

(No Model.)

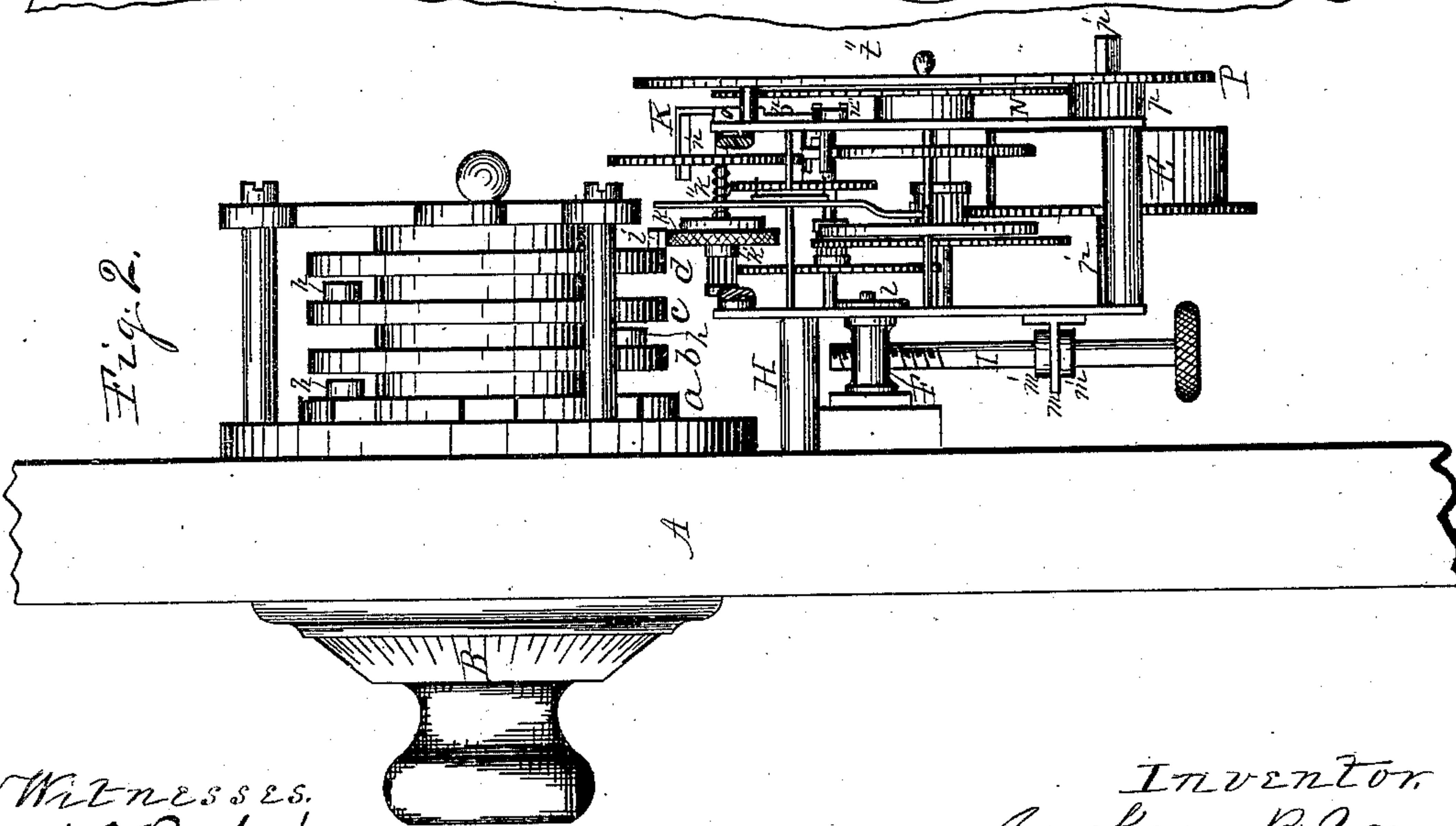
