L. C. & S. M. LILLIE.
Time-Lock.

No. 199,454. Patented Jan. 22, 1878.

Fig 1.

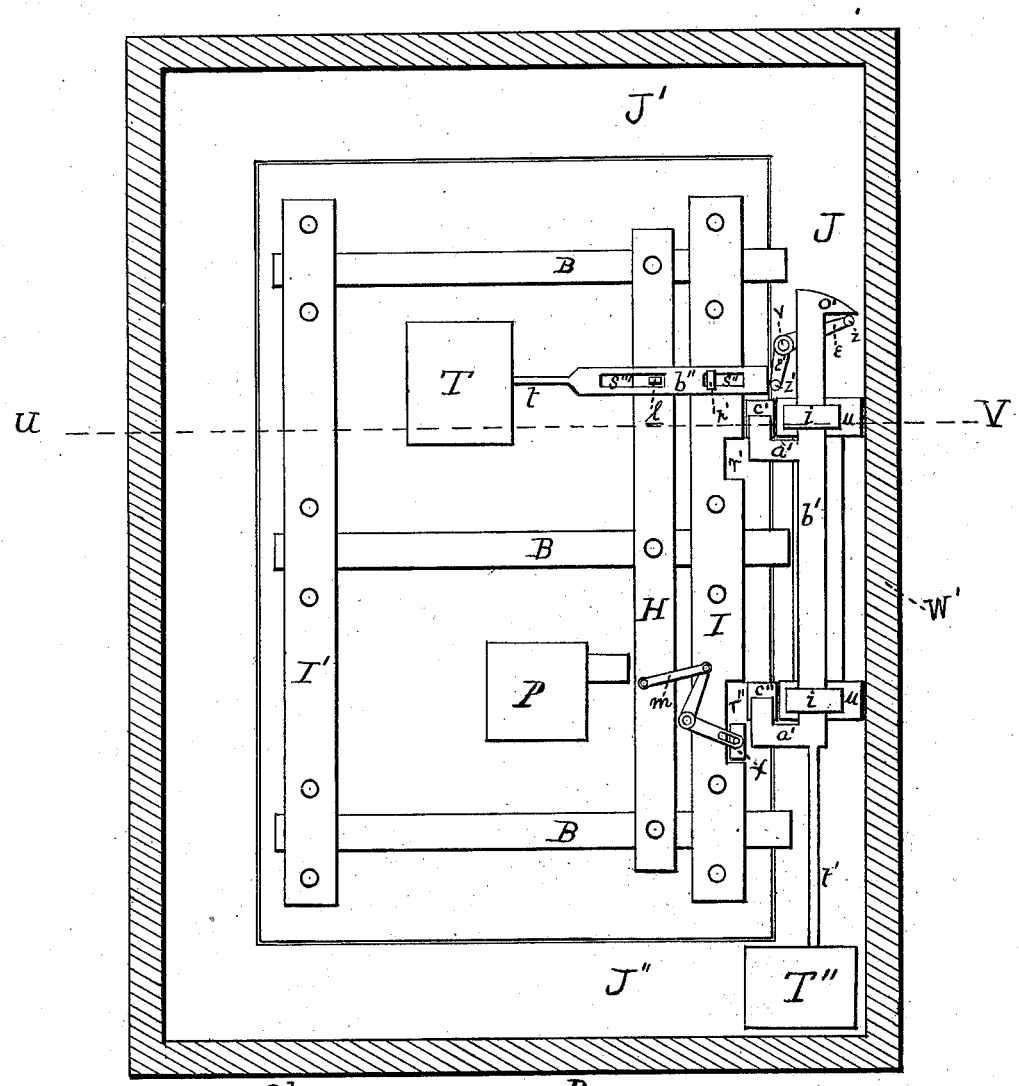

Fig. 2.

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IMPROVEMENT IN TIME-LOCKS.

Specification forming part of Letters Patent No. **199,454**, dated January 22, 1878; application filed October 29, 1877.

To all whom it may concern:

Be it known that we, LEWIS C. LILLIE, of Elizabeth, in the county of Union and State of New Jersey, and S. MORRIS LILLIE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in the Means for Locking Safe and Vault Doors, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

The object of our invention is to construct for safe and vault doors a locking mechanism auxiliary to the bolt-work ordinarily upon them, which in its unlocking will act automatically, and will exert no control over the other locking apparatus on the door.

We accomplish this by using a time-lock in connection with a locking mechanism placed on the jamb of the safe, the arrangement being such that the time-lock may be placed either on the door or on the jamb, as may be most convenient.

Our invention consists comprehensively of an auxiliary locking mechanism placed on the jamb of a safe or vault, in connection with a time-lock located either on the jamb or on the door, the mechanism on the jamb and the locking mechanism on the door being connected, so that the former is locked by the latter.

