(Model.) 2 Sheets—Sheet 1.

H. F. NEWBURY.

TIME LOCK.

No. 262,095. Patented Aug. 1, 1882.

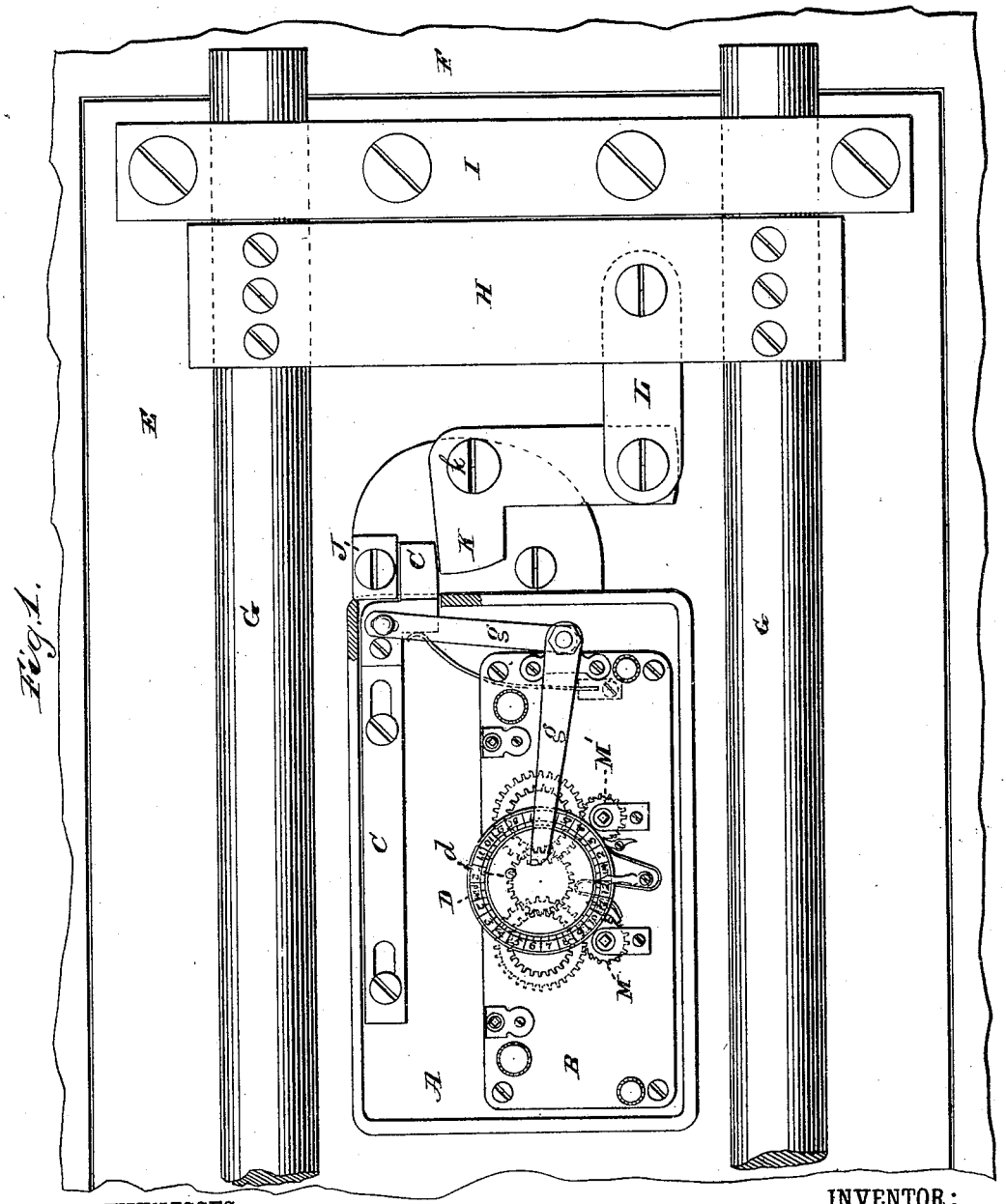

Fig. 1.

