(Model.)

3 Sheets—Sheet 1.

H. F. NEWBURY.

TIME LOCK.

No. 262,096. Patented Aug. 1, 1882.

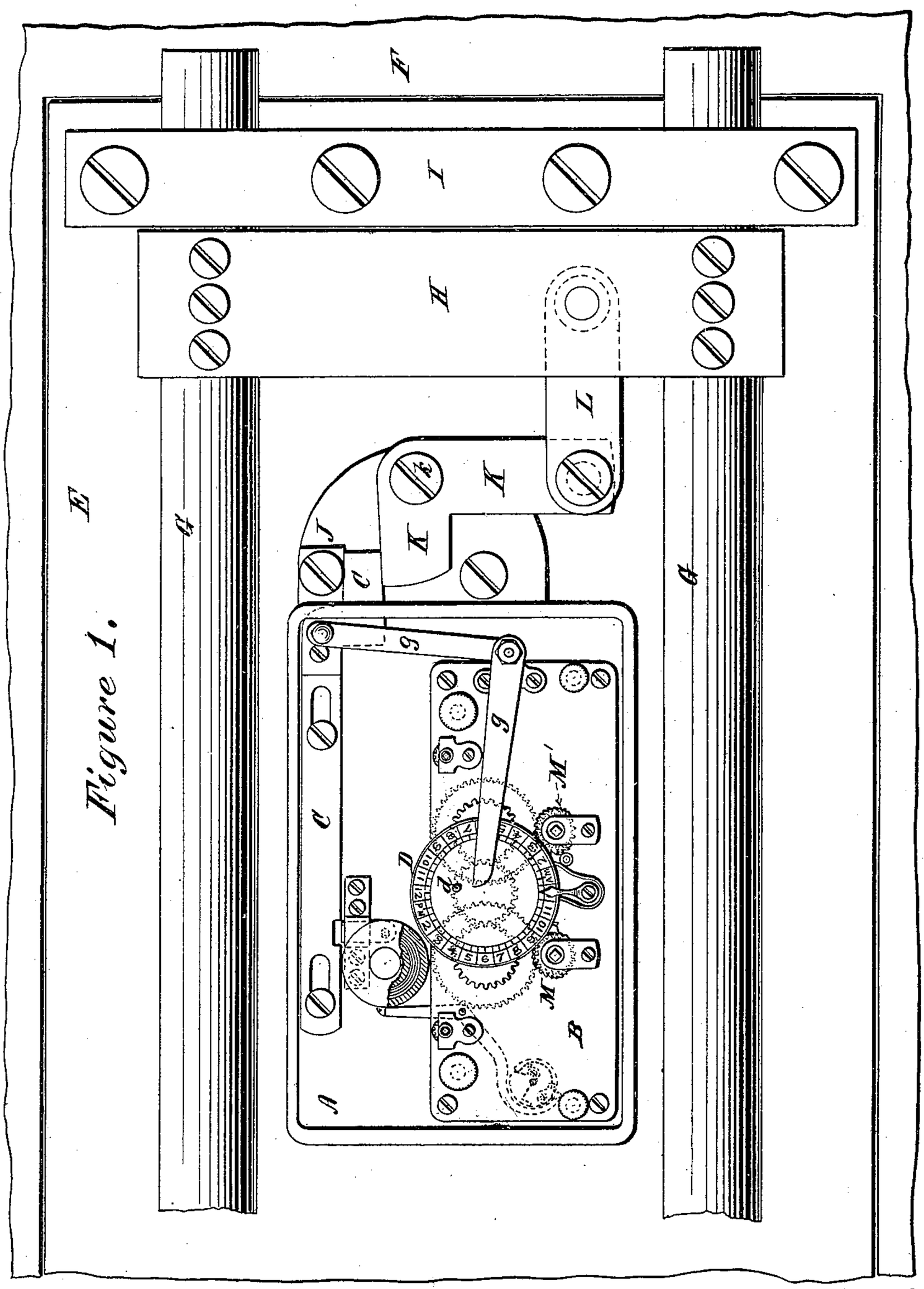

Figure 1.

