No. 623,734. Patented Apr. 25, 1899.

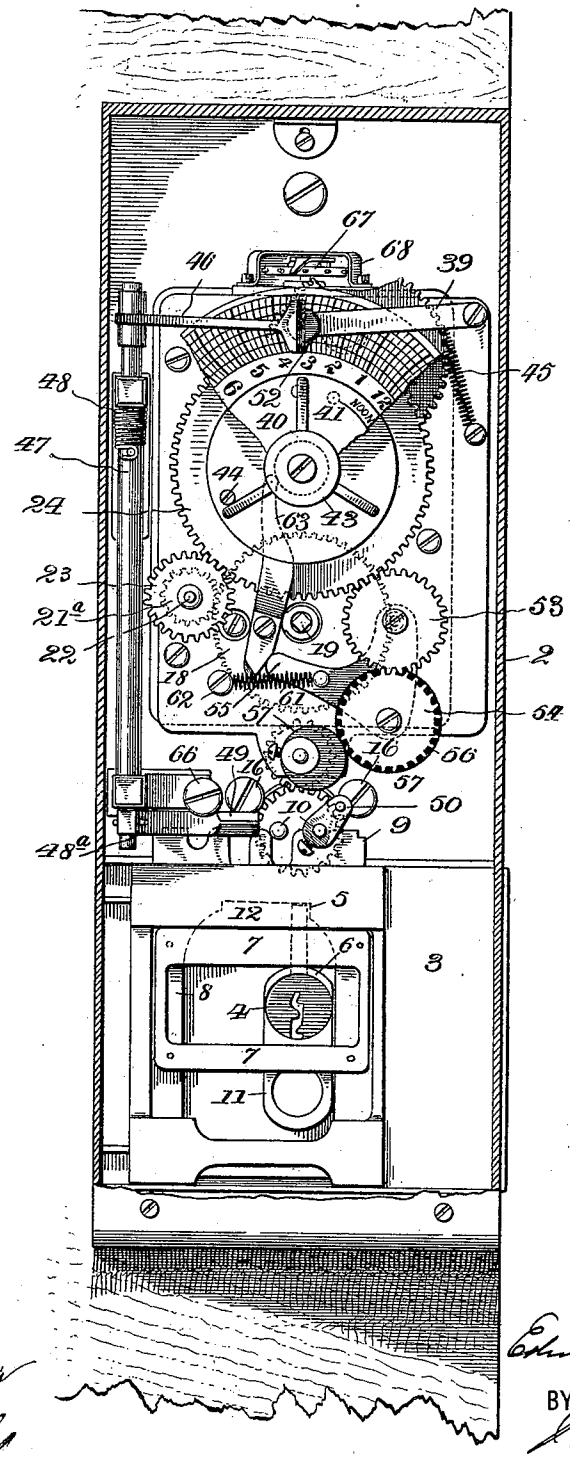
E. S. PHELPS.

REGISTERING TIME LOCK.

(Application filed May 24, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

Geo. W. Naylor

L. C. Hills

INVENTOR

Edwin S. Phelps

BY

ATTORNEY

No. 623,734. Patented Apr. 25, 1899.

E. S. PHELPS.

REGISTERING TIME LOCK.

(Application filed May 24, 1898.)

(No Model.) 2 Sheets—Sheet 2

Fig. 2.

