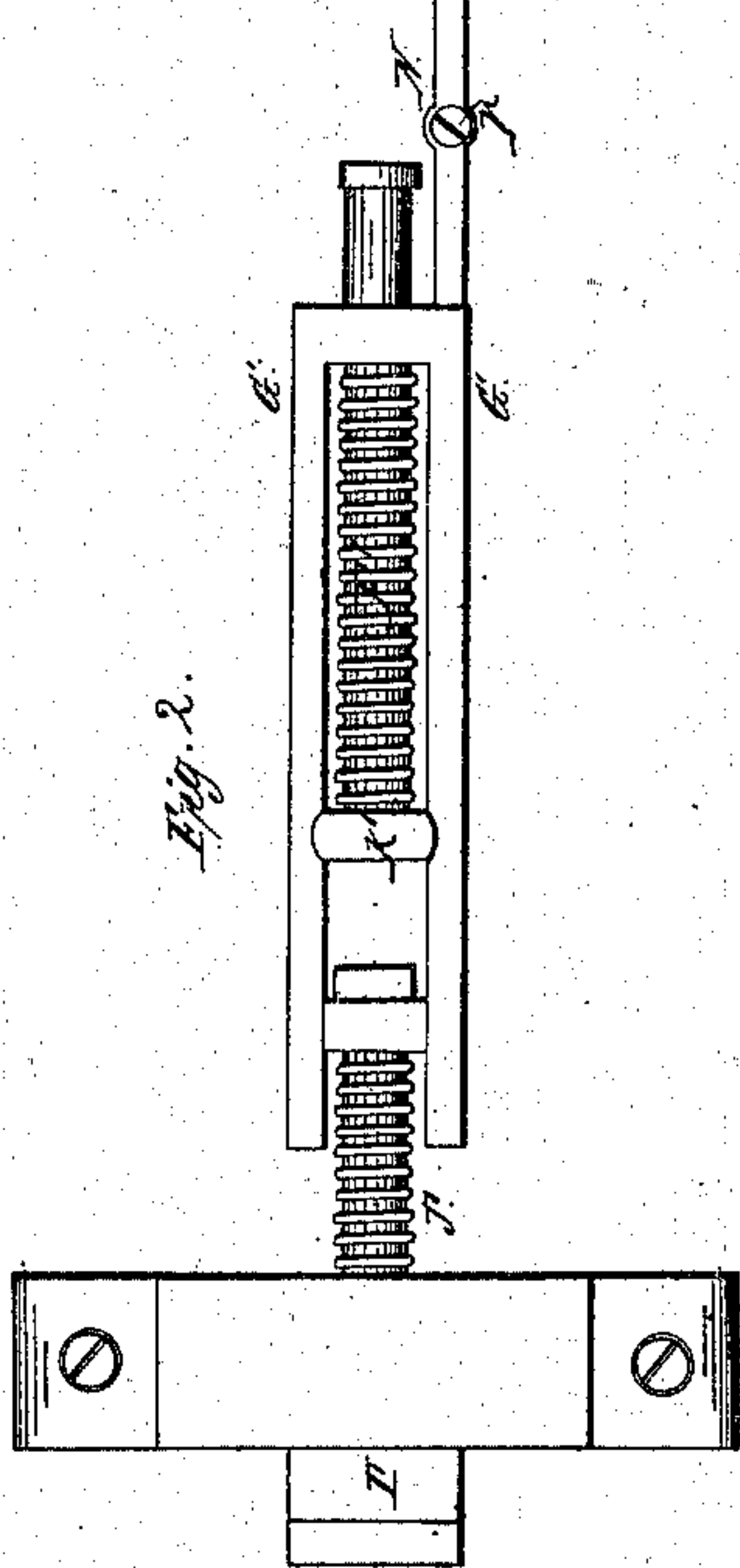