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Inventor:
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(Model.) 3 Sheets—Sheet 2.

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TIME LOCK.

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Figure 2.

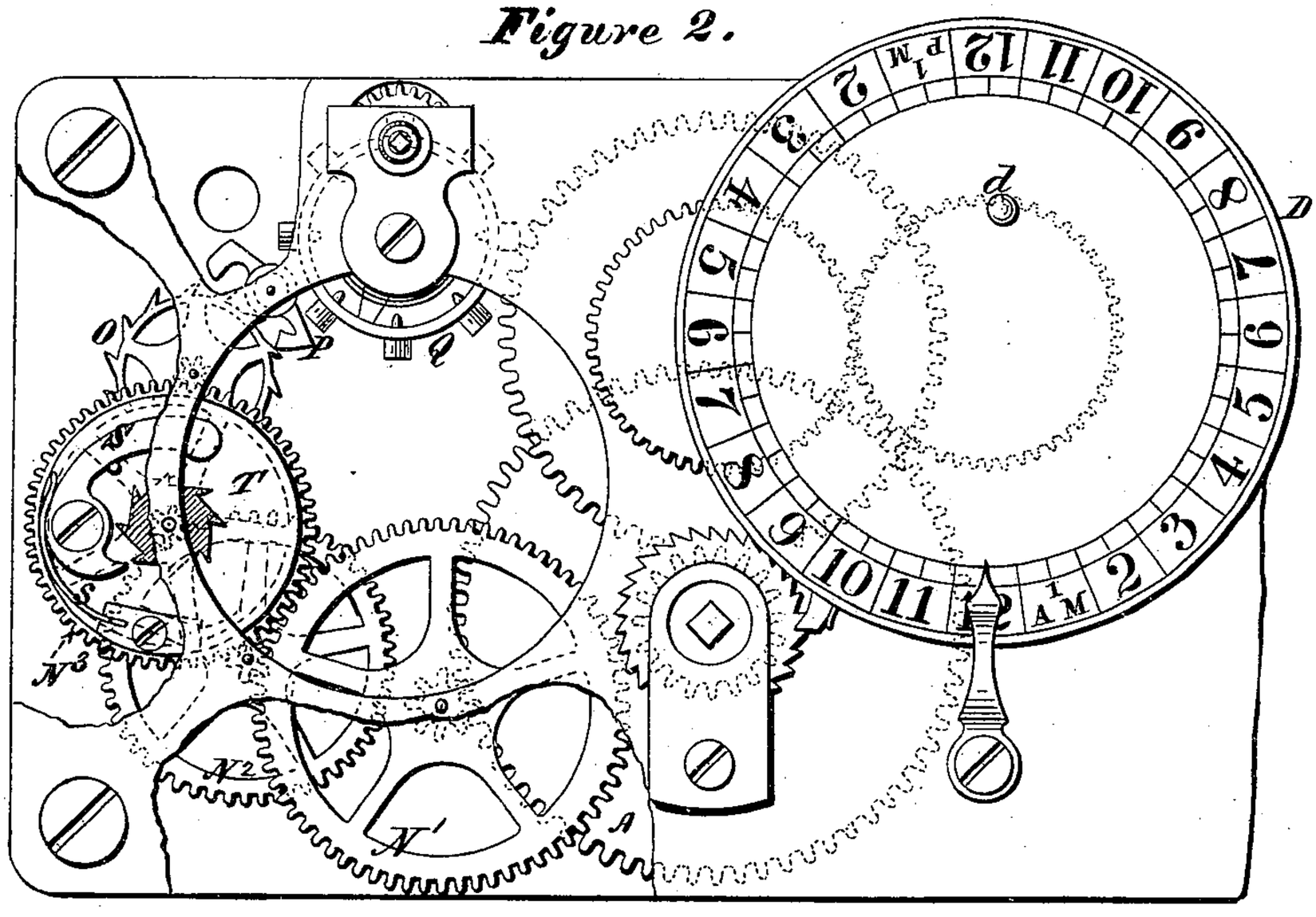


Figure 3.

