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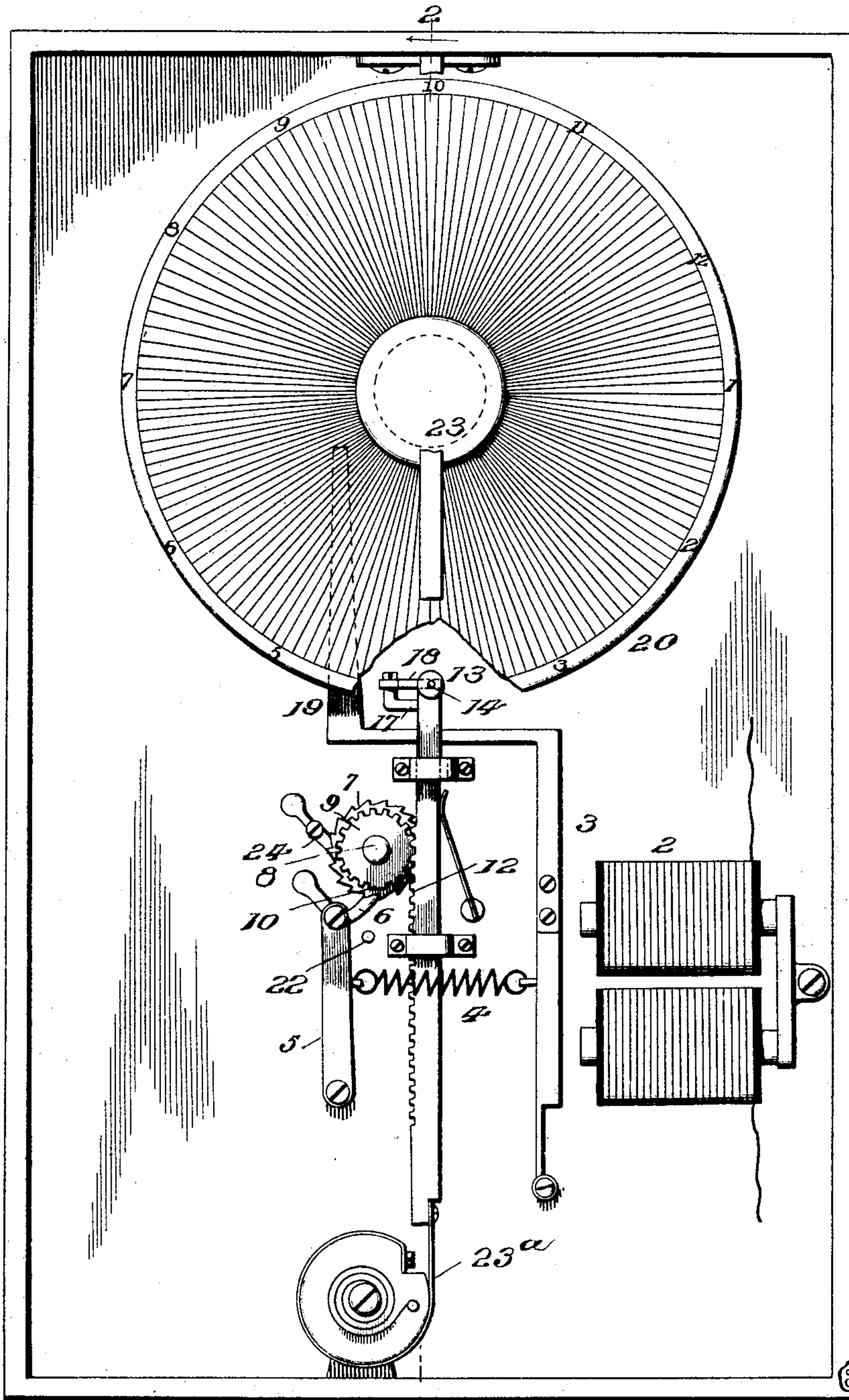
Patented July 15, 1902.

C. J. ROACH.  
RECORDER.

(Application filed Nov. 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Inventor

Christopher J. Roach

Witnesses

FIG. 1.

*John J. ...*  
*Charles H. ...*

By

*Robert H. ...*

Attorney

No. 704,925.