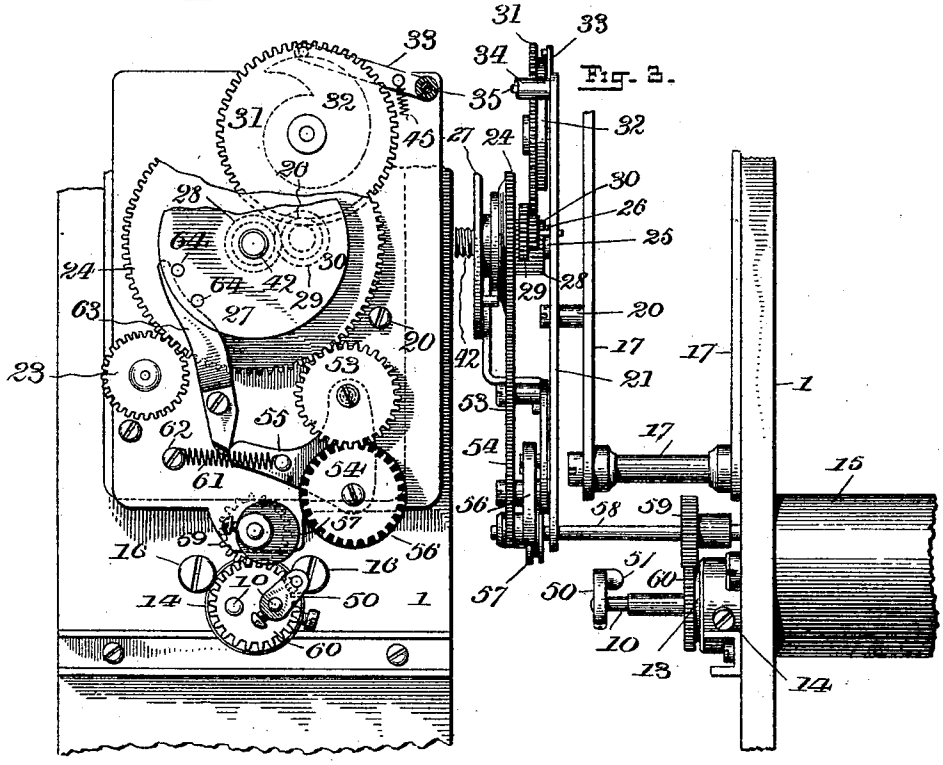
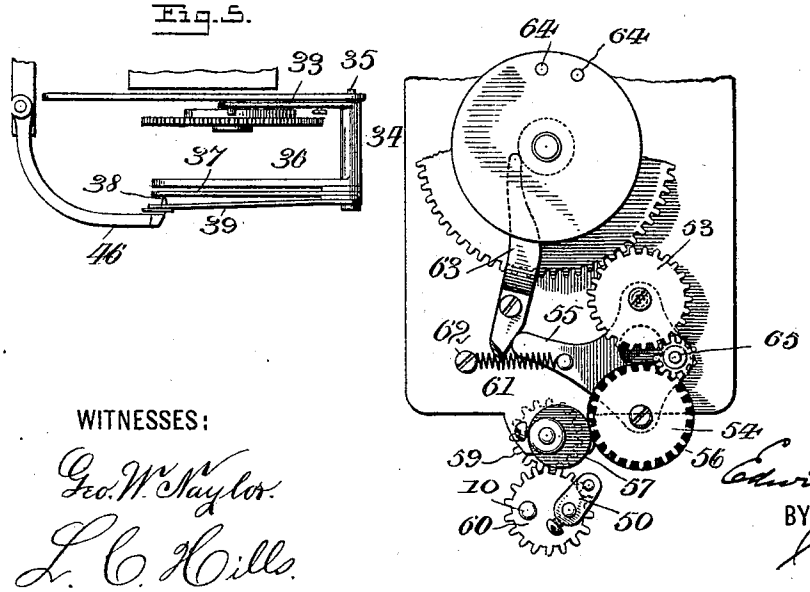


Fig. 4.

Fig. 5.



WITNESSES:

Geo. W. Naylor.

L. C. Hills.

INVENTOR

Edwin S. Phelps.

BY

ATTORNEY

UNITED STATES PATENT OFFICE.

EDWIN S. PHELPS, OF ELIZABETH, NEW JERSEY.

REGISTERING TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 623,734, dated April 25, 1899.

Application filed May 24, 1898. Serial No. 681,567. (No model.)

To all whom it may concern:

Be it known that I, EDWIN S. PHELPS, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Registering Time-Locks; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention has reference to locks, more particularly to a lock designed for use on stores and other business houses where it is desirable to make a register or record of the time when the door is closed at the close of business hours and when opened for business; and it has for its object to provide simple mechanism for making and preserving an accurate record of the time when the door is locked and also when unlocked, thus indicating to the proprietor at what hour his place of business was closed and at what hour or fraction of an hour it was opened up for business, and, further, at what hour and fraction of an hour the door was unlocked and again locked outside of business hours.

It has also for its object to provide means against manipulation of the lock with the view of clandestinely entering the establishment outside of business hours and concealing the fact, such means preventing the manipulation of the lock for that purpose without making a record of the fact and indicating the time when such attempt was made.

It has also for its object to provide mechanism which will constitute a lock, time mechanism, and a registering device for recording the hour or fraction of an hour at which the bolt of the lock is thrown in locking and unlocking the door and in which a single key is used in contradistinction to the use of a master-key and a subsidiary key, thus simplifying the mechanism and at the same time obtaining the security afforded by making a record of the time when the door is locked and unlocked.