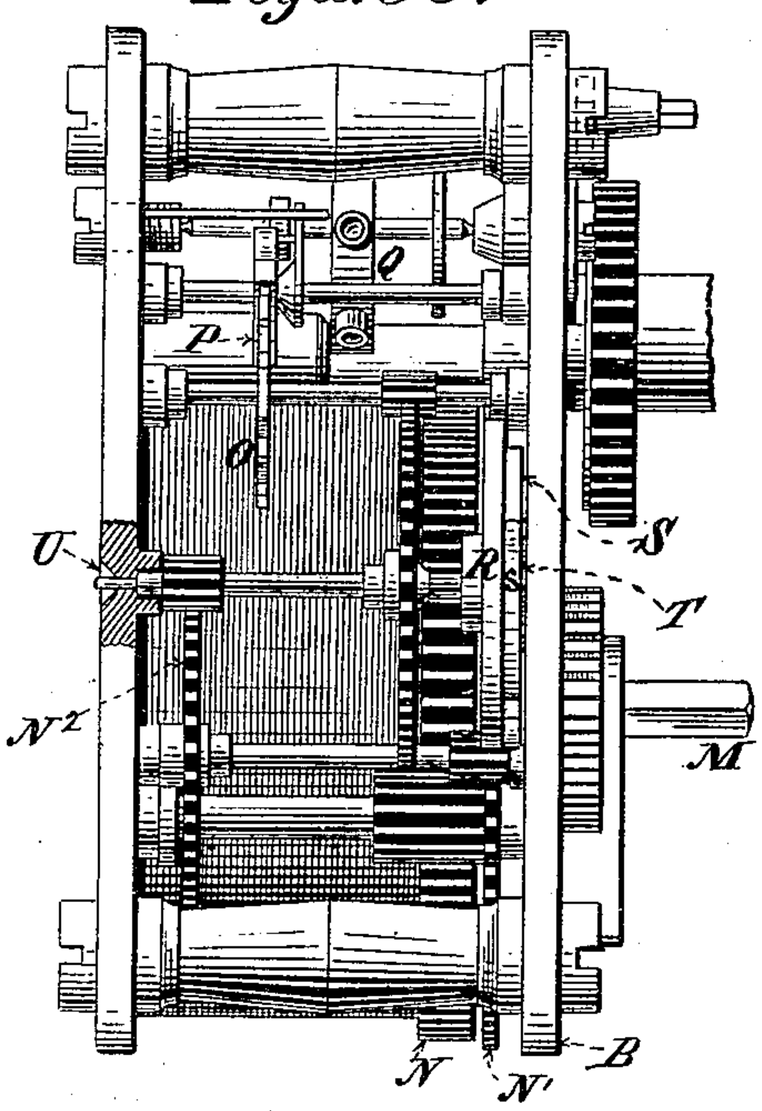


Figure 4.

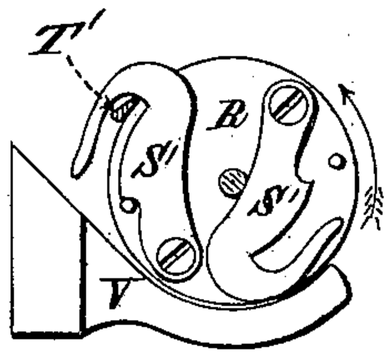


Figure 5.

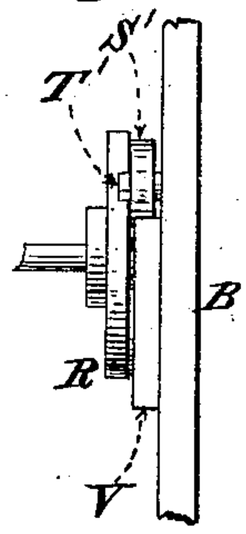


Figure 6.

