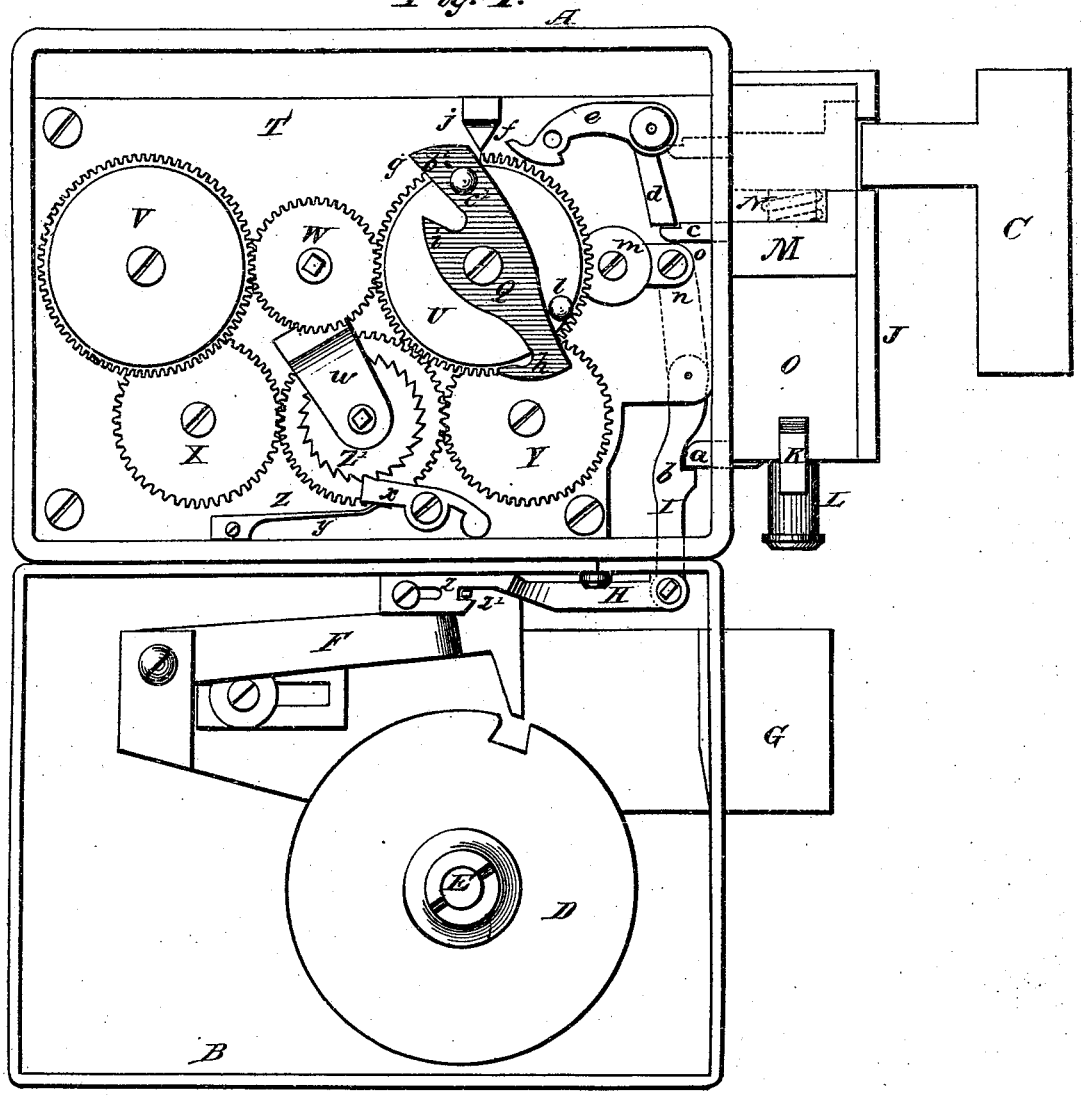
2 Sheets—Sheet 1.

W. F. KISTLER.

TIME-LOCK.

No. 184,630. Patented Nov. 21, 1876.

Fig. 1.



WITNESSES:
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E. S. Bond

INVENTOR:
Willoughby F. Kistler
By West & Bond, Attys.

2 Sheets—Sheet 2.

W. F. KISTLER.

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Fig. 3.

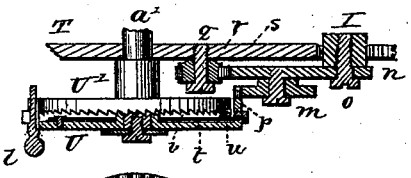


Fig. 4.

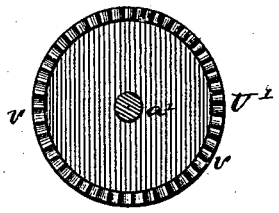


Fig. 5.