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(Model.) 2 Sheets—Sheet 2.

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Fig. 2.

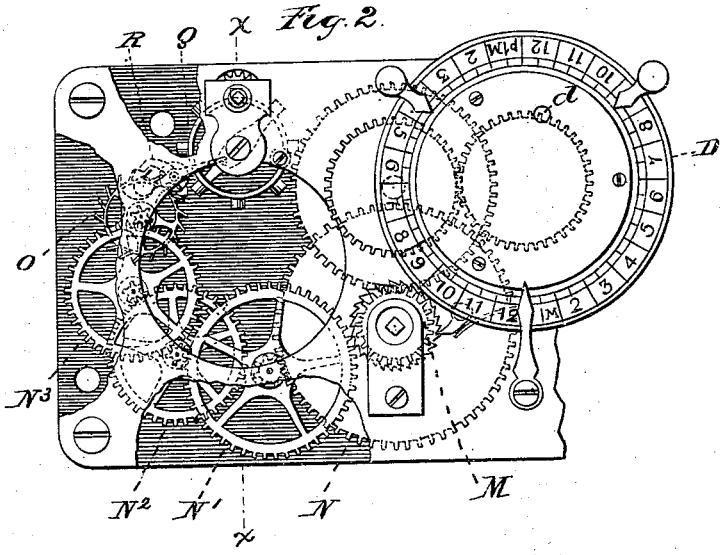


Fig. 3.

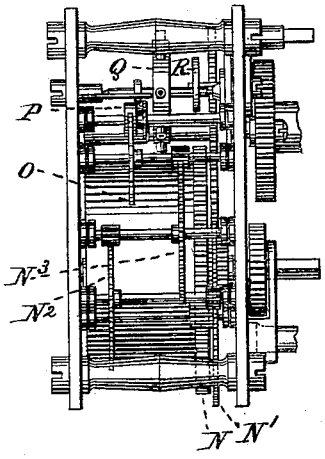


Fig. 4.

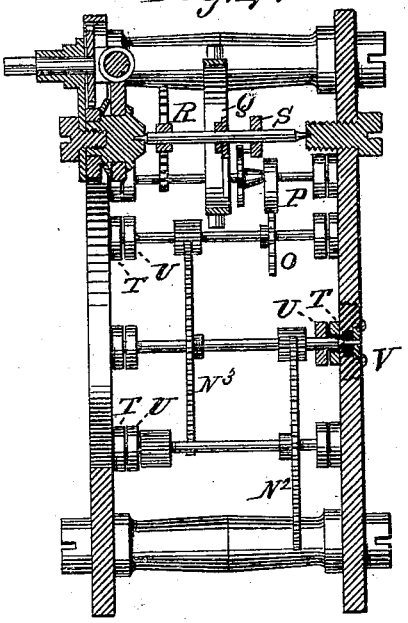


Fig. 5.

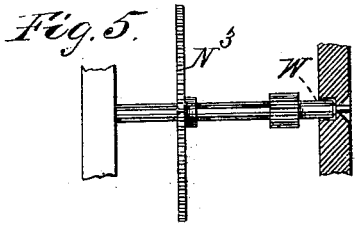
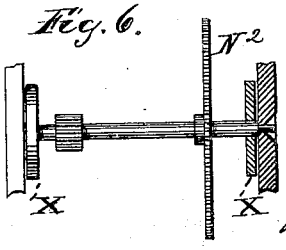


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY F. NEWBURY, OF BROOKLYN, NEW YORK.

TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 262,095, 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 the Same, (Case C;) and I do hereby 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 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 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 obviating the above-described defect in time-locks; and it consists in the use of supplemental bearings for the staffs of the various wheels of the time-movement, so constructed and arranged, as hereinafter explained, as to prevent an interruption in the continuity of the train in case any one of the staffs becomes broken.

The invention is fully illustrated in the accompanying drawings, in which Figure 1, Sheet I, is a front elevation of a safe-door provided with the well-known Holmes lock, this view being intended to show the general relation of such a lock to the parts with which it is designed to co-operate and its normal mode of operation.