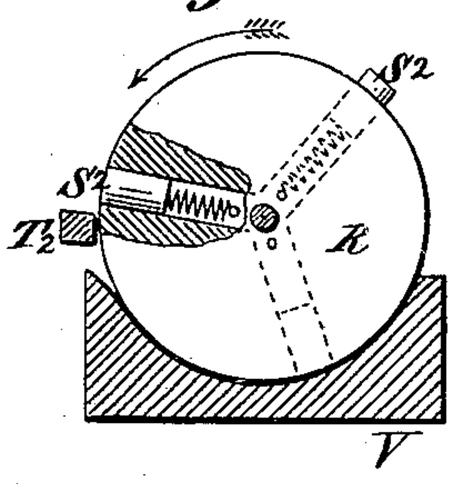
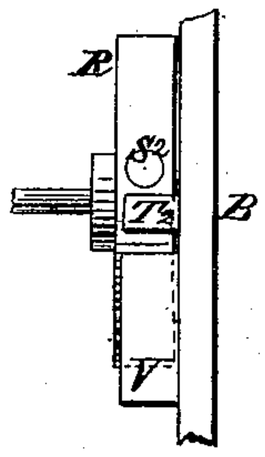


Figure 7.



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(Model.)

3 Sheets—Sheet 3.

H. F. NEWBURY.

TIME LOCK.

No. 262,096. Patented Aug. 1, 1882.

Figure 9.