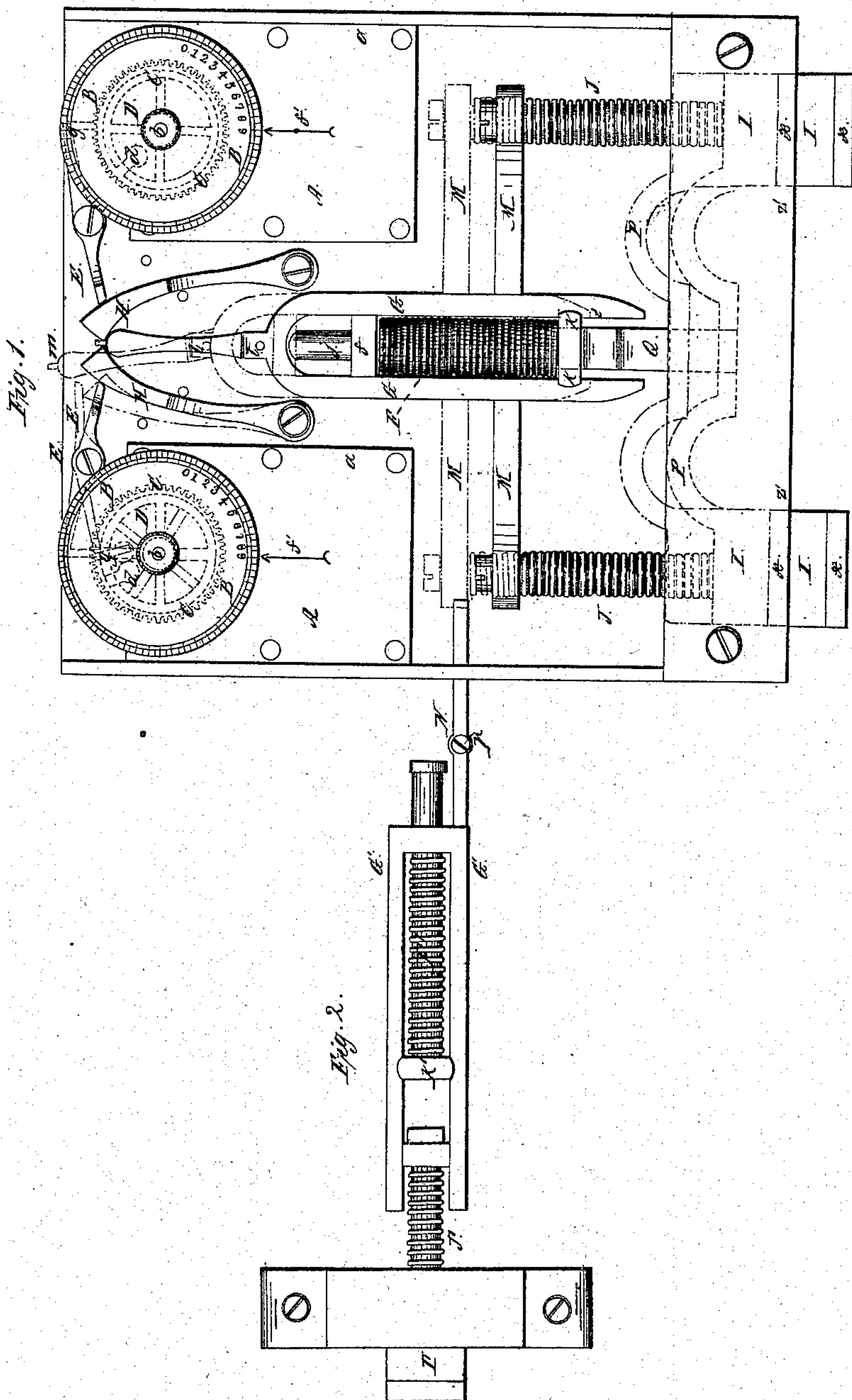


