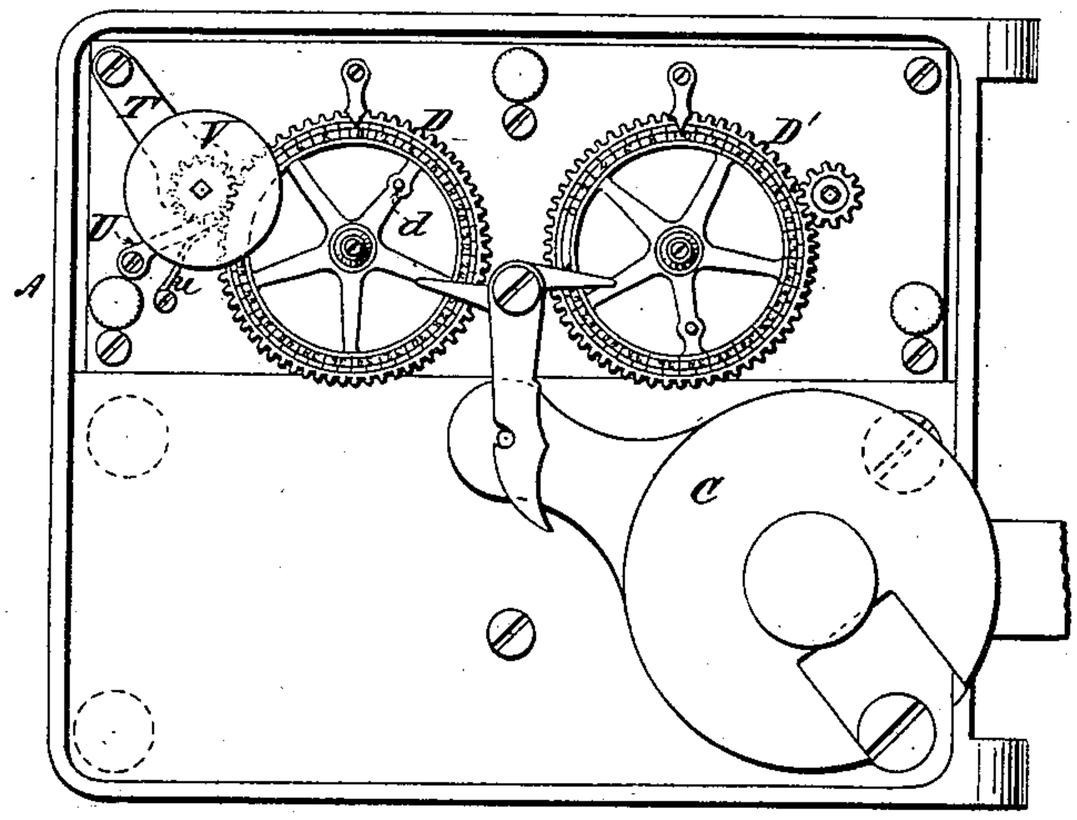


Figure 5.

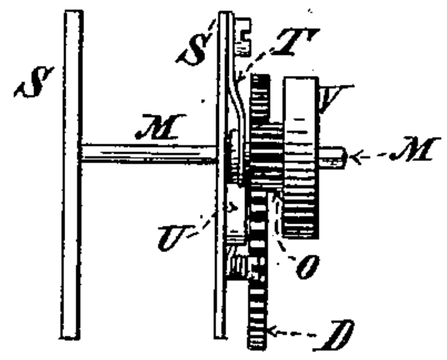


Figure 6.

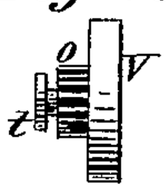


Figure 7.

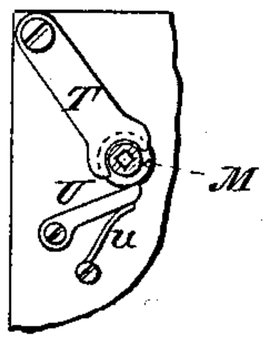


Figure 8.

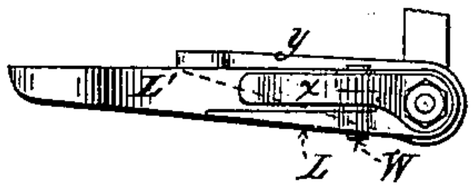


Figure 10.