It has, further, for its object to provide mechanism constituting a lock, time mechanism, a register for recording the time when the door is locked and unlocked, and a night-check which will cause the register to make an additional record if the lock is manipulated between the closing and opening hours, which check will not operate if the door is unlocked at the opening hour, but at such hour permit the other mechanism to make a record of the time when the door is unlocked for opening up business.

To the accomplishment of the foregoing and such other objects as may hereinafter appear the invention consists in the construction and also in the combination of parts hereinafter particularly described and then sought to be specifically defined by the claims, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 is a front elevation of the lock with its front casing removed and with parts broken away. Fig. 2 is a front elevation with a portion of the bottom and of the top broken away and certain parts omitted for clearness. Fig. 3 is a side elevation of Fig. 2. Fig. 4 is detail view of the night-check mechanism modified to adapt it to a left-hand lock, and Fig. 5 is a detail plan view of a portion of the registering mechanism.

In the drawings the numeral 1 designates the base or back plate, which supports the mechanism, and 2 a section of the inclosing case, the front portion being cut away.

The numeral 3 designates the sliding bolt of the lock, which may be operated at any time from inside the store or other room by the insertion of the key into the hub 4, so as to act upon the tumblers in the extension 5 and free the same, so that the hub may be turned. When the hub is turned in one direction, an extension 6 thereon will be brought into engagement with the lower member of a bar 7, which will depress a sliding dog 8, which moves in a suitable recess formed in the bolt 3, so as to release a rack 9, formed at the top of the dog, from engagement with rotatable studs or pintles 10, and thus leave the sliding bolt free to be moved in or out by the key just described. After the extension 6 has depressed the dog a longer extension 11 on the hub 4 and which works in a camway (shown by dotted lines) 12 in the dog will bear against the dog and push it and the sliding bolt outwardly in a locking position. On turning the

hub in the opposite direction the extension 11 will bear against the camway in the dog in the opposite direction, so as to draw back the bolt, and thus unlock the door. In this backward movement of the hub the extension 6 on the hub will be brought into engagement with the upper member of the bar 7, which will lift the dog 8 into the position shown in full lines in Fig. 1 of the drawings, so as to bring the rack 9 again into engagement with the studs or pintles 10, this upward lifting of the dog taking place after the bolt has been drawn in, and thus leaving the parts in position to be operated from the outside of the door by rotation of the studs or pintles 10.

The studs or pintles 10 project from a rotatable hub 13, which turns in a collar 14, which hub will be connected in any suitable way with the rotatable portion of a flat-key tumbler-lock, which may be of the well-known Yale type, the hub of which is indicated by the numeral 15 in Fig. 3 of the drawings and the details of which are not shown, as the same is not novel and is of well-known construction. The hub of this tumbler-lock may be secured to the base or back plate 1 by the screws 16. By revolving the hub 13 from the tumbler-lock the studs or pintles 10 will bear against the teeth of the rack 9, so as to move the bolt 3 in or out in the locking and unlocking of the bolt.

The numeral 17 designates a frame connected to the base or back plate 1 and designed to contain any well-known and approved type of seven-day-clock mechanism, which is not illustrated, except that in Fig. 1 is shown the toothed wheel 18, which represents the ordinary toothed wheel of the clock-spring barrel and also the winding-stem 19. From the face-plate of the clock-mechanism frame 17, supported by suitable studs 20, is a plate 21, which will carry the registering mechanism of the lock. Motion is transmitted to this mechanism from the toothed wheel of the spring-barrel of the clock through a pinion 21^a, (shown by dotted lines in Fig. 1,) mounted upon a shaft 22, which carries at its outer end a gear-wheel 23, which meshes with a toothed wheel 24, which I will designate as the "hour-wheel," since it makes one revolution once in every twenty-four hours. This hour-wheel is supported upon a shaft 25, which extends from the face-plate 21. This hour-wheel is mounted upon a sleeve 26, which encircles the shaft 25, so as to turn thereon, said sleeve carrying a dial-plate 27 in front of the hour-wheel 24 and a pinion 28 to the rear of the hour-wheel. The hour-wheel is held to the sleeve 26, between the dial-plate 27 and pinion 28, by a frictional contact sufficient to cause the hour-wheel and dial-plate to turn together and yet permit the dial-plate and the pinion 28 to turn independently of the hour-wheel when it is desired to adjust the dial-plate, thus permitting the adjustment of the dial-plate and in unison therewith the snail hereinafter mentioned, which transmits motion to the punch or puncturing device hereinafter described. By bringing the dial-plate and impression-receiving dial down close to the hour-wheel I dispense with some train of mechanism, and thus relieve the clock or time movement of some unnecessary work. It also simplifies the setting of the impression-receiving dial and makes it sufficient to set the dial itself instead of both a dial and an hour-hand, as in my Patent No. 520,332 of May 22, 1894, and has various other advantages. The pinion 28 transmits motion to a pinion 29, which communicates motion to a pinion 30, which meshes with a toothed wheel 31, which in its rotation carries a snail 32, which is made in the form of an involute of a circle and against the surface of which bears a follower 33, formed as a part of a sleeve 34, revoluble upon a shaft 35 and carrying at its outer end two plates 36 and 37, between which will extend the periphery of the recording-dial hereinafter referred to, the plate 37 having a perforation through which may be projected the punch or perforator 38, attached to the spring-plate 39, which is secured to the sleeve 34, so as to be moved in unison with the follower 33 and plates 36 and 37. The plate 37 serves as a stripper for the recording-dial, so that when the punch 38 perforates that dial and is retracted the dial will not be drawn out of position by the punch 38.