Halbrook & Fish,

Time Lock,

N^o 17.150,

Patented Apr. 28, 1857.

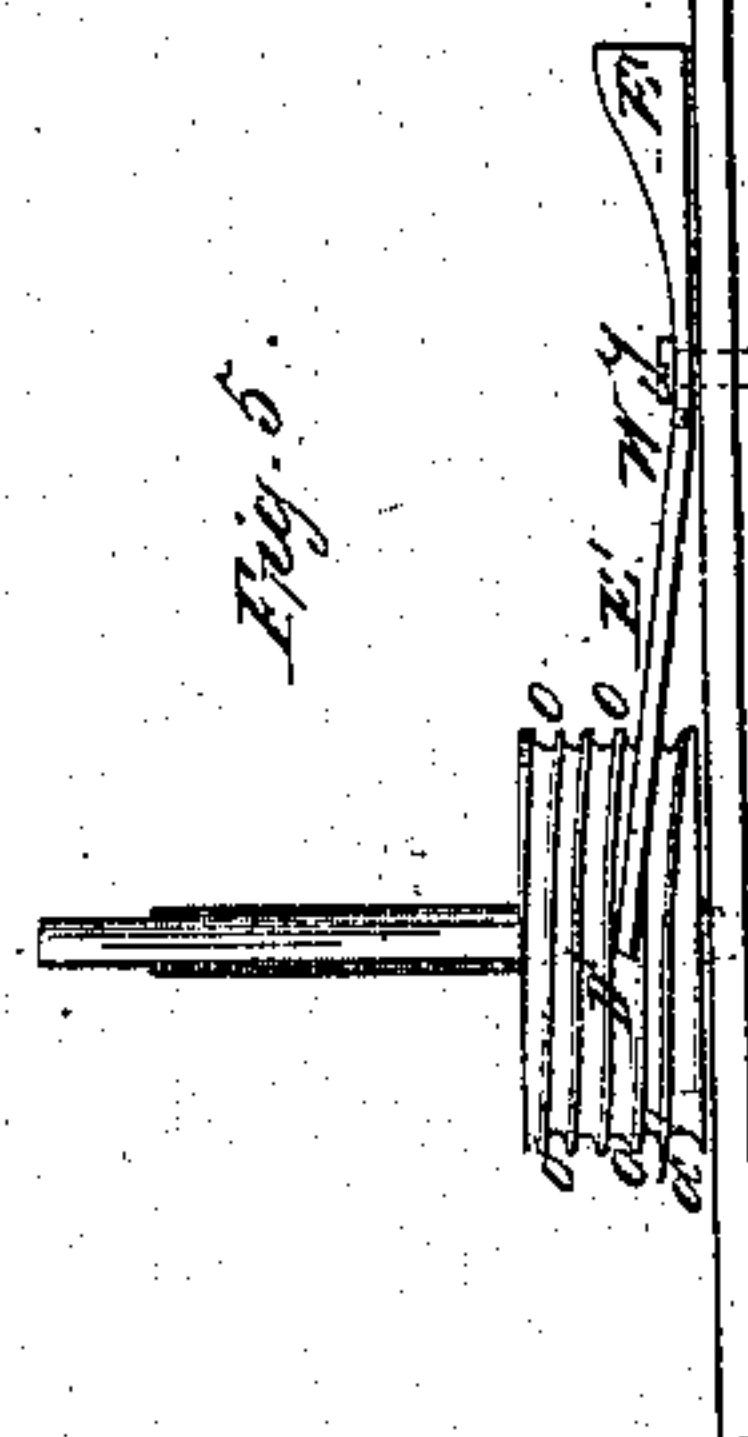