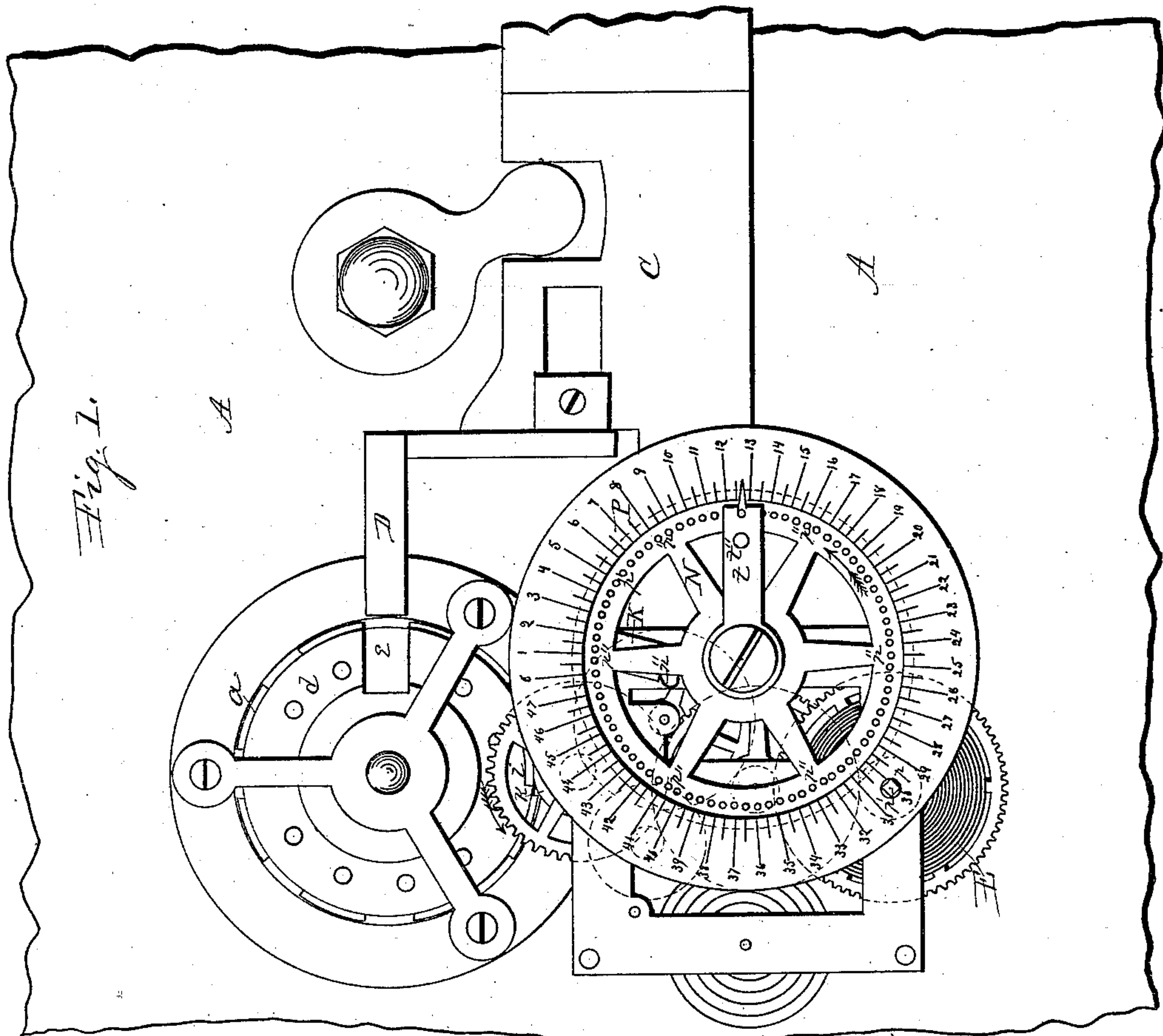
2 Sheets—Sheet 1.