Referring to the drawings in detail, A represents the time-lock; B, the time-movement of the lock; C, the bolt or dog of the lock, and D the dial through which the time-movement acts to withdraw the dog from the locking position. E is the door of the safe or vault; F, the door-frame; and G G, the door-bolts, of which H is the carrying or tie-bar, and I is one of the guide-bars, the other not being 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 C is withdrawn from this locking position in the following manner: M M′ are pinions on the mainspring-arbors of the two time-movements of the lock. These pinions, by the intermediate gears, are made to drive the dial D, and the pin *d* on this dial strikes against 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 Sheet II of the drawings, Fig. 2 is a front elevation, showing the arrangement of the train of one of the time-movements, the front plate of the clock-frame being broken away for the better exhibition of the parts. Fig. 3 is an end elevation of the same, the dial being omitted; and Fig. 4 shows the parts as seen in vertical section, on the line *x x* of Fig. 2, looking from the direction of the dial. Figs. 5 and 6 are detailed views, showing modifications of the invention. In these figures N represents the main wheel of the train, N′ the first wheel, N^2 the second wheel, and N^3 the third wheel, of the train, while O represents the escape-wheel, P the pallet, and Q the balance-wheel. In order to prevent the displacement of the staff of either the first, the second, or the third wheel, or that of the escape-wheel or the pallet, in case their slender and fragile ends should become broken, each of these staffs, as shown on an enlarged scale in Fig. 4, is provided with secondary or supplemental bearings T T. One of these bearings (on the staff of the third wheel N^3 in Fig. 4) is shown in section. As here shown, this supplemental bearing is in the form of a flat ring attached to the inner face of the frame in which the staff has its primary bearing, and is arranged concentric with such primary bearing. The aperture in the ring, into which the end of the thick part of the staff enters, is slightly larger than such portion of the staff, so that the staff, as long as it remains unbroken, can turn freely therein without contact, and so without friction. If, however, the small end of the staff should be broken, and the staff thereby be released from its main bearing, it will at once be caught by the secondary bearing without a disengagement of the train taking place.

As shown in the drawings, the secondary bearing is not used with the balance-wheel staff. It is not necessary thus to protect this part of the movement, for if this staff should be broken it would not cause the movement to run down, but would simply cause it to stop.

Small collars may be used on the staffs of the time-movement, as shown at U U in Fig. 4. These collars will serve to provide against a longitudinal displacement of the staffs, such as might be specially liable to occur under a heavy shock if the primary bearings of the staffs were in jewels, as at V. Instead of using collars for this purpose, other forms of stops, such as pins variously arranged, might be used. So, also, the body of the staff might be enlarged sufficiently to permit a shoulder to be formed on it close to, but not touching, the ring T; or a small plate or other stop might be arranged on the outside of the frame and opposite the end of the staff.

Instead of making the secondary bearing by means of a flat ring or perforated boss affixed to the inner face of the frame of the time-movement, as shown in Fig. 4, this frame may be recessed on its inner face, as shown at W in Fig. 5, such recess being made of slightly-larger diameter than that of the thick part of the staff entering it.

Instead of using a flat ring affixed to the frame as the secondary bearing, it may be made in the form of a broad collar attached to the staff in close proximity to the inner face of the frame, as shown at X in Fig. 6. With this construction, if the small end of the staff becomes broken, the tendency of the staff to fall will at once bring the collar X to a bearing

against the frame, and thus arrest the movement before its parts can become disengaged. Such collar also would act to prevent longitudinal displacement of the staff in the manner above explained.

What is claimed as new is—

1. The combination, in a chronometric lock, of the staffs of the time-movement and supplemental or secondary bearings to prevent the disengagement of the train in case the staffs become broken, substantially as described.

2. The combination, in a chronometric lock, of the staffs of the time-movement, supplemental or secondary bearings to prevent the staffs, if broken by a shock, from being moved apart, and stops mounted on or arranged in combination with the staffs to prevent them from longitudinal displacement, substantially as and for the purpose described.

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Witnesses:
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SAML. A. DUNCAN.