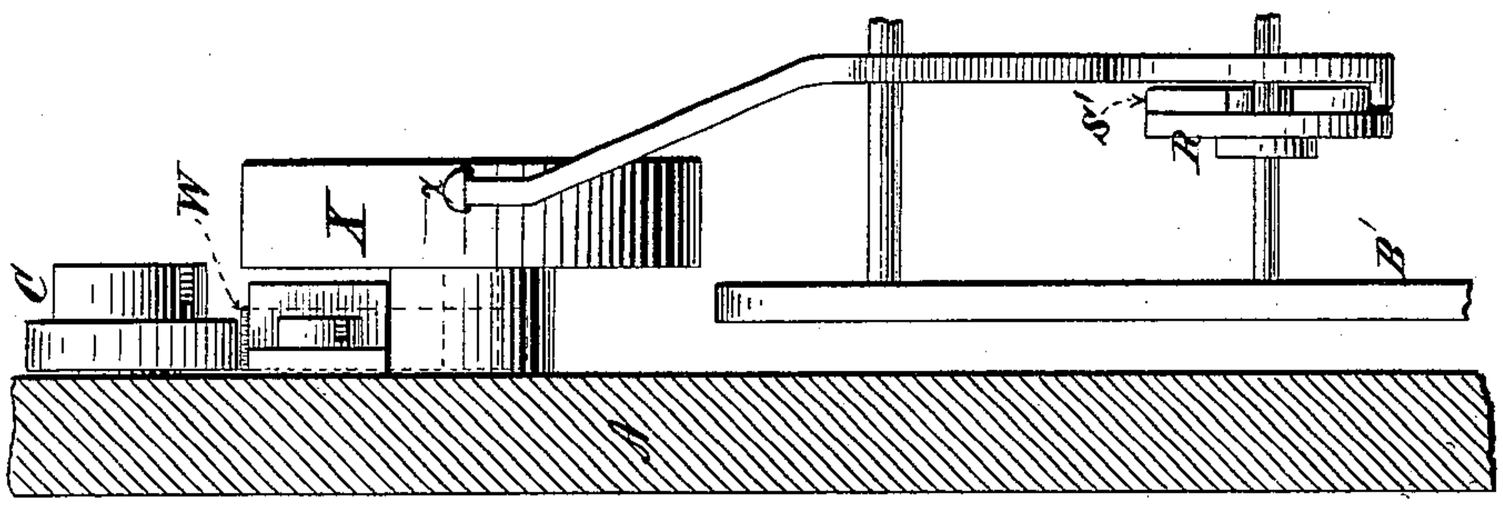
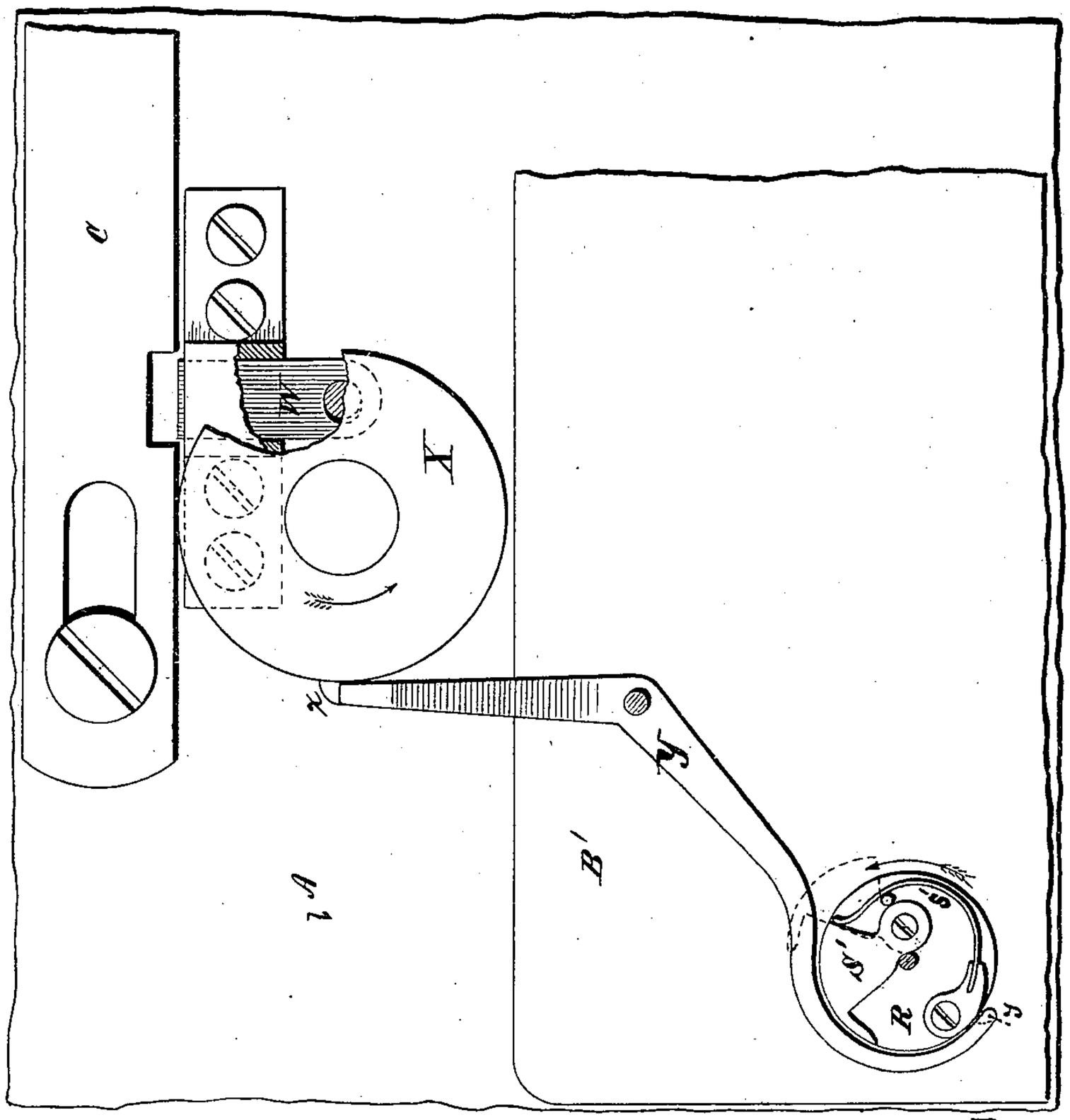


Figure 8.