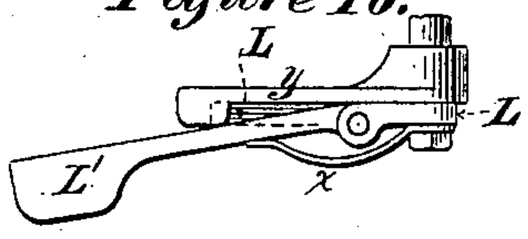
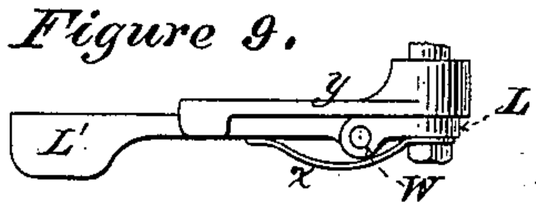


Figure 9.



Witnesses:
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Saml. A. Duncan

Inventor:
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UNITED STATES PATENT OFFICE.

HENRY F. NEWBURY, OF BROOKLYN, NEW YORK.

TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 262,094, dated August 1, 1882.

Application filed June 22, 1881. (Model.)

To all whom it may concern:

Be it known that I, HENRY F. NEWBURY, of the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Chronometric or Time Locks and the Mode of Mounting them, (Case B;) and I do declare the following to be a full, clear, and exact description of my invention, and will enable others skilled in the art to which it appertains to make and use the same.

A chronometric or "time" lock, as the term is understood in the art of safe and vault protection, is a lock whose bolt or checking device (sometimes technically called "dog") is, for the purpose of unlocking at least, under the control of a time-movement capable of withdrawing it automatically or of permitting it to be withdrawn from the locking position upon the arrival of the hour for which the mechanism has previously been set. By placing such locks upon the interior of the structures to be protected and without mechanical connection with the exterior thereof, it has been supposed that an efficient security is provided against what are known as "masked burglaries," and that thus locks of this class afford a complete protection against the operations of the burglar, except when he resorts to violence calculated to force the walls of the safe or vault. I have discovered, however, that the security thus afforded is apparent only, and that any of the time-locks now upon the market, when mounted in the established way, can be defeated by the burglar without difficulty and without resort to force to break or penetrate the walls of the structure in which the lock is used. From this it results that practically a safe or vault guarded by a combination-lock has its security increased but little, if any, by the addition of any of the existing time-locks, and that the protection afforded by such time-lock alone is far less reliable than that afforded by an ordinary combination-lock alone. This defect in the existing chronometric locks as heretofore mounted arises from the frangible character of certain parts of the time-movement, which in all fine work are made so slight and delicate as to be broken readily by a sudden shock, such as might be communicated to them through the walls of a safe or vault by the explosion of a small charge of dynamite, nitro-glycerine, or other quick explosive outside the walls of the structure, but in proximity to that part of the walls against which the lock is secured. The parts of a time-movement which are the farthest removed from the main wheel are the most delicate, and therefore the most easily broken, this being the case especially with the staff of the third wheel and with the pallet and escape-wheel staffs. The journals of these staffs as ordinarily constructed are made exceedingly small for the purpose of reducing the surfaces of contact, and thus the friction, to a minimum, and the finer the workmanship of the lock the slighter and more frangible are these parts likely to be. Any material increase in the extent of the bearings, whereby the strength of the parts would be augmented, would correspondingly increase the friction and impair the time-keeping properties of the movement. Time-locks with jeweled movements also are specially exposed to injury in the manner indicated, since the jewels, by reason of their brittleness, might easily be broken by the force of an explosion of great intensity in close proximity to them. The destruction of any of the parts intermediate between the balance-wheel and the main wheel at once releases the main wheel from the control of the escapement, and the movement immediately begins to "run down," a movement which otherwise would continue to run for several days without rewinding now running down in as many seconds. As the dial or other device arranged to act upon the lock-bolt or dog to withdraw it or permit it to move from the locking position is actuated from the same spring that drives the main wheel, its speed will be correspondingly accelerated, so that the dog, instead of being withdrawn from engagement with the bolt-work of the door at the regular hour for which the lock has been set, will be withdrawn immediately upon the explosion or other shock, leaving the safe or vault, so far as the time-lock is concerned, entirely under the control of the burglar. If there are other locks on the door, (either combination or key locks,) the burglar will probably have effected the unlocking of them in ad-

vance of his attack upon the time-lock, either by picking them or forcing them, or by threats compelling the co-operation of the custodian of the key or combination. In whatever way this may be done, the subsequent unlocking of the bolt of the time-lock in the manner indicated (and repeated experiments show that this can readily be done with a charge of dynamite so small as to make but little noise, and not even indent or otherwise appreciably affect the walls of the safe) removes all obstruction to free access to the valuables placed under the protection of such lock.