The construction of our auxiliary locking mechanism and its arrangement in connection with the time-lock are shown in Figures 1 and 2, Fig. 2 being a section through Fig. 1 along the broken line U V. Fig. 1 is a view of the back of the door and jambs, the door being closed.

D is the door. J J′ J″ are the jambs. B B B are the bolts, which, together with the tie-bar H, form the "train-bolts." I I′ are the guides for the bolts B. They are securely bolted to the door D. P is the combination-lock.

The above elements constitute the ordinary locking mechanism to be found on safe and vault doors.

The train-bolts are thrown by a spindle passing through the door, but which does not appear in the drawings.

The auxiliary locking apparatus which we use with the time-lock is shown on the jamb J. Its principle and construction are as follows: The door D swings on the hinge *h*, Fig. 2, and its companion, which is not shown. Every point of the door, as the latter swings, describes an arc of a circle, and consequently the edge *m′*, Fig. 2, of the guide I does so also, as shown by the dotted arc, Fig. 2. The guide I is always set back from the edge of the door a short distance, in order that in swinging the door the edge of the guide may clear the edge of the jamb; otherwise the door could not be shut, or, if shut, could not be opened, for the path that the edge of the guide I must travel when the door swings would be blocked. Similarly if, by any means, the path of the edge of the guide I or any other point of the door be blocked, the door cannot swing until such obstruction has been removed.

The auxiliary locking mechanism that we have shown furnishes the means by which such an obstruction is offered to the guide I by throwing the train-bolts, and which obstruction can only be removed by the unlocking of the time-lock, and is not at all affected by throwing back the train-bolts while the time-lock is locked, which can be done, as the time-lock has no control over the train-bolts whatever.

Upon the jamb J of the safe or vault are placed the two lugs or blocks of metal *u u*, Figs. 1 and 2, rectangular in shape, and extending from the side wall W′ to the edge of the jamb, or nearly so. These blocks *u* are of the same thickness as the guide I. The lugs are placed at some distance apart, one being above the middle bolt and the other below it. On each of them is a strap, *i*, through which passes the bar *b′*, Figs. 1 and 2, free to move upward and downward in a direction parallel to the edge of the jamb.

Extending from the bar *b′*, one below each of the lugs *u*, are the arms *a′ a′*, which bear the blocks of metal *c′ c″*. These blocks are just large enough to fill the spaces between the lugs *u* and the guide I, and are so held by the arms *a′ a′* that when the bar *b′* is raised

the blocks will pass into and fill the spaces between the lugs *u* and the guide, thereby preventing any motion of the latter, and consequently the opening of the door. When the bar *b'* is lowered the block *c'* comes opposite the recess *r'* in the guide I, which is deep enough to allow the guide to slip by the block *c'* when in that position.

The arrangement of the recess *r''* in the guide is different from that of recess *r'*. The former corresponds to the lower block *c''* and the latter to the upper block *c'*. This difference and the effect of it will be hereinafter described.

At the upper extremity of the bar *b'* is the projection *o'*, Fig. 1, whose lower face or edge is at right angles to the length of the bar.

There is an elbow-lever above the upper lug *u*, which is pivoted to the jamb at *v*, Fig. 1.

The arm *e* of the lever has at its extremity the vertical pin *z*, which bears against the lower face or edge of the projection *o'* of the bar *b'*. The other arm, *e'*, also bears at its end the vertical pin *z'*, which extends above the level of the guide I.

It is evident that the revolving of the elbow-lever in a direction contrary to that of the motions of the hands of a watch will raise the bar *b'* and blocks *c' c''*, and in the contrary direction allow them to fall.

Crossing the guide I and the tie-bar H on a level with the pin *z'* of the elbow-lever is the bar *b''*, Fig. 1. One end of the bar *b''* forms the tongue *t*, which extends into the time-lock T on the door, and the other end bears against the lever-pin *z'*. The headed pin *p'* passes through the slot *s'* in bar *b''*, and screws into the guide I, forming a guide for the motions of the bar *b''*.

The lug *l*, Fig. 1, on the face of the tie-bar H, projects through the slot *s''* in the bar *b''*, in consequence of which the tie-bar, or, what amounts to the same thing, the train-bolts, cannot be thrown out without also moving the bar *b''* toward the jamb J, which, pressing against the pin *z'* on the elbow-lever, revolves the latter, and raises the bar *b'* and blocks *c' c''* of the auxiliary locking mechanism, the latter passing into the spaces between the lugs *u* and the guide I. When the bar *b''* is moved toward the jamb J by the train-bolts, the tongue *t* is drawn from the time-lock T.