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UNITED STATES PATENT OFFICE.

HENRY F. NEWBURY, OF BROOKLYN, NEW YORK.

TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 262,093, dated August 1, 1882.

Application filed July 6, 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 D;) and I do hereby declare that the following is 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 mode, 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 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 their 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 especially 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 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 advance 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 combina-

tion. 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 primarily to a means of preventing the running down of the time-movement of a chronometric lock and the consequent unlocking of the safe or vault in which it is placed when such lock is subjected to a shock sufficient to break or displace some of the parts of its movement; and it consists, in its main feature, in arranging upon some one of the revolving parts of the movement a pawl or detent so held by spring or otherwise that in the normal condition of the lock it will occupy a position where it will not interfere with the regular action of the clock-work, but which upon any unusual acceleration of speed in the part upon which it is mounted will be thrown or moved from its normal position and caused to strike against or engage with a stop, and thus arrest the further movement of the clock-work, and thereby prevent the unlocking of the door. Instead of engaging with a fixed stop, such centrifugally-acting device may also be made to trip a detent or trigger employed to hold in check some safety device, which will thereby be brought into action by spring-power or by the force of gravity, and made to arrest the movement of the train, either by acting as a brake upon the periphery of some one of the wheels or by engaging positively with the teeth thereof, or otherwise; or, again, without arresting the movement of the train, the centrifugally-acting safety device might be made to trip a detent, and thus release a supplemental bolt or check arranged to fall or to be brought into the path of the lock-bolt, or even the bolt-work of the safe-door, and block the same against withdrawal.

In the accompanying drawings there are shown several forms that conveniently may be given to the centrifugal device employed for the above-named purpose; but manifestly, though differing in details, these several forms, as well as many others that might be used, embody the same principle of construction and arrangement.

Referring to the drawings, Figure 1, Sheet I, shows a time-lock—the well-known Holmes lock (the unlocking-lever, for greater distinctness, being shown in front of the dial instead of behind it)—mounted on the door of a safe and provided with one form of safety attachment embodying the invention, the details of this form of the invention being fully illustrated on a larger scale in Figs. 8 and 9, Sheet III. Fig. 2, Sheet II, is a front elevation of a portion of the time-lock seen in Fig. 1, but having a centrifugal device of different form from the one shown in that figure. Fig. 3 is an end elevation of the mechanism seen in Fig. 2, the dial being omitted. Figs. 4 and 5 and Figs. 6 and 7 represent, in front and side elevation, respectively, two modified forms of the same invention.

The general operation of a time-lock is illustrated in Fig. 1, in which A represents the lock; B, the frame containing the time-movements, (two movements being usually employed for greater security;) C, the lock-bolt or dog; D, the dial carrying the unlocking-pin *d;* E, the safe-door; F, the door-frame; G G, the door-bolts, united by the carrying or tie bar H and moving in guide-bars I I, only one of which is shown. The interposition of the lock-bolt C between the fixed stud J and the angle-lever K, which is pivoted at *k*, and is connected with the carrying-bar H by means of the link L, dogs the bolt-work and prevents its retraction by force applied to the spindle which extends from the bolt-work through to the outside of the door. The lock-bolt is withdrawn from the locking position in the following manner: M M′ are pinions on the main-spring-arbors of the two time-movements respectively. These pinions, by intermediate gears, are made to drive the dial D, and the pin *d* on the dial strikes on the lower arm of the dog actuating lever *g*, and thus withdraws the dog at the predetermined hour for which the mechanism has been set and releases the bolt-work.