The recording-dial is designated by the numeral 40 and may be made of paper and is mounted upon the hub of the dial-plate 27 and is held thereon by the spring-fingers 41, extending from a hub which fits upon the hub 42 of the dial-plate, the pressure of the fingers against the recording-dial being regulated by a nut 43, which fits to the threaded hub 42 of the dial-plate. The recording-dial is divided into a series of divisions representing the seven days of the week, and these divisions are formed of a series of involute-curved lines, each line representing a space equal to the twenty-four hours of the day, so that one dial can be used for making a record of one week, each line of the involute curve representing one day of the week, and thus the record of each day of the week can be preserved and the week's record filed away for future reference. The involute-curved lines are divided by transverse lines into spaces representing the hours of the day, the space between the hour divisions being divided by transverse lines indicating fractions of an hour—for instance, into six spaces, each space representing a period of ten minutes and the distance traveled by the dial in that period of time—thus permitting to be read from the dial the hour and fraction of the hour at which the punch is operated in the locking and unlocking of the bolt.

It will be observed that the recording-dial is marked with numerals indicating the hours of the day, which numerals may be arranged in two divisions of twelve hours each, although

they may run from "1" to "24." The dial-plate is also provided with a screw-pin 44, adapted to enter a perforation on the paper dial, so as to insure the ready adjustment of the dial on the dial-plate and which will also tend to prevent any accidental slipping of the dial on the dial-plate. The involute curves of the dial and the involute of the snail bear such relation to each other that while the snail is making one complete revolution the recording-dial will make seven revolutions and the snail will travel each day a distance bearing a definite relation to the length of the curve representing the day whose record is to be made, so that the snail will act upon the punching device to carry it from one curved line to the other as one day succeeds another, the snail and gears for transmitting motion thereto being so proportioned as to effect that result and the follower 33 being held in contact with the snail by a spring 45.

The punch or perforator is acted on by an arm 46, extending from a rock-shaft 47, which is under the influence of a spring 48, the lower end of the rock-shaft carrying an arm 48^a, whose free end is preferably formed with beveled faces 49 and which lies in the path of an arm 50, operated from the outside tumbler-lock, said arm preferably being connected by a set-screw to one of the pintles 10 and formed with a knob or lug 51, which will constitute the contact-point to engage the beveled surfaces of the arm 48 on the rock-shaft in both locking and unlocking the bolt by a key applied from the outside.

When the bolt is thrown to lock the door, the arm 50 presses on the arm 48, so as to turn the rock-shaft 47 and throw its arm 46 against the spring-plate 39, carrying the punch or perforating-point, so as to puncture the recording-dial and indicate the time of locking the door, the spring of the rock-shaft restoring the two arms of that shaft to their normal position as soon as the arm 50 frees the arm 48. In unlocking the bolt the same operation takes place.

The pointer 52 on the perforating spring-arm 39 serves as an index for the proper adjustment of the paper dial at the time of placing the same upon the dial-plate, so that the dial and the dial-plate may be adjusted to the proper position agreeing with the day, the hour, and fraction of the hour at the time when the recording-dial is placed in position, so that the correct register will be made from that time on.