The present invention relates to a means of securing the door of a safe or vault in case the time-lock guarding the same be subjected to a sudden shock, as above explained, sufficient to release the mainspring of the time-movement and permit it to run down; and the invention consists in so constructing and arranging the connections between the mainspring and the lock-bolt that under the circumstances supposed the continuity of such connections will be interrupted, and thus the power of the mainspring be expended without the withdrawal of the lock-bolt from the locking position.

The invention is fully illustrated in the accompanying drawings, in which the corresponding parts in the several figures are designated by the same letters.

Figure 1, Sheet I, represents the invention as applied to the well-known Holmes time-lock. Figs. 2 and 3, Sheet II, are enlarged views, in plan and side elevation, respectively, of portions of the mechanism of such lock. Fig. 4 represents the ordinary Sargent lock provided with the present invention, Figs. 5, 6, and 7 being detached views of certain of the parts of the same. Figs. 8, 9, and 10 show a further modification of the invention.

Referring to the drawings more in detail, A represents the time-lock, C the lock-bolt, and D the revolving dial, that is driven from the mainspring and acts to withdraw or permit the withdrawal of the lock-bolt from the locking position.

E in Fig. 1 is the safe-door; F, the door-frame; and G G are the ordinary train-bolts, united by the carrying or tie bar H and moving in the bolt-bars I I.

Fig. 2 is an enlarged plan of that part of the Holmes lock which consists of the connections between the mainspring and the unlocking-lever L, which immediately controls the lock-bolt; and Fig. 3 is a side elevation of the same. In these figures, J represents the drum that contains the mainspring of the movement. The dial D carries a pin, *d*, which at the proper hour is brought by the revolution of the dial into contact with the unlocking-lever L, that controls the lock-bolt. The revolution of the dial is produced by the gear-connections between the mainspring-arbor M and the spur-wheel N on the dial-shaft, these connections being, in this instance, the pinion O, the spur-wheel P, meshing therewith, and the spur-wheel Q, meshing with wheel N.

The shaft R, that carries the wheels P Q, is made capable of forward longitudinal movement in its bearings in the plates S S′, its normal position being as shown in the drawings—that is, with the wheel Q in mesh with N and P with O. This shaft is held in this position against displacement by any slight force by means of a spring, T, bearing against a collar on the shaft R; but any considerable shock directed against the lock from behind will overcome the resistance of this spring and send the shaft forward sufficiently to throw the wheel Q out of engagement with N, or P out of engagement with pinion O. In either case the dial will be released from the control of the mainspring and will come to a rest, even though the same shock should break or displace some part of the time-movement, and thereby permit the mainspring to run down. The connection between the dial and mainspring being interrupted, the running down of the spring will have no effect upon the lock-bolt, which will continue to dog or guard the bolt-work of the door.

To prevent the possibility of the shaft R returning to its normal position, and thus restoring the connection between the mainspring and the dial, before the spring has entirely run down, a latch, U, may be provided, so arranged as to fall in behind a shoulder on the shaft R immediately on the forward movement of this shaft. This latch may be pressed down by a spring of some kind, as shown, which will not only make its action more prompt, but also will secure the latch in place against the shoulder on R.

In Fig. 2 the parts marked J′, K′, M′, O′, P′, Q′, and R′ are parts of or attachments to the second time-movement, which, for greater security, it is usual to put in every first-class time-lock. Although in the drawings the invention is shown in connection with only one of the movements, yet in practice the same or some equivalent safety mechanism should be applied to the other movement. As the trains of the time-movements proper form no part of the present invention they have not been shown in the drawings, except that with one of the movements the main wheel has been represented at K′.