Referring now to Figs. 2 and 3, in which the time-movement is shown in detail, N represents the main wheel; N′, N², and N³, the first, second, and third wheels, respectively; O, the escape-wheel; P, the pallet, and Q the balance-wheel. On the staff of the third wheel is mounted a supplemental wheel, R, which carries a pawl, S, arranged to engage with the ratchet T, rigidly affixed to the inner face of the frame-plate B. The long arm of this pawl S is made much heavier than its short arm, which latter engages with the ratchet. During the normal action of the parts a spring, *s*, bearing against the long arm of the pawl, prevents its engagement with the ratchet; but whenever the revolution of the wheel becomes abnormally accelerated, as would happen by the displacement of the escape-wheel or of the pallet, centrifugal force acting upon the long arm of the pawl S will throw it outward against the resistance of the spring *s*, and thus bring the pawl into engagement with the ratchet, which will instantly arrest the motion of the mainspring, provided there is no interruption of the continuity of the train between the third wheel and main wheel. There is comparatively little danger of interruption at such points, since the parts of the train which lie nearest the main wheel can always be made the strongest, and strong enough to resist a shock that would be sufficient to shatter the more delicate staffs of the pallet and the escape-wheel. However, to guard against the danger of the movement running down by

a breakage of the train between the third wheel, when provided with the above-described safety device, and the main wheel, it is deemed desirable to provide the staffs of the first, second, and third wheels with supplemental or auxiliary bearings, as shown at U in Fig. 3. This auxiliary bearing is, in the form of a flat ring or perforated boss, secured to the inner face of the clock-plate concentric with the primary or main bearing of the staff, the opening in the ring being slightly larger than the thick part of the staff, which enters within it. By this arrangement the staff during the normal action of the parts does not touch the auxiliary bearing, and therefore is not affected by it; but if by any casualty the small end of the staff should be broken, so as to let the staff drop, it would instantly be caught by the supplemental bearing and before its spur-wheel and pinion are disengaged from their connections up and down the train. This secondary bearing is made the special subject of a separate application for a patent contemporaneous with this, and therefore is claimed here only in combination with the detaining-pawl or equivalent device, as hereinafter set forth.

The safety-pawl above described is preferably arranged upon the staff of the third wheel, as shown in Figs. 2 and 3, since the motion of this wheel is much faster than either the first or second. It might also be placed on the staff of one of these last named, but not with the same certainty of efficient action.

Instead of making the detent in the form of a pawl acting on a ratchet, it may be made in the form of a pivoted hook, S′, as shown in front and end elevation, respectively, in Figs. 4 and 5, such hook being arranged to take against a fixed stop, T′, in the side of the plate B. When the wheel R takes on an undue rate of speed this pivoted hook S′, being acted upon by centrifugal force, will be thrown outward and brought into engagement with the stop T′. For greater security, the hook S′ may be duplicated, as shown in Fig. 4; also, to prevent the hooks from falling downward by the force of gravity, a guard, as shown at V in Fig. 4, may be employed. This guard is so arranged in relation to the periphery of the wheel as to prevent the hooks from being moved by the force of gravity beyond the periphery of the wheel; but it should not be extended so far as to prevent the hooks from being thrown out by centrifugal force, in case of a marked acceleration of speed, in time to engage with the stop. It will be seen that the function of the guard V in Fig. 4 is the same as that of the spring *s* in Fig. 2 and *s′* in Fig. 8, which latter device is used solely for the purpose of preventing the pawl S from being brought into engagement with its fixed ratchet-wheel by the force of gravity acting upon the long arm of the pawl in that part of its revolution where but for the opposing force of the spring that arm would fall down below the periphery of the wheel T.

In Figs. 6 and 7 there is shown in front and end elevation, respectively, a centrifugally-acting detent in the form of a pin, S^2, which, during the normal action of the mechanism, is held retracted within a recess in the periphery of the wheel R by means of a spiral spring, but which is capable, as in the case of the hook shown in Fig. 4, of being projected beyond the periphery on any unusual increase in the speed of the wheel, and thus being made to strike against the fixed stop T^2. As in the case of the pivoted hooks in Fig. 4, the pin S^2 may be duplicated, as shown in Fig. 6; and it is also preferred to use, in connection with these pins, a positively-acting guard, V, to prevent the pins being moved out of their recesses by the mere force of gravity, although the spiral springs upon which the pins are shown as mounted may be made to do this work. When the guard V is used the only office of the spiral springs will be to prevent the pins from being thrown entirely out of their sockets in case of the wheel R taking on an abnormally rapid movement.