If it were not for the mechanism which I am about to describe, it might be possible for an expert and unfaithful employee to so manipulate the lock by a quick locking and unlocking of the bolt without the lapse of any appreciable time between the two operations to make only a single perforation in the two movements of the bolt, and thus leave the door unlocked, so as to gain admission to the room after business hours for dishonest purposes. For the purpose of preventing this being done I employ what for convenience I will designate as a "night-check," and which will insure making a second or auxiliary perforation in the dial by the registering mechanism notwithstanding a quick and immediate unlocking of the bolt directly following the locking operation. To do this, I avail myself of the slack in the clock and other gears, of which there is always some to a greater or less extent. To enable this to be availed of, I employ idle-gears, (designated by the numerals 53 and 54,) the idler 53 being mounted upon a post and having its teeth meshing with the teeth of the hour-wheel 24, the idler 54 being mounted upon a yoke or arm 55, swinging from the post of the idler 53, the teeth of the idler 54 meshing with those of the idler 53. The post or pivot of the idler 54 carries a disk 56, which preferably has a frictional surface of rubber and is adapted to be acted on by a cam 57, which may have a grooved periphery and which for convenience is mounted upon a shaft 58, carrying a toothed wheel 59, with which will mesh a toothed wheel 60, carried by the pintle 10, as illustrated in Fig. 3, or upon the hub from which that pintle projects, so as to be located by the key which is operated from the outside. If therefore the disk 56 is in position to be in contact with the cam 57 when the bolt is being unlocked, the cam 57 will turn the disk 56 so as to transmit motion through the idlers 54 and 53 to the hour-wheel 24, the motion to the hour-wheel being in the opposite direction to that in which the hour-wheel normally rotates under tension from the spring-barrel of the clock mechanism, there being sufficient slack, as before stated, in the train of gears to allow a slight backward movement under pressure. This slack is accordingly taken up and the dial slightly moved from the point where the perforation is made in the locking operation, and as the result a second or auxiliary perforation is made in the dial, thus registering the unlocking of the bolt after the closing of business hours and before the hour for opening up business, and an effectual check is thus afforded against expert and dishonest manipulation of the lock. For the purpose of keeping the disk 56 in the path of the cam 57 during certain hours a spring 61 connects the swinging arm 55 with a stud or screw 62. In order to prevent this auxiliary record being made except between certain hours, I employ a lever or arm 63, arranged so as to press against the swinging arm 55, and thus take the disk 56 out of the path of the cam 57, so that the rotation of the latter will have no effect upon the idlers 53 and 54. At such time the lever 63 is pressed by pegs 64, attached to the dial-plate 27. The pegs are arranged on the dial-plate in such relation to the lever 63, which projects into their path, that between certain hours—say three o'clock and ten o'clock a. m., assuming that the store is to be opened at some time between those hours—that at the hour of

three a. m.—these pegs will press against the lever 63, so as to throw the disk 56 out of the path of the cam 57, and accordingly from the opening hour the auxiliary record will not be made, but only the regular record for the proper opening up of the store. In this way I cause the record not only to indicate the time when the store was closed for business, but also the time when opened up for business, and if there has been any movement of the bolt between those hours a record thereof is made and the time indicated by the auxiliary puncturing of the record-dial. The position of the idlers for making the auxiliary record is illustrated in Fig. 1 of the drawings, and their position when not to make such record is illustrated in Fig. 2 of the drawings.

The arrangement of the idlers in Figs. 1 and 2 of the drawings is for a right-hand lock. When applied to a left-hand lock, they are arranged as illustrated in Fig. 4 of the drawings, and an intermediate pinion 65 is used, so as to change the direction of rotation of the idler 53, as will be apparent to those skilled in the art.

For the purpose of holding the arm 48 of the rock-shaft 47 in position at all times for the arm 50 to engage therewith I employ a set-screw 66, as illustrated in Fig. 1 of the drawings. This, among other features, is an improvement over the locks of the same general character which I previously made in omitting certain parts of the former locks and in altering the construction so as to bring the present parts in such relation to one another that I dispense entirely with the use of a master-key and make one key answer the purpose of manipulating the lock and registering the time of locking and unlocking. I am also enabled to bring the parts into a smaller space and compact form and to dispense with many parts the employment of which would add to the expense of construction. The lock as now constructed and described constitutes strictly a lock, time mechanism, and registering device, in which a record is made of the time when the bolt is thrown in both locking and unlocking and in which one form of key alone is sufficient for manipulation of the lock at all times and to make a record of the time when the bolt is thrown in both locking and unlocking. It also provides means for guarding against the expert manipulation of the lock between the hours of closing and opening without making a record of the manipulation. I have also in this present construction located the escapement (indicated by the numeral 67) at the top of the mechanism, where it is easy of access, and I effectually protect the same against dust by providing a housing or casing 68 therefor, as indicated in Fig. 1 of the drawings.

