

T. A. KEEFER.
 RECORDING DEVICE.
 APPLICATION FILED MAR. 20, 1916.

1,273,114.

Patented July 16, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

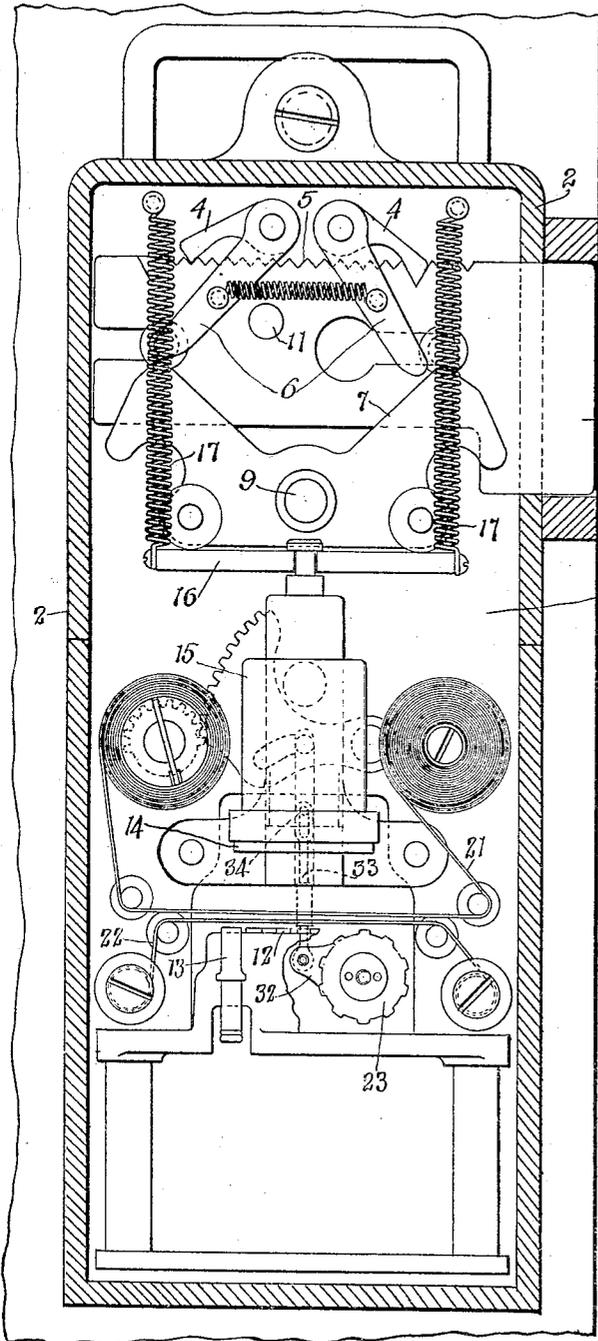


Fig. 2.

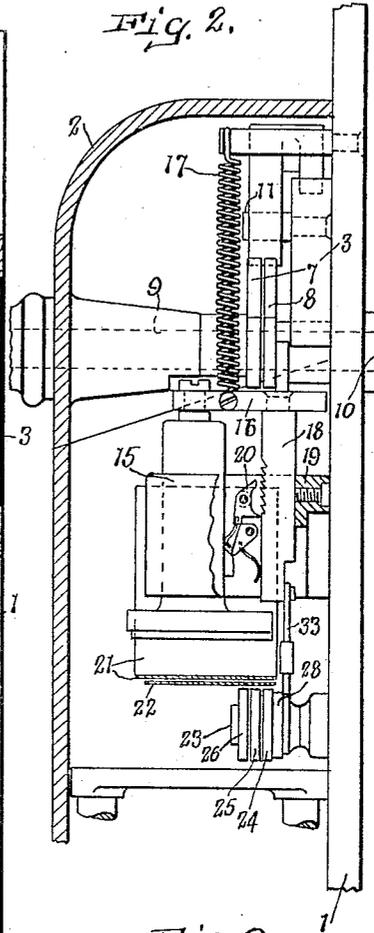
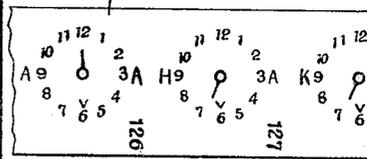


Fig. 9.