J. B. YOUNG.

TIME LOCK.

No. 314,282.

Patented Mar. 24, 1885.



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Jackson B. Young.
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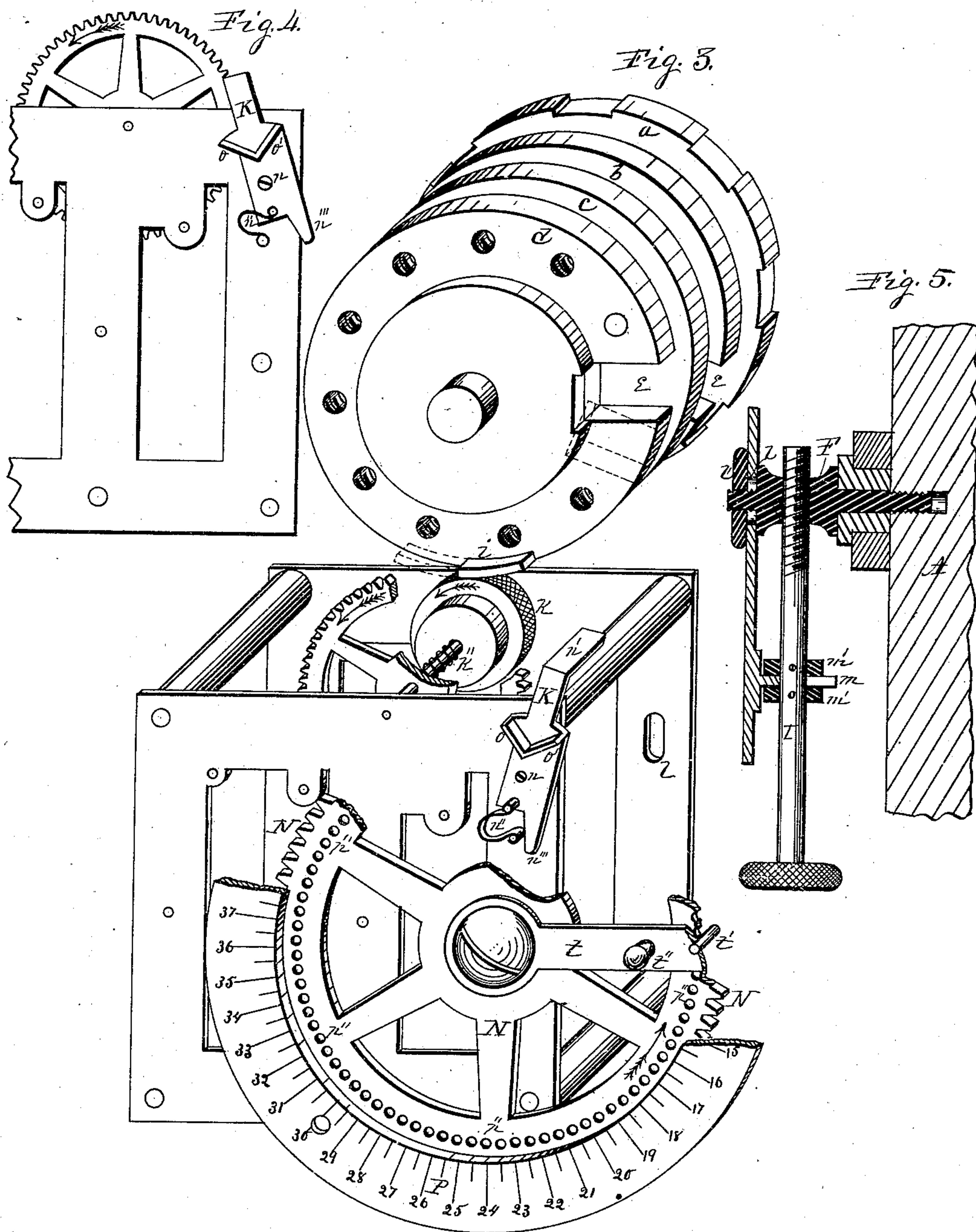
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UNITED STATES PATENT OFFICE.

JACKSON B. YOUNG, OF SIOUX FALLS, DAKOTA TERRITORY.

TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 314,282, dated March 24, 1885.

Application filed September 27, 1883. (No model.)

To all whom it may concern:

Be it known that I, JACKSON B. YOUNG, a citizen of the United States, residing at Sioux Falls, in the county of Minnehaha and Territory of Dakota, have invented new and useful Improvements in Time-Locks, of which the following is a specification.

This invention relates to that class of time-locks in which a single time-movement is employed to determine the time at which the lock may be unlocked.

The object of this invention is to produce a time-lock of a construction to prevent unlocking when the timer is running, and capable of adjustment to stop the movement at any predetermined time within the running-time of the movement, and to permit unlocking when the movement is not running; and it consists, mainly, in the combination of a time-movement with the tumblers of a permutation-lock to prevent their adjustment for the purpose of unlocking, and in combination with the movement of a stop mechanism capable of adjustment to stop the movement at any predetermined time within the running-time of the timer; in mechanism to adjust the timer in its connection with the lock to regulate its operative force within the capacity of the movement. These, including the mechanism employed, and other improvements, to be hereinafter more fully described, constitute the subject-matter of this specification.