Fig. 4 shows the invention as applied to the pinion of one of the mainspring-arbors of the well-known Sargent lock, (the door of the lock-case being removed.) Fig. 5 is a side elevation of the pinion and the parts immediately connected with it. Fig. 6 is a detached view of the pinion, and Fig. 7 a view showing the spring which holds the pinion in its normal position. In these figures, M represents the arbor of one of the time-movements of the lock, and the pinion O, which fits upon the squared end of this arbor is capable of sliding lengthwise thereon. When in the position shown in Fig. 5 it engages with the teeth of

the dial D. This is its normal position, and it is held in this position by the spring T pressing against the collar *t* on the sleeve which projects from the side of the pinion.

V is a weight attached to the pinion to give it increased momentum when once put in motion in the line of the arbor M. When, now, a sudden shock is directed against the lock from behind, such as would be calculated to break or displace parts of the time-movement, it will also cause the pinion O to move forward until it becomes disengaged from the dial D. The revolution of the dial thereupon ceases and the lock-bolt C remains unaffected, even though the mainspring should run down instantly. The latch U, acted on by a spring, *u*, drops in behind the collar of the pinion as the latter is thrown forward, and thus locks it against a return.

The dial D′ in Fig. 4 indicates the second time-movement of the Sargent lock. In practice this also should have an efficient safety mechanism connected with it; but it has not been considered necessary to show this in the drawings. The mechanism shown with dial D might be duplicated for dial D′.

Figs. 8, 9, and 10 show the invention as applied to the lever by means of which, in the Holmes lock, the dial operates to withdraw the lock-bolt from the locking position. This lever, when modified as shown in Figs. 8, 9, and 10, is to be mounted so that its lower arm will come in front of the dial instead of behind it, as shown in Figs. 1 and 2, and of course the pin *d* will in this case project from the face of the dial rather than from its back. In Fig. 8 this lever is shown in elevation, while Figs. 9 and 10 are two plan views, showing the lever in the two positions which it assumes respectively before and after it is affected by the force of a heavy shock. As here shown the lower arm of the lever is jointed at W, leaving the part marked L′ free to turn upon the hinge except as restrained by the spring X.

Y is a latch, the end of which in the normal position of the parts rests upon the top of the part L′; but whenever L′ is thrown forward this latch will drop down behind it and rest upon the part L, and thus lock it out of the path of the pin *d* on the dial. In such case, again, the lock-bolt would not be withdrawn, even though the shock should have deranged the time-movement to the extent of letting the mainspring run down entirely.

It is plain that the same principle of construction might be applied to any of the other parts intermediate between the mainspring of the time-movement and the lock-bolt which such movement controls. Thus the dial itself might be loosely mounted on its shaft, so as to be thrown forward by a shock and carry the unlocking-pin *d* beyond the range of the lever L; or the pin *d* might be loosely mounted in the dial, so as to be thrown out by the shock, and thus permit the dial to revolve freely without affecting the unlocking-lever L. It would be possible, also, with some forms of existing locks, to make the lock-bolt thus movable, so as to detach it from the unlocking-lever that ordinarily controls it without disturbing its relation to the bolt-work; or the body of the lock might be so mounted as to be capable of being moved away from its connection with the lock-bolt. In all these suggested constructions, as well as in those illustrated in the drawings, the essential thing is to so adjust some one or more of the elements that make up the connections between the mainspring and the lock bolt or dog that such element will yield sufficiently under the force of a shock that would damage the time-movement, to break the continuity of such connections.

It will readily be understood that the part or parts which are required by this invention to have a yielding connection with the lock or door or other part of the safe may be secured to their supports by such slight means as to be thrown by the shock entirely off from the lock or door. In such case the continuity of the connection between the lock-bolt and the mainspring will of course be as effectually interrupted as in any of the constructions shown in the drawings.

What is claimed as new is—

1. The combination, in a chronometric or time lock, of the lock bolt or dog, the mainspring of the time-movement, and connecting mechanism between the two, some part of which is made yielding for the purpose of interrupting the operative continuity of the mechanism under the force of a shock, substantially as above set forth.

2. The combination, in a chronometric or time lock, of the lock-bolt or dog, the mainspring of the time-movement, connecting mechanism between the two, some part of which is made yielding for the purpose of interrupting the operative continuity of the mechanism under the force of a shock, and a latch or dog for holding the yielding device out of engagement with the other parts of the train, substantially as above set forth.

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ROBT. H. DUNCAN.