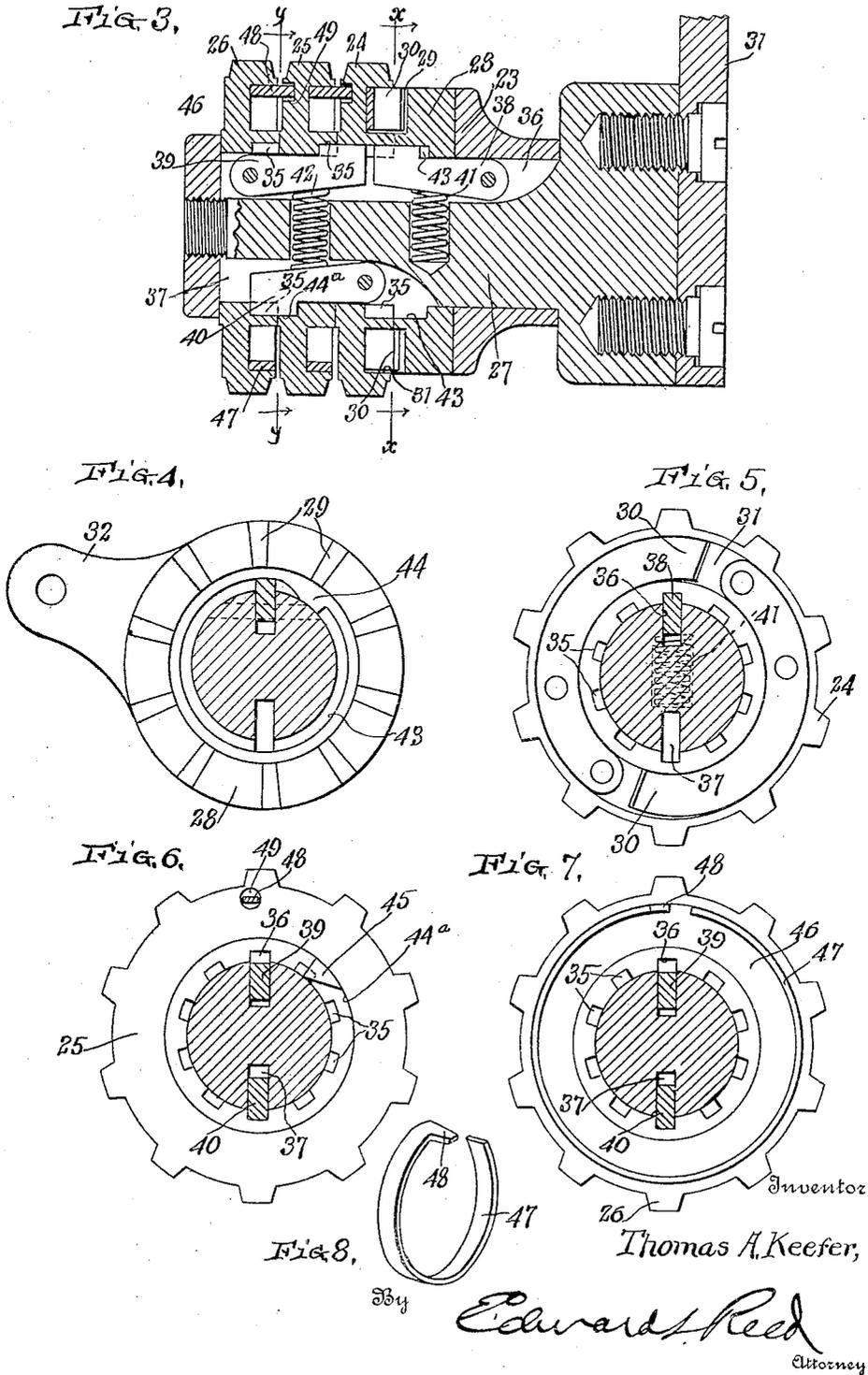
Inventor
 Thomas A. Keefer

334 Edward Reed
 Attorney

1,273,114.