In the accompanying drawings, Figure 1 is an inner face elevation of a mechanism embodying my invention. Fig. 2 is an edge elevation. Fig. 3 is an isometrical inner face representation, partly in skeleton, of the main portions of my improvements. Fig. 4 is an elevation of the stop mechanism; and Fig. 5 is a vertical central section of mechanism employed to adjust the timer to the locking mechanism.

In the figures I have represented a base-plate or a portion of a wall on which to mount a lock, and a timer in connection therewith, to illustrate my improvements; and for this purpose in this instance I have selected a well-known form of a four-tumbler permutation-lock and an ordinary time-movement. These I have mounted on the base-plate A. The lock employed consists of the tumblers *a*, *b*, *c*, and *d*, of disk form, each provided with a radial

slot, *e*, opening through their periphery to receive the locking-bolt. These several tumblers are supported in a frame fixed to the base-plate, and the tumbler *a* is connected with a graduated disk, B, on the outside of the base-plate or wall A, by means of a spindle extending through the base-plate or wall in such a manner that the rotations of the graduated disks B will be imparted to the tumbler *a*. This tumbler *a* and the tumblers *b* and *c* on their inner-face sides, and the tumblers *b* and *c* on both face sides, are provided with screw-studs *h*, projecting therefrom on lines having the same diameter, in a manner to engage each other when the graduated dial is rotated.

At C is represented a locking-bolt capable of an endwise sliding movement in guideways. This locking-bolt is provided with an arm, D, fitted to enter the radial slots in the tumblers when they are adjusted to bring their radial openings in position to receive it. These several parts are substantially the same as like parts of locks now in use, and are operated in the same manner, and capable of like adjustments for like purposes.

At *i* is represented a segment-block of proper dimensions, fixed to the outer face of the outer tumbler—in this instance near its periphery—and about a quadrant distant from the radial slot therein and rearward thereof relatively with the direction of rotation in picking up the tumblers preparatory to their adjustment for unlocking. Instead of this segment-block a pin, peripheral or side enlargement of the tumbler may be employed.

In combination with this lock I have employed an ordinary time-movement consisting of a mainspring, E, and the usual gear-train, in connection with an escapement and balance wheel mounted in a suitable frame. In this movement I have provided a friction-wheel, *k*, mounted loosely on a shaft of the gear-train to engage a collar, *k'*, fixed on the shaft, against which it is held with a force sufficient to produce the required friction by means of a spring, *k''*, surrounding its shaft. The periphery of this friction-wheel *k* and the periphery of the segment-block *i* are provided with roughened or corrugated surfaces to engage each other; but instead thereof they may be produced in even plain frictional surfaces, or they may be produced with corrugated sur-

faces to engage each other in gear-toothed form to increase their frictional contact or holding force. This movement is mounted upon the bed-plate or wall on suitable supports, F and H, in such position relatively with the lock that the periphery of the friction-wheel shall be in position to engage the periphery of the segment fixed to the outside face of the tumbler. This movement in its connection with the bed-plate is made adjustable toward and from the lock, for the purpose of regulating the holding force between the friction-wheel and the segment. For this purpose I have produced the slot *l* in the movement-frame to engage the stud-support F, to permit of a limited adjustment.

At *V* is represented a burr-nut having a screw-thread connection with the outer end of the stud-support F, to fix the movement-frame to the stud-support.

At *I* is represented an adjusting-screw having a screw-thread connection with the stud-support F, and its shaft is connected with the movement-frame by means of the slotted arm *m*, projecting therefrom and embracing the shaft between the collars *m'*, fixed thereto. By means of this adjusting-screw and the burr-nut in their connection with the movement and its supports, the movement is made readily adjustable toward and from the lock, to regulate the holding force of the friction-wheel and segment.

From the foregoing it will be seen that in picking up the tumblers preparatory to their adjustment for the purpose of unlocking, the segment may be carried over the friction-wheel, which, by reason of its loose connection with its shaft, will revolve thereon without stopping the movement.

In the adjustment of the tumblers by means of the graduated disk B, for the purpose of unlocking, the inner tumbler, *d*, is the first of the series to be brought into position to receive the arm D of the bolt in its radial slot. The arrangement of the parts are such that in this adjustment, when the tumbler *d* is brought into position to receive the arm D of the bolt the segment will have engaged the friction-wheel in such a manner that when the tumbler is released from the action of the graduated disk, as in the adjustment of the other tumblers in the series, the movement of the timer will have carried the tumbler *d* from its adjusted position to the position shown in the dotted lines at Fig. 3 before the other tumblers can be adjusted, from which it will be seen that my improved time-lock cannot be opened while the time-movement is running. This construction and arrangement requires that provision be made for stopping the movement at the time fixed upon for opening the lock. For this purpose I have provided the following mechanism:

At *K* is represented an angle-lever detent having a pivotal connection at *n* with the movement-frame in such position thereon that its angle-arm *n'* when thrown forward, as in Fig.