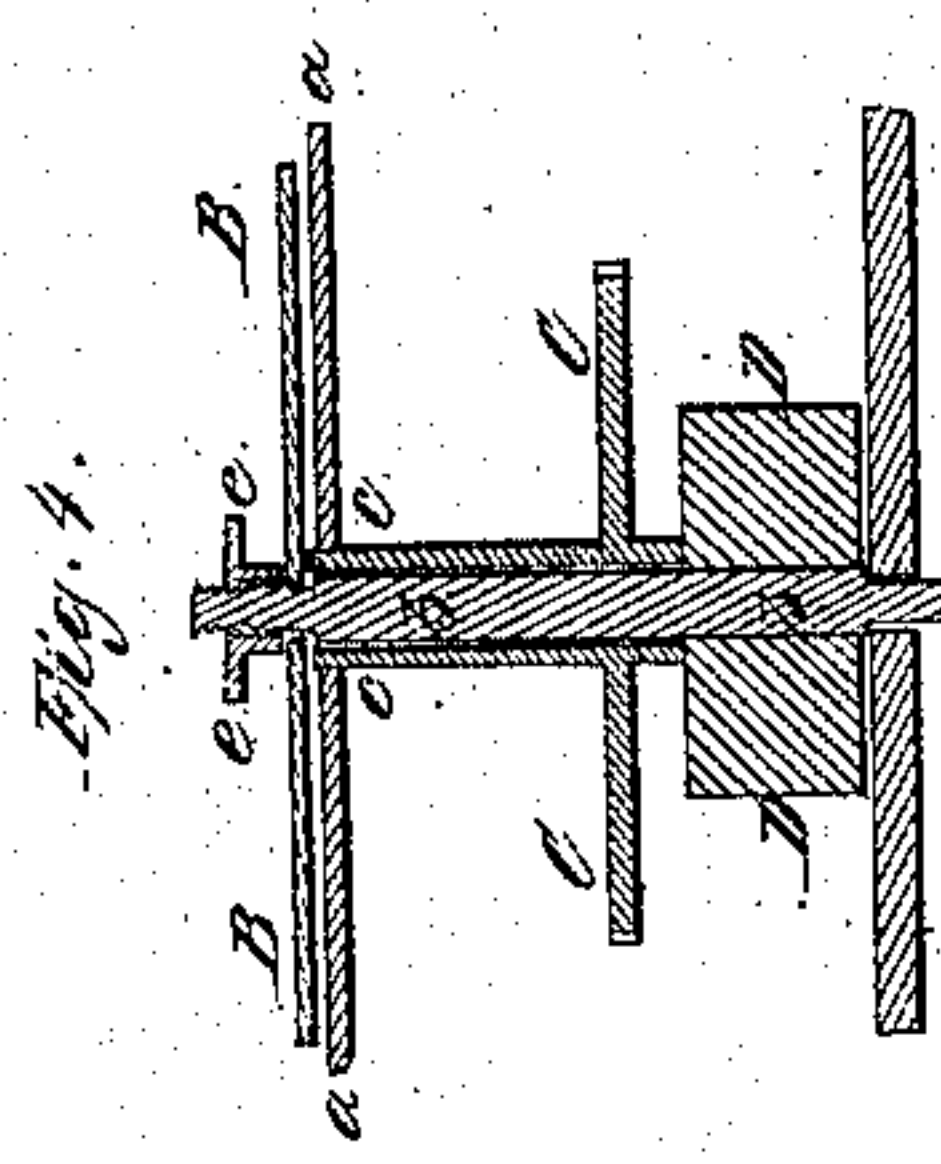
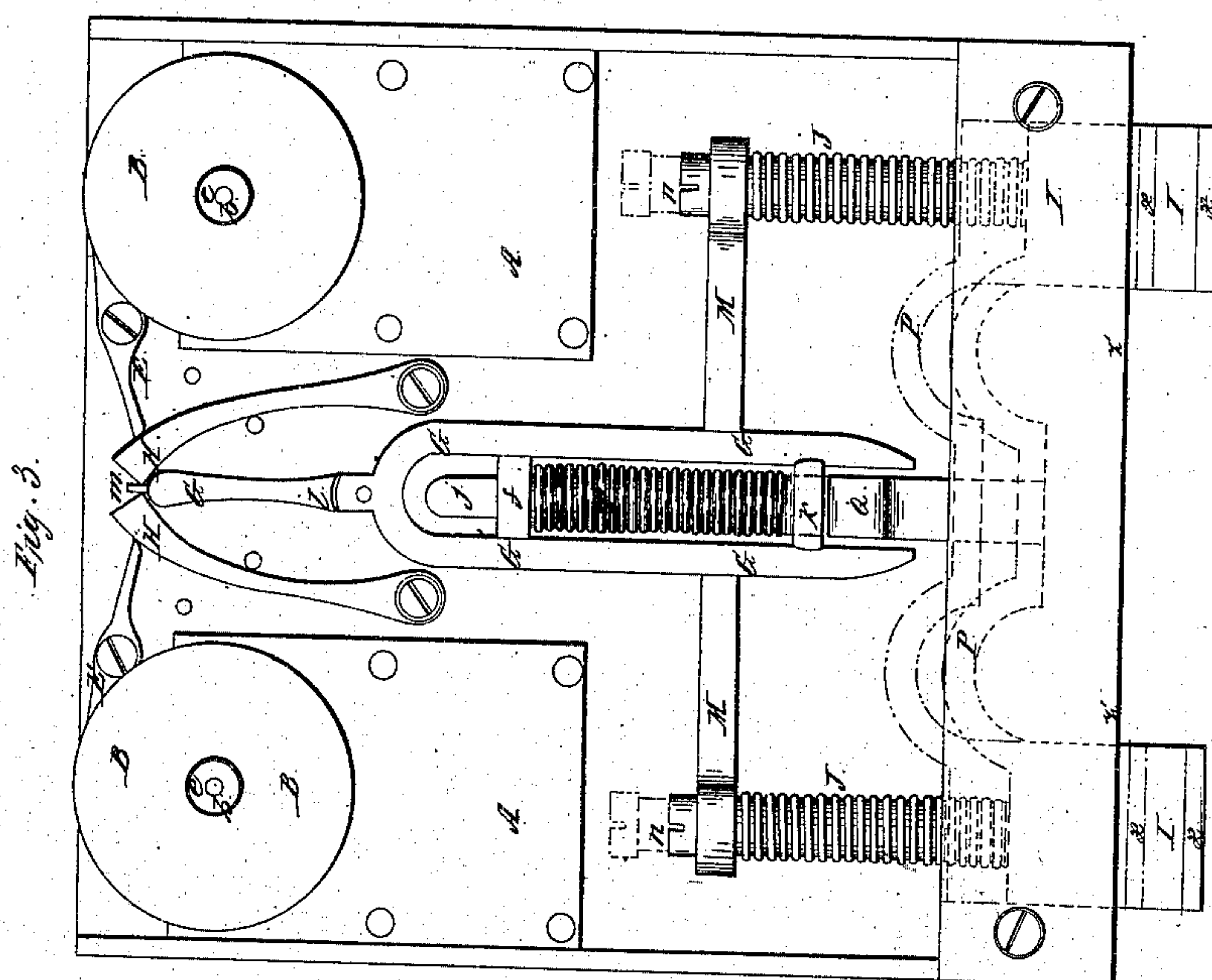