Figs. 8 and 9 represent on an enlarged scale, in front and end elevation, respectively, the supplemental safety mechanism which is shown in Fig. 1 in connection with the lock there represented. In this case the construction is such that any unusual acceleration of the clock-work—such as would result from breaking the staff of the pallet or the escape-wheel—will trip a detent, and thus release a secondary bolt or dog, which will then be thrown by the force of a spring into a recess in the main lock-bolt, and thus lock it against the possibility of its being withdrawn by the running down of the clock. W represents such supplemental bolt or check moving in suitable ways on the lock-frame and pivoted to the drum X, within which is placed a strong spring so arranged that when unrestrained it will revolve the drum and throw the bolt W up into the recess in the under side of the lock-bolt C. By turning the drum X by hand until the lug *x* rests on the upper end of the pivoted lever Y the bolt W will be brought into the position shown in the drawings, the spring in drum X being at the same time brought under tension. The lower end of the lever Y, when the lever and drum are thus set, is brought within the grasp of the hook S′ whenever, by the undue acceleration of the part to which it is attached, this hook is thrown out beyond the periphery of such part. When, now, this hook does engage with the lower end of the detent-lever Y, the drum X is tripped and immediately the dog W is forced into engagement with the lock-bolt C. The revolving piece R here shown is to be mounted on the staff of one of the wheels of the clock-train, as before has been fully explained. The centrifugal hook S′ engages with the lower end of the detent-lever Y by means of a suitable stud or projection, *y*, on such end of the lever, and preferably the parts should be so constructed that this lever, with its stud or projection, shall act as an absolute stop to the wheel R, so that thereby the

time-movement will be stopped and the main-spring kept from running down. It is plain that by the same means the bolt-work of the safe-door can be dogged directly by a supplemental bolt operated on the principle above explained; or the supplemental bolt might be projected into the teeth of the main wheel, and thus arrest its movement, or into some part of the gear-connections between the main wheel and the dial. So, also, the supplemental bolt, instead of being moved by some supplemental force, might be moved into any one of the positions above indicated by the direct action of the time-movement operating through the centrifugal device.

What is claimed as new is—

1. In combination with the time mechanism of a chronometric lock, a device pivoted or otherwise secured to one of the wheels or other revolving parts thereof, and arranged to be moved from its normal position by centrifugal action whenever the speed of the time-movement is unduly accelerated, and a device arranged to be acted upon by such centrifugal device when thus moved from its normal position, substantially as and for the purpose set forth.

2. In combination with a device pivoted or otherwise secured to one of the wheels or other revolving parts of a chronometric lock, and arranged to be moved from its normal position by centrifugal force generated by the revolution of such part when running at an abnormal speed, suitable means for preventing the movement of such device while the parts are running at their normal speed, and a device arranged to be acted upon by the centrifugal device when moved from its normal position, substantially as and for the purpose set forth.

3. In combination with a centrifugally-acting device secured to one of the wheels or other revolving parts of a chronometric lock, a fixed stud for arresting the revolution of such part when such centrifugal device is moved by any unusual increase in the speed, substantially as and for the purpose set forth.

4. In combination with a centrifugally-acting device secured to one of the wheels or other revolving parts of a chronometric lock, a supplemental bolt or check arranged to be brought by the action of such centrifugal device into engagement with the lock-bolt or some other part to prevent the retraction of the door-bolts, substantially as and for the purpose set forth.

5. In combination with a device pivoted or otherwise secured to one of the wheels or other revolving parts of a chronometric lock, and arranged to be moved from its normal position by centrifugal force whenever the speed of the time-movement is unduly accelerated, a device arranged to be acted upon by such centrifugal device when thus moved from its normal position, and supplemental or auxiliary bearings for the staffs of the wheels composing the clock-train, whereby the continuity of the train between the mainspring and the centrifugal device will be preserved, substantially as and for the purpose set forth.

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