The train-bolts and bar *b''* having been thrown, the former may be entirely retracted without exerting any influence over the bar *b''*, as the lug *l* will slide in the slot *s''* in the bar *b''*. If the time-lock T has locked in the meantime, the bar *b''*, elbow-lever, and bar *b'* of the locking mechanism will remain unaltered in position, holding the blocks *c' c''* between the lugs *u* and the guide I, keeping the door closed. If, however, the time-lock is unlocked when the train-bolts are retracted, the tongue *t* is free to pass back into the time-lock, and the bar *b''* may be moved back by the weight of the bar *b'* and blocks *c' c''*, causing them to fall and revolve the elbow-lever. The falling of the blocks *c' c''* brings them opposite the recesses *r' r''* in the guide, and allows the door to be opened.

The above arrangement admits the time-lock to be placed on the door, and, while governing the unlocking of the auxiliary locking mechanism, exerts no control over the movements of the train-bolts, and consequently no strain can be brought upon the time-lock by means of the train-bolts or their spindle.

T'', Fig. 1, represents the time-lock placed upon the jamb underneath the auxiliary locking mechanism. Extending from the lower end of the bar *b'* into the lock T'' is the tongue *t'*, which is drawn from or passes back into the time-lock, according as the bar *b'* is raised or lowered. Hence, when the bar *b'* is raised and the door locked, the tongue *t* is drawn from the time-lock, and only when the latter is unlocked can the bar *b'* fall and allow the door to be opened. When the time-lock is placed upon the jamb, and not upon the door, the bar *b''* is superfluous, as the elbow-lever can be so placed that the end of the arm *e'* will bear against the end of one of the train-bolts, by which it would be moved as by the bar *b''*.

It is an important result of this method of locking safe or vault doors that no strain can be brought upon the time-lock other than that due to the weight of the bar *b'* and the blocks *c' c''*, there being no way of exerting any force upon it from the exterior of the safe or vault.

As before stated, and as shown in the drawings, the recess *r''* in the guide I, corresponding to the lower block *c''*, is different from the one *r'* corresponding to the upper one, *c'*. The recess *r''* is as long as the whole play of the block *c''*, so that, were it not for the sliding piece *x* in the recess *r''*, the block *c''* would at no time offer any resistance to the opening of the door. The sliding piece *x* just half fills the recess *r''*, being of the same breadth and depth, and one-half as long. The slide *x* is under the control of an elbow-lever pivoted at *v'*, one arm of which is attached to the piece *x* by means of the slot in the former and the pin on the latter. The other arm is connected with the tie-bar H by the rod *m*. The effect of this is that as the train-bolts are thrown out the piece *x* is moved to the lower half of the recess *r''*, and as the train-bolts are thrown back the sliding piece is moved to the upper half of the recess. Consequently, when the train-bolts are thrown out, which operation, besides locking the door, elevates the block *c''* to a position between the upper half of the recess *r''* and the lug *u*, and lowers the piece *x* to the lower half of the recess, leaving the upper half vacant, it follows that the block *c''* can offer no obstruction to the opening of the door D; but when the train-bolts are thrown back, and therefore the slide *x* is moved to the upper half of the recess *r''*, the block *c''* will prevent the opening of the door, provided the time-lock is not unlocked. If, however, it is unlocked, the bar *b'* and block *c''* will fall, bringing the block *c''* opposite the

lower half of the recess r'' now vacant, and the door will be free to be opened.

With both recesses r' and r'' arranged in this manner, with a sliding piece, x, the auxiliary locking mechanism would offer no obstruction to the opening of the door until after the train-bolts had been retracted, and then only in case the time-lock was still locked, so that the bar b' and blocks c' and c'' could not fall.

With both recesses made as r', the auxiliary mechanism fastens the door when the train-bolts are thrown; but when the train-bolts are withdrawn they only release the door, provided the time-lock is unlocked, which allows the bar b' and blocks c' to fall, and bring the latter opposite the recesses.

We do not wish to limit ourselves to the particular mechanism shown.

Our invention may be applied in many different ways, and must be arranged to conform to the arrangement and the necessities of the locking mechanism on the door.

We claim as our invention—

1. The combination, with a time-lock, T, on the door, or a time-lock, T″, on the jamb, of a safe or vault, of an auxiliary locking mechanism placed on the jamb, and consisting of the bar b'', elbow-lever, sliding bar b', and blocks c' c'', working with reference to the lugs u and the guide I, having recesses r' in it, substantially as and for the purpose specified.

2. The combination, with a time-lock, T, on the door, or a time-lock, T″, on the jamb, of a safe or vault, of an auxiliary locking mechanism, placed on the jamb, and formed as described, in connection with the guide I, having in it recesses r'', containing a sliding piece, x, moved by the elbow-lever, rod m, and the train-bolts, substantially as and for the purpose specified.

3. The combination, on a safe or vault, of a locking mechanism on the jamb, the train-bolts on the door, and intermediate mechanism connecting the two, and operating to lock the auxiliary mechanism on the jamb on the turning of the train-bolt spindle, substantially as described.

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