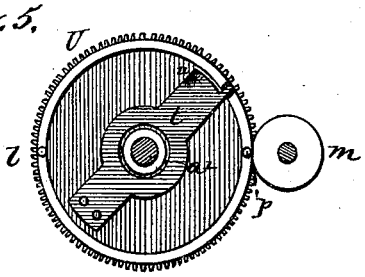


Fig. 6.

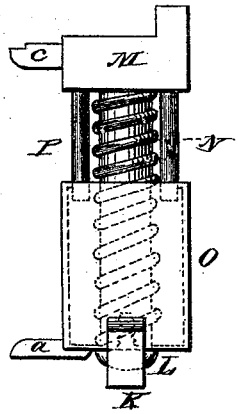


Fig. 7.

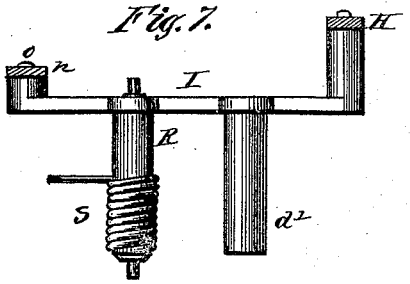
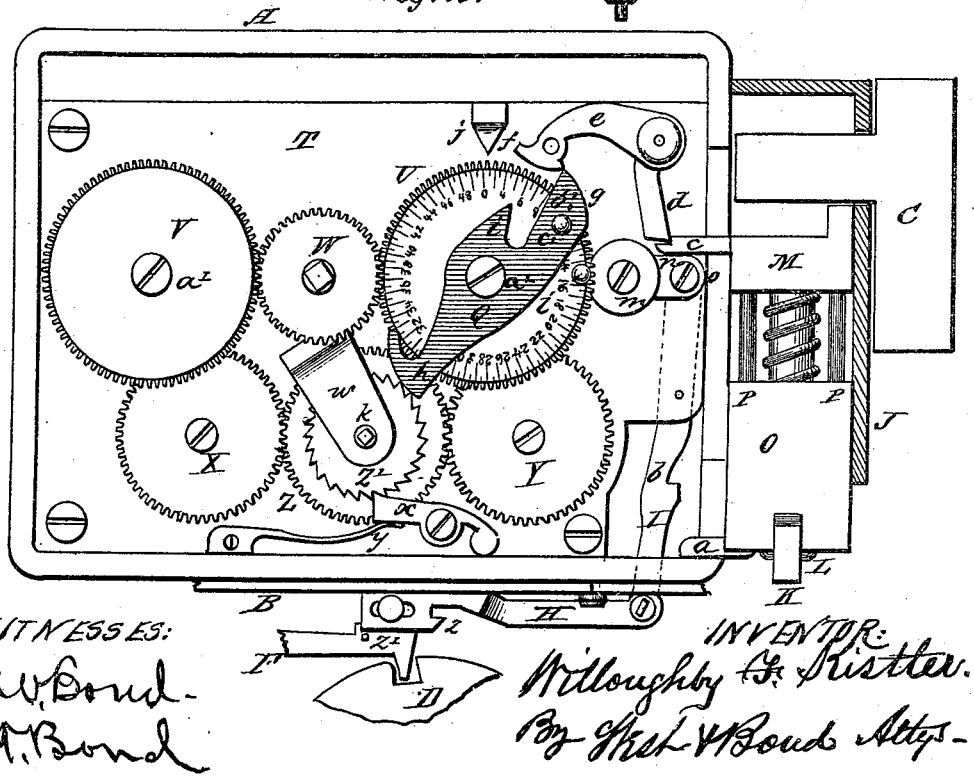


Fig. 2.



WITNESSES:

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By Kistler & Bond Attys.

UNITED STATES PATENT OFFICE.

WILLOUGHBY F. KISTLER, OF CHICAGO, ILLINOIS, ASSIGNOR TO JEREMIAH M. TERWILLIGER, OF SAME PLACE, AND EDMUND J. McCUNE, OF SHIPPENSBURG, PENNSYLVANIA.

IMPROVEMENT IN TIME-LOCKS.

Specification forming part of Letters Patent No. **184,630**, dated November 21, 1876; application filed December 3, 1875.

To all whom it may concern:

Be it known that I, WILLOUGHBY F. KISTLER, of the city of Chicago, Cook county, State of Illinois, have invented new and useful Improvements in Time-Locks, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a time-lock, in combination with a combination-lock; Fig. 2, a front elevation of the time-lock unlocked; Figs. 3, 4, 5, 6, and 7, details.