T. A. KEEFER.
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2 SHEETS--SHEET 2.



UNITED STATES PATENT OFFICE.

THOMAS A. KEEFER, OF DAYTON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE DAYTON ADDING MACHINE AND TIME LOCK CO., OF DAYTON, OHIO, A CORPORATION OF OHIO.

RECORDING DEVICE.

1,273,114.

Specification of Letters Patent.

Patented July 16, 1918.

Application filed March 20, 1916. Serial No. 85,245.

To all whom it may concern:

Be it known that I, THOMAS A. KEEFER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Recording Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to recording devices and more particularly to recording locks. Recording locks are now in use which produce a printed record of each and every operation of the lock. These records may be removed by the proprietor of the store, or other room, to the door of which the lock is applied, or they may be removed by some person delegated for that purpose and delivered to the proprietor or manager, or to an operating company which prepares and delivers to the proprietor or manager a report of the operations of the lock. It is possible for an inaccurate report to be made, due to the failure, either accidental or fraudulent, of the person removing the record to deliver the complete and original record strip. One or more records might be torn from the record strip and destroyed, or the entire record strip might be destroyed and a fraudulent record strip prepared and substituted therefor.

The object of the invention is to prevent the delivery of an incomplete, or inaccurate, record by causing different marks or designations, such as consecutive numbers, to be applied to the several records to indicate the order in which they issue, thereby enabling a person examining the records to readily determine whether or not he has before him every record which has been made; and further to provide a marking or numbering device which cannot be manipulated or set back to cause a false mark or number to be placed on a record. To this end it is a further object of the invention to provide a counter, or the like, comprising a plurality of adjustable members such as counter wheels, and to separately lock a part or all of the adjustable members to prevent them from being adjusted, except in the regular and prescribed manner. It is also an object of the invention to provide a mechanism of this kind which will be simple in its construction and positive in its

operation, and which can be embodied in a recording device at a low cost.

In the accompanying drawing: Figure 1 is a front elevation of a recording lock with the casing in section and the mechanism partially broken away to show the invention applied thereto; Fig. 2 is a side elevation of such a lock, partly in section; Fig. 3 is a longitudinal sectional view taken centrally through the numbering device; Fig. 4 is a transverse section taken on the line $x-x$ of Fig. 3, looking in the direction of the arrows; Fig. 5 is a transverse section on the line $x-x$ of Fig. 3, looking in the direction opposite that indicated by the arrows; Fig. 6 is a transverse section taken on the line $y-y$ of Fig. 3, looking in the direction of the arrows; Fig. 7 is a section taken on the line $y-y$ of Fig. 3, looking in the direction opposite that indicated by the arrows; Fig. 8 is a detail view of one of the springs for actuating the counter wheels; and Fig. 9 is a view showing a portion of a record strip.

In the accompanying drawings I have illustrated the invention as embodied in a recording lock such as is shown in the application for patent filed by B. H. Ziehler and D. R. Rowe, Feb. 20, 1915, Serial No. 9,714, but it will be understood that this particular lock is used for the purpose of illustration only, and that the invention is not limited to recording locks of the type shown but may be embodied in recording mechanism of various kinds. This recording lock is fully shown and described in said application and I will herein show and describe only such portions thereof as are necessary to a clear understanding of the present invention.