4, will engage the teeth of one of the gear-wheels in the gear-train of the movement. This detent-lever is provided with a spring, *n''*, having a pivotal connection at one end with the detent-lever, and its other end is pivoted to the movement-frame. The connection of these parts are such that when the free angle-arm of the detent is carried to the right-hand side of a vertical line cutting the pivotal centers of the lever-detent and the spring in their connection with the movement-frame, the lever-detent will be thrown by the action of the spring to the right-hand side of the line until its depending arm *n'''* engages the pivotal connection of the spring with the frame. If the free angle-arm of the detent-lever is carried to the left-hand side of the line of the pivotal centers of the detent and spring with the movement-frame, the spring action will carry the free arm of the lever to the left-hand side, and cause its angle-arm to engage the teeth of a gear-wheel of the gear-train, as shown in Fig. 4, and stop the movement. This detent-lever is provided above its pivotal connection with oblique tappet-arms *o* and *o'*, rising from its outer face.

At *p* is represented a gear-toothed pinion mounted upon the projecting end of the spring-shaft *p'*.

At *N* is represented a gear-toothed wheel having its journal-support on the frame of the time-movement in such position thereon that its teeth shall engage the teeth of the gear-toothed pinion *p*. The rim of this gear-wheel *N* is provided with a series of holes, *p''*, in close proximity, in an annular ring within, but near the base of, its gear-teeth.

At *t* is represented an index-arm pivoted on the axial center of the gear-wheel *N* in a manner to permit of a rotary or oscillating movement independent of the wheel for the purpose of adjustment. The outer portion of this arm is provided with a stud-pin, *t'*, projecting from its inner face in position to enter the holes *p''* in the rim of the wheel, and extend beyond its under face in position to engage the tappet-arms *o* and *o'* of the detent in its rotary or oscillatory movements. The construction of these parts is such that when the detent-lever is in its position, disengaged from the gear-wheel of the movement, the rotation of the gear carried by the time-movement in the direction indicated by the arrow, the stud-pin *t* will pass over the outer end of the right-hand tappet-arm, *o'*, and engage the left-hand tappet-arm, *o*, and carry the detent to engage the gear-wheel of the train and stop the time-movement.

In winding the spring the gear-wheel *N* will be made to rotate in the opposite direction to that indicated by the arrow thereon, which movement will carry the stud-pin over the outer end of the left-hand tappet-arm, *o*, to engage the right-hand tappet-arm, *o'*, and disengage the detent from the gear-wheel of the train and permit the running of the movement.

At P is represented a dial of annular-ring form mounted over the gear-wheel N, concentric thereto, on suitable supports rising from the frame of the gear-train. This dial in this instance is graduated into forty-eight main divisions, corresponding to the hour-divisions of the timer, and these in this instance are numbered from, 0, the zero-point, toward the right hand to 47. These main divisions are divided centrally, representing half-hours, but may be subdivided into any practical number of parts required to indicate any required division of the hour. The outer end of the index-arm *t* is produced in pointed-finger form to more readily determine its position of adjustment on the dial. The position of the 0 or zero-point of the dial relatively with the detent is such that when the index-finger has reached the 0 or zero-point the stud-pin *t'* will have carried the detent beyond its pivotal center, and the detent will have engaged the teeth of the gear-wheel and stop the time-movement.

To determine the position of the index-finger relatively with the dial to stop the time-movement at a predetermined time for the purpose of unlocking, the number of hours between the time the adjustment is made, and the time fixed upon for unlocking must be reckoned, and the number obtained by this reckoning found upon the dial is the point on the dial to which the index-finger must be adjusted to stop the time-movement at the predetermined time. This adjustment is accomplished by lifting the stud-pin *t'* from its connection with the dial, and carrying it to the required point thereon, and inserting the stud-pin in the proper hole in the gear-wheel. For this purpose the index-arm is made from suitable material and in a proper manner to permit of the withdrawal and reinsertion of the stud-pin at any point on the dial; and it is provided toward its outer end with a stud-knob, *t''*, as a ready means by which to adjust the arm. In this instance I have connected with the time-movement the lock-tumbler farthest from the operating graduated disk, and have connected this tumbler with the fourth wheel of the gear-train of the movement; but instead thereof any one or more than one of the tumblers may be connected with the movement, and such connection may be made with any portion of the time-movement which will be efficient in moving the tumbler in the manner and for the purpose hereinbefore stated.