This invention relates to time-locks; and consists in the drop-bolt, having a section, and combined with a rod and spring, and the lever having arms for holding the spring-section of the drop-bolt, and in the parts hereinafter described, and pointed out by the claims.

In the drawings, A represents the case of the time-lock; B, the case of the combination-lock; C, the section of the door-bolt frame upon which the time-lock acts; D, the wheel or wheels of the combination-lock; E, the shaft upon which the combination-wheels are located, and by which they are operated by means of a knob, or other suitable device on the opposite side, (not shown;) F, the locking-hook or dog of the combination-lock; G, the bolt to which the hook or dog F is attached; H, the sliding arm for holding the dog F out of contact with the combination-wheels; I, the lever or pivoted bar for operating the sliding arm H; J, the secondary case of the time-lock; K, the cross-bar or thumb-piece for lifting the drop-bolt O; L, the rod running through the drop-bolt; M, the spring-section of the drop-bolt; N, the spring around the rod L, for operating the spring-section M; O, the drop-bolt; P, the slides or steady pins for keeping the spring-section M in position; Q, the plate for releasing the spring-section M of the drop-bolt; R, the shaft of the arm or lever I; S, the spring of the shaft R for returning the lever I to position; T, the division-plate, behind which the spring movements are located; U V, the main wheels actuated by the spring movements; W, the intermediate gear-wheel connecting the two main wheels; X Y Z, the winding-wheels; Z′, the ratchet-wheel; *a*, the arm on the drop-bolt O, projecting through a slot into the case A; *b*, the notch or step on the arm I for supporting the drop-bolt by means of the arm *a*; *c*, the arm on the spring-section M of the drop-bolt O, projecting through a slot into the case A; *d*, the locking-arm for holding the spring-section M down; *e*, the lever for operating the arm *d*; *f*, the head of the lever *e*; *g h*, the eccentric projections on the plate Q for operating the arm *e*; *i*, the point on the plate Q for setting the time; *j*, the guide-hook for holding the eccentrics *g h* in position when in operation; *k*, the winding-post; *l*, the removable pin placed on the wheel U; *m*, the anti-friction wheel; *n*, the sliding bar pivoted to the upper end of the bar I; *o*, the pivot of the bar *n*; *p*, the fixed pin on the wheel U; *q*, the pin for supporting the inner end of the sliding bar *n*; *r*, the anti-friction collar on the pin *q*; *s*, the slot in the bar *n*; *t*, the ratchet plate or bar on the wheel U; *u*, the lip or projection on the ratchet-plate *t*; *v*, the teeth or notches on the under section U′ of the wheel U; *w*, the bridge for supporting the winding-post *k*; *x*, the pawl; *y*, the spring for operating the pawl; *z*, the hook of the bar H; *z′*, the pin on the hook F, which connects with the hook *z* for the purpose of holding the locking-hook F out of contact with the wheel D; *a′*, the shafts through which the clock work or spring motor operates the wheels U V; *b′*, the pin for holding the plate Q in position; *c′*, the stud for lifting the plate Q, and disengaging the pin *b′*; *d′*, the weight on the bar I.

The case B, together with the several parts of the combination-lock, except the hook or dog F and bar H, are made in any of the usual or well-known forms. The case A is made of any suitable size, and is provided with a partition-plate, T. Between this plate T and the back of the main case A is located the time-movements, which are operated by means of springs, it being designed to use two, one for driving the wheel U and one for driving the wheel V, but, as they are made in any of the usual forms of clock or watch works, the movements are not shown or described. On the main shafts *a′* of the movements, which project through the plate T, the wheels U V

are located. These wheels are connected together by an intermediate gear-wheel, W, so that each of the interior movements assists the other in operating the devices, and, as either movement will operate the wheel U, it is necessary to mark but one of them with a dial or other indicator.

The wheels U V are made double, the wheel U being shown partly in section, in Fig. 3, and in detail in Figs. 4 and 5. The lower portion U′ of the wheel is provided with a series of teeth or projections, *v*, which engage with a spring-pawl, *t u*, of the other section, as shown in said Figs. 3, 4, and 5. By this construction of the wheels they can either or both of them be turned forward freely for the purpose of setting the time arrangement at any desired hour without interfering with the main movements. It also permits the winding of both sets of main movements from a single winding-stem, *k*, through the intermediate wheels X Y.

The wheel U is provided with a cross-plate, Q, which plate is provided at its end with eccentrics or inclines *g h* for the purpose of operating the lever *e*, and also with a point, *i*, for adjusting the plate in reference to the dial-wheel U, and the time for operating the locking devices. It is obvious that any other part of the plate Q may be used for this purpose; but, in order to prevent mistakes, it is preferable to use a separate point for that purpose. The wheel U is provided with two pins, *l* and *p*, which come in contact with the anti-friction wheel *m*, for the purpose of operating the bar I. The pin *p* is permanently attached to the wheel, and the pin *l* is made removable for the purpose hereinafter explained. The lever *e* is pivoted to the plate T, and is provided with an arm or stop, *d*, which stop comes in contact with an arm or projection, *c*, which is connected with the spring-section M of the drop-bolt O.