The lock herein illustrated comprises a plate 1, which constitutes a supporting frame for parts of the mechanism, and also constitutes the base of the casing 2 which incloses the mechanism. Slidably mounted in the upper portion of the casing and on the frame 1 is a bolt 3, which is held normally against movement in either direction by detents 4, which engage the teeth 5 in the upper edge of the bolt, and which are provided with releasing arms 6. The actuating mechanism for the bolt comprises two actuating members, 7 and 8, mounted for separate movement about a common axis

and preferably on separate shafts 9 and 10, which extend to the opposite side of the door and are respectively provided with operating knobs. Each actuating device, 7 and 8, has parts arranged to engage a part of the bolt, such as a pin 11, and impart movement thereto, and these parts are also arranged to engage the respective releasing arms 6 and move the detents 4 into inoperative positions. Consequently, the bolt can be moved in either direction from either side of the door. As here shown, the knob on the inner side of the door is always free to rotate, but the knob on the outer side of the door is normally locked and must be released by means of a key before it can be rotated. The key-actuated controlling devices for this outer door are not here illustrated, as they form no part of the present invention.

Mounted in the casing 2 is a recording device which, as shown, comprises a normally fixed form consisting of a clock-operated printing dial 12, and a key-actuated, key identifying type bar 13. Cooperating with the forms is a reciprocatory platen 14 which is slidably mounted in a vertical bearing, or guideway, 15, and is connected at its upper end with a plate 16, which is held normally in an elevated position by springs 17, and is arranged in a position to be engaged by either of the actuating devices, 7 and 8, when moved in either direction, and to be depressed thereby to cause a record to be made upon each operation of either of said actuating devices. The plate 16, is preferably supported by a guide rod, or bar, 18, which is mounted in a vertical guideway, or bearing, 19, arranged parallel with the bearing 15. This guide rod is provided with full stroke mechanism, indicated as a whole by the reference numeral 20, which makes it necessary for the platen to complete its downward movement and make a record before it can return to its normal position. The record is printed on a strip of paper, or other suitable material, 21, which is fed between the two members of the printing couple by suitable feeding mechanism. Likewise an ink ribbon 22 is fed between the record strip 21 and the form to cause the form to print on the record strip. It will thus be apparent that a record will be made for each and every movement of the bolt.

In applying my invention to recording mechanism, either such as shown in these drawings or of any other suitable character, I provide a marking device which will print on each record made an identifying mark, such as a consecutive number, thereby connecting each record with the records which precede and follow the same, and making it impossible to remove any record

from the record strip without discovery. This marking device is shown in the form of a counter and preferably forms a part of the form of the recording mechanism, it being so arranged that it will be acted on by the platen which cooperates with that form. This arrangement, while not essential to the invention, is desirable because it avoids the use of additional parts, renders the mechanism more compact and enables the identifying mark to be placed on the record strip close to the other portions of the record. This marking device is operatively connected with a movable part of the recording mechanism, to cause it to be adjusted to make a different mark upon each operation of the recording mechanism. Preferably, the adjustable parts of the marking device are so locked against movement that they cannot be manipulated by hand to falsify the record, as for example, by setting back the marking device to cause it to print on the next record made a mark corresponding to the mark on a record which has been removed.

These results may be accomplished with mechanism differing more or less from the mechanism here shown, but the mechanism here shown accomplishes the desired result in a satisfactory manner. In this particular embodiment of the invention, the marking device comprises a counter, indicated as a whole by the reference numeral 23, and comprising a plurality of counter wheels, there being preferably three of these wheels. As here shown the units counter wheel is indicated by the reference numeral 24, the tens counter wheel by the reference numeral 25, and the hundreds counter wheel by the reference numeral 26. These counter wheels are mounted on a stud shaft 27 which is rigidly secured to the frame member 1. This stud shaft is so arranged as to support the counter in the rear of and close to the clock-operated printing dial, so that the counter will be in the path of the platen. To advance the counter upon each operation of the recording mechanism, and consequently upon each operation of the bolt, an operative connection is established between the units counter wheel and a movable part of the recording mechanism, and transfer mechanism is provided to transfer the count from the units counter wheel to the tens counter wheel, and from the tens counter wheel to the hundreds counter wheel. The connection between the units counter wheel and the recording mechanism may be of any suitable kind, but in the present instance I have mounted on the shaft 27, adjacent to the units counter wheel, an actuating device, which is here illustrated as a collar 28 rotatably mounted on the shaft and having pawl and ratchet connection with the units counter wheel. Preferably, that face of the