Holbrook & Fish,

Time Lock,

N^o 17,150,

Patented Apr. 28, 1857.



UNITED STATES PATENT OFFICE.

AMOS HOLBROOK, OF MILFORD, AND HENRY D. FISH, OF HARDWICK, MASS.

IMPROVEMENT IN CHRONOMETRIC LOCKS.

Specification forming part of Letters Patent No. **17,150**, dated April 28, 1857.

To all whom it may concern:

Be it known that we, AMOS HOLBROOK, of Milford, and HENRY D. FISH, of Hardwick, both of the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Chronometric Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings of the same, in which—

Figure 1 represents a plan of a lock having our improvements applied thereto, showing the relative positions of the various parts when locked, and in red lines when unlocked. Fig. 2 represents a plan of a bolt that may be applied to any other part of the safe or other door in combination with our improved lock; and Fig. 3, a similar view of the lock when the door is locked, but showing in red lines the proper position of the lock-bolts previous to closing the door to lock it. Fig. 4 represents a partial section of one of the clocks, taken centrally through the shaft of the notched disk, toothed wheel by which the same is rotated, and graduated disk, and Fig. 5 a modification of the notched disk.

In chronometric locks as heretofore constructed the motive power that operated the locks has generally been arranged on the side of the safe or vault, while the lock itself is located on the door. Such an arrangement as this is at once clumsy, liable to get out of order, costly, constantly in the way, and occupies more valuable space than is consistent with economy.

To remedy these objections constitutes the first branch of our improvement; and it consists in so arranging and combining two or more clocks, for the purpose of operating the lock, with the latter that the clocks, together with those parts by which the lock-bolt is liberated and withdrawn to unlock the door, shall all be located within the lock, whereby the latter is much simplified and cheapened, is made more compact, and rendered capable of being applied to or secured to the door alone.

In the use of a single clock to release the bolt, it not unfrequently happens that the clock stops before the expiration of the time required to unlock the door, by which it is left permanently locked unless some independent device be arranged by which it can be picked, to avoid which we apply two or more clocks, so

arranged that either at the appointed time will unlock it independent of the other, so that if one should cease to run the other could operate the lock, it being highly improbable that both will stop at the same time. It will therefore be apparent that where two clocks are employed and arranged like ours, two pawls and levers must be used, one pawl and lever for each shoulder of the end of the bolt, in order to prevent the latter from being forced back or unlocked by the action of the spring employed for that purpose when either pawl is released, and also to enable either clock to release it; but as the action of these pawls, were the bolt straight and rigid, would prevent it from being released at all, unless by both clocks, (a necessity we specially wish to avoid,) we joint that end of it next the pawls, so that it may turn freely to the side next the pawl of the clock that first released it as it is forced back by the spring; but the tendency of the bolt when thus jointed under the pressure of the spring (its end being rounded off to enable it the more easily to force apart the pawls on either being released) is to turn under the curved sides of the pawls, whereas for certainty of action it ought to be retained centrally between them, in order to be ready to be released by either of the clocks, to which end we form a small stud centrally on its end, against which the pawls are made to bear, which effectually retains it in its proper position, the jointing of the bolt and arrangement of the stud, when used in connection with the pawls and release-levers, constituting the second branch of our invention.

The third branch of our improvement consists in so arranging a spring that it will, upon the release of either of the pawls by their respective clocks and release-levers, force back the lock bolt or bolts and unlock the door.

The fourth branch of our improvement relates to a device by which the lock bolt or bolts are held in their proper position to enable the party locking the door to close it, and by that act lock it; and it consists in so arranging a curved spring-catch on the lock-bolts that it can, on the latter being forced back a certain distance, be pressed down and hooked upon a stationary stud, so as to retain them in that position until they have been pressed still farther back by the closing of the door, which

disengages the spring-catch from the stud and permits the bolts to be projected by springs suitably arranged for that purpose, to effect which, however, it is first necessary to fix the lock as when locked.

To enable others skilled in the art to make, construct, and use our invention, we will now proceed to describe its parts in detail, reference being had to the accompanying drawings of the same, and to the letters of reference marked thereon, in which—