I claim as my invention--

1. In a time-lock, a time-movement, in combination with a set of tumblers none of which is connected with the time-movement, except when adjusted in position for unlocking, a projection or enlargement on one or more of the tumblers, and a wheel driven by the time-movement, and arranged to come in contact with the said projection when the tumbler is at the point of adjustment for unlocking and to be released from such contact just after the

said tumbler is displaced, substantially as and for the purposes set forth.

2. In a time-lock, a time-movement, in combination with a set of tumblers all of which are disconnected from the time-movement when out of position for unlocking, a frictional surface provided by a flange or enlargement on one or more of said tumblers, and a friction-wheel driven by the time-movement, and arranged to engage with the frictional surface on the tumbler just at the point of the adjustment of the latter into position for unlocking and to be released from such contact when said tumbler is slightly displaced, substantially as and for the purposes set forth.

3. In a time-lock, a time-movement, a set of tumblers having no operative connection with the time-movement except in one position, and automatic means for producing an engagement of the time-movement with one of the tumblers whenever said tumbler is in position for unlocking, all in combination, substantially as and for the purpose described.

4. In a time-lock, the tumbler *d*, having in its periphery the slot *e*, for the purpose of receiving an arm of the locking-bolt, and having also the projection *i*, arranged, as described, on its periphery, a friction-wheel arranged on a fixed bearing to engage with the projection on the tumbler when the two are nearest each other, and means for communicating to the friction-wheel a rotary motion from the time-movement, all in combination, substantially as and for the purpose described.

5. In a time-lock, the revolving tumbler *d*, having the projection *i*, arranged, as described, thereon, the friction-wheel *k*, loosely mounted on a revolving shaft in a position to engage with the projection at a certain point in the revolution of the latter, the collar *k'*, rigidly mounted on the shaft, and the spring *k''*, arranged to press the wheel against the collar, all in combination, substantially as and for the purpose described.

6. In a time-lock, the fixed dial, the gear-wheel N, concentric with the dial and having near its periphery the laterally-projecting pin *t'*, the lever K, pivoted on the frame of the time-movement and having the lateral arm *n'*, arranged to engage at one end of its range of oscillation with one of the gear-wheels of the movement, and having also the tappets *o* and *o'*, arranged, as described, to engage with the pin *t'*, the spring *n''*, arranged, as described, to push the lever to the nearer extreme of its arc of oscillation, and means for communicating the time-movement to the wheel N, all in combination, substantially as and for the purpose described.

7. The rotating tumbler *d*, having on its periphery the projection *i*, the time-movement, the friction-wheel *k*, mounted on a revolving shaft of the time-movement in position to engage with the projection, the revolving wheel N of the time-movement, having near its periphery the laterally-projecting pin *t'*, the lever K, having a pivotal fulcrum on

the frame of the movement, having the lateral arm n' , arranged to engage at one end of its range of oscillation with one of the gear-wheels of the movement, and having also the tappets o and o' , arranged, as described, to engage with the pin t' , and the spring n'' , arranged, as described, to push the lever to the nearer extreme of its arc of oscillation, all in combination, substantially as described, for the purpose of preventing the adjustment of the tumbler in a certain position up to a predetermined time, and permitting the adjustment when the time has arrived.

8. In a time-lock, a combination-lock, in combination with an adjustable time-movement, whereby the relative position of the time-movement and lock may be adjusted, substantially as and for the purpose described.

9. In a time-lock, the fixed support F , having a threaded transverse aperture arranged therein, as described, the frame of the movement having the slot l , arranged to engage with the fixed support, and the slotted arm m , projecting to a position opposite the threaded aperture, and the shaft 1 , arranged in the slotted arm and in the threaded aperture, threaded toward one end to fit the aperture, and provided with the collars m' , arranged on each side of the slotted arm and close to it, all in combination, substantially as and for the purpose described.

JACKSON B. YOUNG.

Witnesses:

W. C. HOLLISTER,
A. BOYNTON.