collar 28, adjacent to the counter wheel, is provided with teeth 29 which are engaged by two resilient pawls 30 which are secured to the units counter wheel and are preferably arranged in an annular recess 31, formed in that face of the counter wheel adjacent to the actuating collar. The collar is provided with an arm 32 which is connected by means of a pitman 33 with the guide rod 18, so that each reciprocation of this guide rod, and consequently either reciprocation of the platen and each movement of each of the actuating devices, 7 and 8, will advance the units counter wheel one step. The arrangement of the pawl and ratchet mechanism between the actuating collar 28 and the units counter wheel is such that the downward movement of the platen will cause the actuating collar to move in a reverse direction thus carrying the ratchet teeth past the pawls. The upward movement of the platen, after the record has been made, moves the actuating collar in the opposite direction and causes the teeth to operatively engage the pawls and thereby advance the counter wheel. Consequently, the counter is stationary during the taking of the record and does not begin its movement until after the platen has moved away from the form. To allow ample time for the platen to move clear of the form before movement is imparted to the counter, and also to permit the platen to have a longer stroke than is desirable for the counter actuating device, I have connected the pitman 33 with the guide rod by a slidable connection which permits of a certain amount of lost motion, this being preferably accomplished by a pin and slot connection, as shown at 34. Thus it will be noted that the operative movement of the counter will not begin until the platen has moved upward a distance equal to the length of the slot in the pitman. In this manner it will be apparent that each and every record made is provided with a consecutive number and consequently, if any record strip is delivered which does not contain consecutive record numbers, or in which the first number does not immediately follow the last number on the record strip last previously delivered, it will be apparent at once that the record is incomplete and proper investigation may be made.

To prevent a person having access to the mechanism of the lock from manipulating the counter wheels by hand, to cause them to produce a false record, I have provided means for locking a part or all of the counter wheels against movement at all times except during the normal operation thereof, through the connection with the recording mechanism. Preferably all the counter wheels are normally locked against movement in either direction, but very good protection can be had if the outer counter wheels, that is the tens and hundreds counter wheels, are so locked and the units counter wheel is provided with the usual detent to prevent rearward movement. Because of the arrangement of the counter the units counter wheel is difficult of access and it would be a very tedious operation to advance the same by hand sufficiently to enable a fraudulent record to be made. In the counter here shown, which is particularly designed for the recording mechanism described, I have provided separate detents for normally locking the respective counter wheels against movement in either direction, and have provided means controlled by the actuating device for the counter for releasing the respective counter wheels from these detents and adjusting the counter wheels to advance the count. As shown in Figs. 3 to 7, inclusive, each counter wheel is provided at one edge of its inner periphery, that is its bore, with an annular series of notches 35, there being one notch for each mark, or number, carried by the counter wheel, in the present instance ten. The supporting shaft 27 of the counter is provided with longitudinal recesses, or slots, 36 and 37, in which are mounted a series of detents arranged to cooperate with the respective counter wheels. As here shown the detent 38 acts upon the units counter wheel, the detent 39 acts upon the tens counter wheel, and the detent 40 acts upon the hundreds counter wheel. A spring 41, confined in a recess in the shaft, holds the detent 38 normally in one of the notches of the units counter wheel, while a spring 42 mounted in an opening of the shaft acts upon the detents 39 and 40 to move them outwardly into engagement with their respective counter wheels. The detent for each counter wheel is moved into its inoperative position by that part immediately preceding said counter wheel. In the case of the units counter wheel this preceding part is the actuating device, or collar, 28. while in the cases of the tens and hundreds counter wheel the preceding part is the adjacent counter wheel. In each instance the preceding part is provided with a projection, or cam, which at the proper time during the movement of that part will engage the detent for the adjacent counter wheel and move the same into its inoperative position. Further an operative connection is established between the particular counter wheel which has been released and the preceding part of the mechanism to advance that counter wheel. Thus I have combined with my locking mechanism a transfer mechanism for transferring the count from one counter wheel to the other. As shown in the drawings, the actuating collar 28 is provided along that edge of its inner periphery adjacent to the units counter wheel with a recess 43 which