I have illustrated and described with particularity the preferred details of construction and arrangement of the several parts; but it is to be understood that variations can be made therein without departing from the essential features of the invention.

Having described my invention and set forth its merits, what I claim is—

1. In a registering time-lock, the combination of a recorder, time mechanism for actuating the same, means for registering on the recorder the movements of the lock in the operation of both locking and unlocking, and means for effecting an auxiliary record of the manipulation of the lock between the first locking and regular time for unlocking, substantially as and for the purposes described.

2. In a registering time-lock, the combination of a recorder, time mechanism for actuating the same, means for registering on the recorder the movements of the lock in the operation of both locking and unlocking, and means for effecting an auxiliary record of the manipulation of the lock between the first locking and regular time for unlocking, said means being adapted to be thrown into and out of operative relation with the recording mechanism, substantially as and for the purposes described.

3. In a registering time-lock, the combination of a recorder, time mechanism for actuating the same, means for registering on the recorder the movements of the lock in the operation of both locking and unlocking, means for effecting an auxiliary record of the manipulation of the lock between the first locking and regular time for unlocking, and mechanism for automatically throwing into operative relation said last-mentioned means, substantially as and for the purposes described.

4. In a registering time-lock, the combination of a recorder, time mechanism for actuating the same, means for registering on the recorder the movements of the lock in the operation of both locking and unlocking, means for effecting an auxiliary record of the manipulation of the lock between the first locking and regular time for unlocking, and mechanism for automatically throwing out of operative relation said last-mentioned means, substantially as and for the purposes described.

5. In a registering time-lock, the combination of a recorder, time mechanism for actuating the same, means for registering on the recorder the movements of the lock in the operation of both locking and unlocking, means for effecting an auxiliary record of the manipulation of the lock between the first locking and regular time for unlocking, and mechanism for automatically throwing into and out of operative relation said last-mentioned means, substantially as and for the purposes described.

6. In a registering time-lock, the combination of a recorder, time mechanism for actuating the same, means for registering on the recorder the movements of the lock in the operation of both locking and unlocking, and means for effecting an auxiliary record of the

manipulation of the lock between the first locking and regular time for unlocking, said means comprising idlers operatively connected with a part of the time mechanism, a cam operated from a key mechanism, a disk operatively connected with one of the idlers, and means for throwing said disk in and out of the path of said cam, substantially as and for the purposes described.

7. In a registering time-lock, the combination of the hour-wheel operatively connected with time mechanism, a dial-plate located in front of and rotatable with said hour-wheel, an impression-receiving dial carried by said plate, and means for registering on said dial the movements of the lock in the operation of both locking and unlocking, substantially as and for the purposes described.

8. In a registering time-lock, the combination of the hour-wheel operatively connected with time mechanism, a dial-plate located in front of and rotatable with said hour-wheel, an impression-receiving dial carried by said plate, a snail operatively connected with said hour-wheel, a follower in contact with said snail, a punch or perforating arm connected with the snail-follower and provided with an index-finger, and means for actuating said perforating or punch arm in the operation of locking and unlocking, substantially as and for the purposes described.

9. In a registering time-lock, the combination of the hour-wheel operatively connected with time mechanism, a dial-plate located in front of and rotatable with said hour-wheel, an impression-receiving dial carried by said plate, a snail operatively connected with said hour-wheel, a follower in contact with said snail, a punch or perforating arm connected with the snail-follower, a rocking shaft provided with an arm to bear against the punch or perforating arm, an arm extending from the lower portion of the rocking arm, a screw or stud to prevent the accidental upward movement of the rocking arm, and means connected with key mechanism for actuating the rocking arm in the locking and unlocking operations, substantially as and for the purposes described.

10. In a registering time-lock, the combination of the hour-wheel and the dial-plate connected with a sleeve so that the wheel and plate may move in unison and one may move independently of the other when required, a pinion connected to said sleeve so as to move with the dial-plate, a toothed wheel and a snail operatively connected therewith, gears connecting said wheel and the pinion on the dial-sleeve, and a punch or perforating arm operatively connected with said snail, substantially as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN S. PHELPS.

Witnesses:
N. CURTIS LAMMOND,
M. M. MERRILL.