A A represent two clocks operated by springs arranged on either side of the lock, each of which may be made to run for any given length of time; but as a general thing three days will be found sufficient, so that should the lock be applied to a bank safe or vault it may be set to run over any holiday, even should the same fall upon a Saturday. In such an event as that the party using the safe regulates or sets the clock to run so many hours before the lock can open by means of the dial-plate B, which is graduated for that purpose on its face at the periphery with marks for hours, half-hours, and quarter-hours, from any given number, according to the time the clock will run down, to 0. This dial-plate is mounted on the outside of the clock-plate *a* upon the end of a shaft, *b*, and rests upon the extremity of the neck or hub *c* of the wheel C, which is also mounted upon the shaft *b* of the release-wheel D, against which it is forcibly compressed by means of the nut *e*, as it presses the dial B firmly against the end of its hollow journal *c*, so that as the wheel C is rotated by the mechanism of the clock it carries the dial-plate and release-wheel around with it. In setting the dial-plate B to make the clock run for a given length of time before the lock will open, the nut *e* is unscrewed, which releases the dial-plate from the journal of the toothed wheel C, and permits it to be set at any hour required without reversing the motion of the wheel C, but revolving the release-wheel with it, (the dial,) after which the nut is again tightened up, binding the dial to the hollow journal of the wheel C and the latter to the release-wheel. When the clock is intended to run, say, for forty-eight hours, then the dial-plate would be graduated accordingly, and the wheel C formed with that number of teeth; if so graduated as to yield also the half-hours, then the wheel would have ninety-six teeth, and so on; or, in other words, the wheel will have as many teeth as the clock is intended to run half-hours or quarter-hours. As this wheel is operated by the clock-work in the usual manner, it is deemed unnecessary here to enter into a more minute description of the parts of the clock-work that operate it.

Upon the lower end of the shaft *b* is secured the release-wheel D, into which a notch, *d*, is cut, which gradually widens as it enters, and so arranged that as the graduated mark 0 is brought by the revolution of the disk B opposite the index-hand or arrow-head *f'* on

the upper plate of the clocks it will be opposite the bent end *g* of the trip or release lever E, so that it shall be free to enter as the lever is forced back by the force or action of the spring F on the frame-bolt G, which, pressing against the end of the clasps H, forces back the trip-lever E, causing its bent end to enter the notch *d* of the disk D, thus enabling the spring F to withdraw the frame-bolt which carries the lock-bolts I, and unlock the door. In this instance the unlocking-spring F is wound spirally around a guide-rod, *j*, secured to the side of a stationary stud, *k*, the latter answering the twofold purpose of a guide in conjunction with the rod *j'* to the frame-bolt G and of a stationary bearing for one end of the unlocking-spring F. The other end of this spring bears against a cross-piece, *f*, of the frame-bolt G, through which is pierced a hole for the reception of the guide-rod *j*.

The upper end of the frame bolt G is formed with a joint, *l*, to permit it to turn to either side, according to the clasp H, that has been released. On the end of this bolt G is formed a stud, *m*, against which the ends of the clasps H abut, there being a small notch cut in each for its reception. The object of placing this stud upon the end of the bolt is to prevent the latter from turning under either of the clasps by the pressure of the unlocking-spring, which would prevent the opposite clasp, on being released, from releasing the bolt, as it would be confined by the other.

Through mortises formed in the end of the arms of the frame-bolt G are passed the guide-rods *n* to the locking-springs J, they also forming the connecting-rods between the locking-bolts I and the frame-bolt G. The lock-bolts I are connected together by means of a coupling-bar, P, which may be made of any suitable form. To this coupling-bar is secured a curved spring, Q, which, when the lock-bolts are pressed back a sufficient distance, is pressed over the stud *k* so as to hook on it, to retain them in that position, the pressure of the locking-springs J serving to keep it in place for that purpose.

When it is desired to use, in connection with the side or main locking-bolts, end or other locking-bolts, it is only necessary to arrange a frame-bolt, G', Fig. 2, and unlocking-spring F', similar to those in Figs. 1 and 2, the locking-bolt I' and spring J' and stationary stud *k'* being also arranged on the same plan. The withdrawing or unlocking of these bolts is effected simultaneously with the unlocking of the main lock by the arm M of the frame-bolt G of the latter striking the end of a lever, N, which, turning upon an axis, *p*, withdraws the other end of the lever from the end of the frame-bolt of the end lock-bolt, which permits the spring F' to force back the frame-bolt, and thus unlock it by withdrawing the lock-bolt I' with it.