may extend all, or a portion of, the distance about the bore of the collar. This recess is arranged to receive a portion of the nose of the pawl when the latter is in one of the notches 35 of the units counter wheel. Mounted within this recess in the collar is a cam 44 which is so arranged that upon the reverse movement of the actuating collar the cam will ride over the detent 38 and force the same out of the notch 35 of the counter wheel. The cam is provided with a dwell, or straight portion, of such a length that the detent will be held against upward movement until the forward movement of the actuating collar has caused the units counter wheel to be advanced a distance sufficient to move the notch therein out of alinement with the nose of the detent, thus preventing the detent from interfering with the adjustment of the counter wheel. When the actuating device has completed its stroke and the units counter wheel has been advanced one point another notch 35 of the counter wheel will be brought into alinement with the nose of the detent and the detent will enter this notch, thereby again locking the counter wheel against movement in either direction and holding it in this position until the actuating device is again operated. In Figs. 6 and 7, I have illustrated the detent and transfer mechanism between the tens counter wheel and the hundreds counter wheel, but it will be understood that this mechanism is identical with that between the units counter wheel and the tens counter wheel and the description of the mechanism of these figures will apply equally well to the connection between the other counters. As has been stated the hundreds counter wheel is provided at the right hand edge of its inner periphery with a series of notches 35 to receive the nose of the detent 40, which is normally held therein by the spring 42. The tens counter wheel is provided in that edge of the inner periphery thereof, adjacent to the hundreds counter wheel, with a circumferential groove, or recess, 44^a, which receives a portion of the nose of the detent 40 when the latter is in one of the notches in the hundreds counter wheel. Mounted within this recess is a cam 45 which is so arranged with relation to the figures on the periphery of the tens counter wheel, that the cam will engage the detent 40 and move the same into its inoperative position when the tens counter wheel has completed one revolution. Thus releasing the hundreds counter wheel and leaving the same free to advance with the tens counter wheel upon the next movement thereof. To cause the counter wheel which has been released to advance with the preceding counter wheel when the latter is next actuated, I have provided an operative connection between the two counter wheels which will permit the preceding counter wheel to move independently of the succeeding counter wheel when the latter is locked against movement, but will cause the succeeding counter wheel, when released, to move with the preceding counter wheel. In the present instance this connection is a frictional connection which will slip when the succeeding counter wheel is locked, but which will have sufficient grip upon the succeeding counter wheel to cause it to move when released. Preferably, the succeeding, or hundreds, counter wheel is provided in that face adjacent the tens counter wheel with an annular groove 46, and in this groove I have mounted a split ring 47 of resilient material which is of such a normal diameter that it will bear with considerable friction against the outer wall of the annular recess 46. This ring is provided with a laterally extending projection 48 which enters a recess 49 in the adjacent face of the preceding, or tens, counter wheel, thus connecting the ring, or frictional element, to the preceding, or tens, counter wheel in such a manner as to cause the ring to move at all times with that counter wheel. When the hundreds counter wheel is locked against movement, the resilient frictional member will slip over its cooperating frictional surface and will permit the preceding counter wheel to rotate. The friction is such, however, that as soon as the hundreds counter wheel is released it will be caused to move with the frictional element and consequently with the preceding counter wheel. Thus it will be apparent that when the tens counter wheel has advanced nine points, the hundreds counter wheel will be released and upon the next movement of the tens counter wheel the hundreds counter wheel will be advanced therewith, thus adding one to the tens counter wheel and moving the cam 45 of the tens counter wheel past the detent 40 and permitting the latter to move into the next notch 35 of the hundreds counter wheel, thereby again locking the latter against movement. It will be understood, of course, that the frictional connection between the units counter wheel and the tens counter wheel is so regulated that it will advance both the tens counter wheel and the hundreds counter wheel when the latter is released.