The anti-friction wheel *m* is journaled on a sliding bar, *n*, which sliding bar is supported on its inner end by the pin *q*, which is provided with an anti-friction collar, *r*. The outer end of the bar *n* is pivoted to the upper end of the bar I by a stud or projection, as shown at Fig. 7.

The bar I is pivoted to the main case A and to the plate T by means of a shaft, R, which is provided with a spring, S, to return the bar I to its original position whenever it is moved by the bar *n*. This bar I, at its lower end, is pivoted to the bar H, and is also provided with a notch or step, *b*, which engages with the arm or pin *a* of the drop-bolt O. The bar H is provided with a catch or hook, *z*, into which the pin *z′* enters when the bolt of the combination-lock is thrown out, and the hook F lifted from its notch in the wheel D.

The drop bolt O is made in two sections. The spring-section M is supported on a rod, L, which passes through the drop-bolt, and is held in place partly by the case J and partly by the two sliding rods or steady-pins P. The rod L is surrounded by a helical spring, N, which forces the section M upward when the door is to be locked by the bolt or bolts connected with the section C.

The parts inclosed and in connection with the case A constitute a separate and complete lock, and may be used without being combined with any other lock, with only the change made by cutting the lever I off at the lower edge of the case A, instead of passing through it, as shown; and, when used in connection with a combination-lock, the additional case J and the drop-bolt arrangement may be omitted, and, when so omitted, its offices are performed by the sliding bar H and the hook F.

The pin *z′* on the hook F operates to engage with the hook *z* of the slide-bar H, and holds the hook F out of contact with the wheels D.

The bar I is provided with a weight, *d′*, so that, when the lock is placed in a vertical position, the bar will be more evenly balanced, and so that in any position the weight will act as a counter-balance, so as to avoid the necessity of making the spring S so strong as to give unnecessary resistance to the action of the wheel U on the bar *n*. The weight also aids in keeping the bar I in position when heavy blows are applied to the outside of the safe.

In operation, the entire movement is wound up by a single key applied to the post K, and the time at which the lock is to be opened or closed is indicated on the dial by the point *i* on the plate Q, which is a spring-plate, and is set by lifting the end by the knob *c′*, which disengages the short pin *b′* from the wheel U, so that the plate Q can be turned freely in either direction without disturbing the movements. When the plate Q is in the desired position the end is released, when the pin *b′* engages with the gear-teeth of the wheel U, and holds the plate Q in place. The drop-bolt O is then pressed up in the position shown in Fig. 1. As the wheel U progresses, one of the inclines *g* or *h* lifts the lever *e*, which disengages the arm *d* from the arm or projection *c*, which allows the section M of the drop-bolt O to spring up into the position indicated by the dotted lines in Fig. 1, when the bolt is locked. The drop-bolt O will remain in this position until one of the pins *p* or *l* comes in contact with the anti-friction wheel *m*, which pin crowds, through the bar *n*, the upper end of the bar I over, which releases the arm or projection *a* from the step *b* on the arm I, when the bolt O drops to the position shown in Fig. 2, in which position the bolt C can be withdrawn from its connections, and the safe or vault to which it is applied can be opened.

The pins *p l* are arranged to drive the bar *n* once in twenty-four hours. The pin *l* can be withdrawn, and, when withdrawn, the operation will only be repeated once in forty-eight hours. This pin *l* is withdrawn Satur-

days, which will carry the lock over until Monday, when the pin is again inserted.

By the use of the intermediate wheel W the power of both of the driving mechanisms is applied to the bar *n* by a single pin. If desired, the bar *n* can be extended back to the wheel V, so as to take a separate action from each wheel, by inserting similar pins in the wheel V; but it is preferred to make the lock with the intermediate wheel W, as shown, as with that wheel the double motor is made to act with the certainty and uniformity of a single one, as neither can get in advance of the other.

The motors or clock-works are to be made of sufficient power, so that either will operate the lock in case the other should become disabled. The motors to be used should be, at least, of an eight-day movement, so as to be wound only on Saturdays, and by winding both from a single stem at the same time, neither one can be left unwound.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. The drop-bolt O, provided with the section M, in combination with the rod L and spring N, substantially as and for the purpose specified.

2. The combination of the lever *e*, provided with an arm, *d*, with the arm *c*, for holding the spring-section M of the drop-bolt in position, substantially as specified.

WILLOUGHBY F. KISTLER.

Witnesses:

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O. W. BOND.

2,225