Where the door is intended to be kept locked for a longer time than twenty-four hours a modification of the release-wheel had better

be used. This wheel D', Fig. 5, is formed with a groove, *o*, winding spirally around its periphery, it having as many coils as the clock runs days, each revolution representing a day. When such a wheel is used then the dial-plate will be graduated into twenty-four parts, and each part into halves and quarters, if desired, corresponding with the number of hours, half-hours, and quarters in each day, the toothed wheel C having twenty-four, forty-eight, or ninety-six teeth, respectively, according to the graduation of the dial.

In setting the lock with such a release-wheel the operation is as follows: Let us suppose that the time required for the door to be kept locked is two days and fourteen hours. After unscrewing the tightening-screw *e*, Fig. 4, the dial-plate is revolved twice, and then set with the number 14 opposite the index *f'*, when the operation will be complete, it having caused the end of the release-lever E', which is jointed for this purpose, to perform two revolutions and $\frac{14}{24}$ part of a revolution of the groove, from which it will be apparent that, as the wheel performs but one revolution per day, the release-lever will be two days and fourteen hours in returning to the point from whence it started, where it will be released by its bent end being pressed into a notch, *d'*, located there for that purpose, and the door unlocked by the spring F, as before described.

W represents the hinged joint of the release-lever E', which permits it to rise and fall in a vertical direction, and *y* the pivot upon which it turns.

The operation of our lock is as follows: Supposing, for example, that the lock is unlocked, as shown in red lines in Fig. 1, the frame-bolt is first drawn down so as to project the lock-bolts to their utmost capacity beyond the edge of the lock-plate, thus compressing the unlocking-spring F. In this position the clasps H are closed over the end of the jointed bolt G, claspings the latter and bearing against the stud *m*. The release-levers are then pressed down against the ends of the clasps H, and the graduated disks B turned sufficiently round to carry the notches *d* past the bent ends of the release-lever, so that they shall rest upon the periphery of the disk D, the locking of the lock being then completed; but in this position it will be perceived that the door cannot be closed because of the projection of the lock-bolts I over the jamb of the door. To obviate this difficulty the lock-bolts I are so arranged as that they can be pressed back a suffi-

cient distance by sliding through the mortise in the arms M of the frame-bolt G to permit the curved spring-catch Q to be hooked over the stationary stud *k*, whereby the bolts are retained in that position, as shown in red lines, Fig. 3, the beveled part *x* alone projecting through the lock-plate *z'*, by which arrangement the door can be closed and locked, as the act of closing the door forces back the lock-bolts slightly farther, which releases the spring-catch from the stud. The pressure of the locking-springs J then projects the lock-bolts into the mortises formed in the jamb of the door for their reception, by which the locking operation is completed; previous to which, however, after the lock has been arranged properly to lock the door, the party locking it first winds up the clock if it has run down, and then sets the proper number on the graduated disk of the clocks (he having first unscrewed the nut *e* for this purpose) in relation to the index-hands *f'* according to the number of hours and parts of hours he desires the safe to be kept locked—that is to say, if he wishes it to run exactly twelve hours he will bring the number 12 on the graduated disks opposite to the index-hands or arrow-heads, when the door of the safe will be ready to be closed in order to lock it. At the expiration of this time the clocks will have brought round the notch of the wheels D opposite the bent end of the release-levers, so that they shall be free to enter as the clasps I force its other end outward under the pressure of the spring as it unlocks the door.

We do not claim the employment of two or more clocks to operate chronometric locks; but

What we claim, and wish to have secured to us by Letters Patent, is—

1. The confining of the frame-bolt G, and the releasing of the same by means of the jointed portion G *i*, the embracing-pawls H H, and release-levers E E, operated by said clocks, as set forth.

2. The partial setting back of the independent locking spring-bolts I I by means of the spring-catch Q until the closing of the door, as set forth.

In testimony whereof we hereunto set our hands this 31st day of December, A. D. 1856.

AMOS HOLBROOK.

HENRY D. FISH.

Witnesses:

WILLIAM MIXTER,
GEORGE RUGGLES.