The operation of the mechanism has been fully described in connection with the description of the several parts thereof, and it will be apparent that I have not only provided a mechanism which will consecutively mark the records to enable their consecutive relation to be readily determined, and have so constructed this mechanism as to prevent its being manipulated to fraudulently change the marks, but that I have provided a device of this kind which is of a very simple construction, which requires the addition of but a few parts to the recording

mechanism, which is positive in its operation and which can be manufactured and added to the recording mechanism at a comparatively low cost.

5 I wish it to be understood that I do not desire to be limited to the details of construction shown and described, as obvious modifications will occur to a person skilled in the art.

10 Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent is:—

1. In a recording lock, a bolt, recording mechanism comprising a form and a platen, 15 one of said members being movable toward and from the other to cause a record to be taken from said form on a record strip, said form including a numbering device, means to actuate said movable member to cause a 20 record to be taken from said form upon each operation of said bolt, and means controlled by the movement of said movable member to adjust said numbering device to cause a different number to be recorded upon each 25 operation of said recording mechanism.

2. In a recording lock, a bolt, recording mechanism comprising a normally fixed form including a numbering device, a platen movable toward and from said form to 30 cause a record to be taken from said form on a record strip, means to actuate said platen to cause a record to be taken from said form upon each operation of said bolt, and means actuated by the movement of said 35 platen to adjust said numbering device to cause a different number to be recorded upon each operation of said platen.

3. In a recording lock, a bolt, recording mechanism comprising a form including a 40 numbering device, a reciprocatory platen, means for actuating said platen to cause a record to be taken from said form on a record strip upon each operation of said bolt, and an operative connection between said 45 actuating means and said numbering device to cause said numbering device to be adjusted to record a different number upon each operation of said bolt.

4. In a recording lock, a bolt, recording mechanism comprising a form including a 50 numbering device, a reciprocatory platen, a guide rod secured to said platen, means for actuating said platen to cause a record to be taken from said form upon each operation 55 of said bolt, and an actuating device for said numbering device operatively connected with said guide rod.

5. In a recording lock, a bolt, recording mechanism comprising a form having a part 60 to print a record pertaining to the movements of said bolt, and also having a numbering device, a platen movable toward and from said form, means to actuate said platen

to cause a record to be printed from said form on a record strip upon each operation 65 of said bolt, and an operative connection between said platen and said numbering device to adjust the latter to cause a different number to be printed upon each operation 70 of said platen.

6. In a recording lock, a bolt, recording mechanism comprising a form and a platen, one of said members being movable toward and from the other to cause a record to be taken from said form on a record strip, said 75 form including a numbering device, means to actuate said movable member to cause a record to be taken from said form upon each operation of said bolt, means controlled by the movement of said movable member to 80 adjust said numbering device to cause a different number to be recorded upon each operation of said recording mechanism, and a locking device to hold said numbering device normally against adjustment in either 85 direction, said locking device being controlled solely by the operation of said recording mechanism.

7. In a recording lock, a bolt, recording mechanism comprising a form and a platen, 90 one of said members being movable toward and from the other to cause a record to be taken from said form on a record strip, said form including a numbering device, means to actuate said movable member to cause 95 a record to be taken from said form upon each operation of said bolt, means controlled by the movement of said movable member to adjust said numbering device to cause a different number to be recorded upon 100 each operation of said recording mechanism, and means to prevent said numbering device from being adjusted independently of the operation of said recording mechanism.

8. In a recording lock, a bolt, recording mechanism including a counter, means to 105 actuate said bolt and said recording mechanism, means to adjust said counter upon each operation of said bolt, and means to prevent the adjustment of said counter except 110 when said bolt is operated.

9. In a recording lock, a bolt, recording mechanism including a counter, an actuating device for said bolt, an operative connection between said actuating device and 115 said counter to adjust the latter to cause a different record to be made upon each operation of said bolt, means to normally lock said counter against adjustment, and means 120 to release said locking means upon each operation of said bolt, said releasing means being controlled solely by said actuating device.

In testimony whereof, I affix my signature hereto.

THOMAS A. KEEFER.