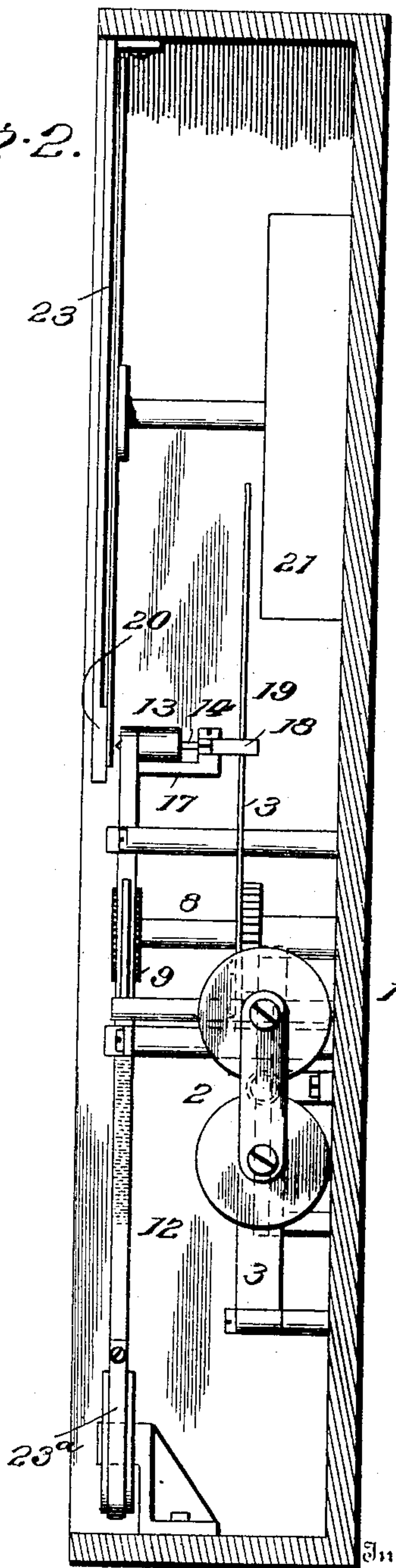
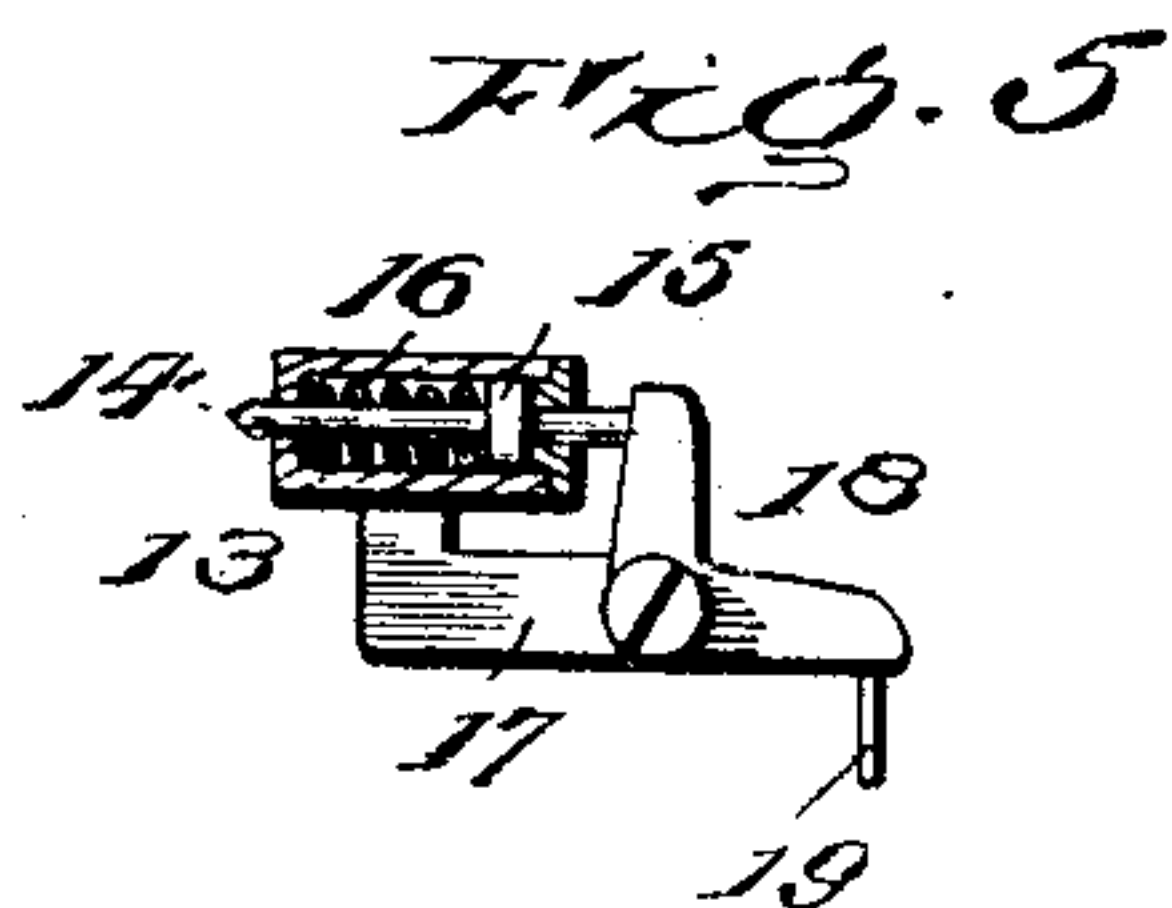
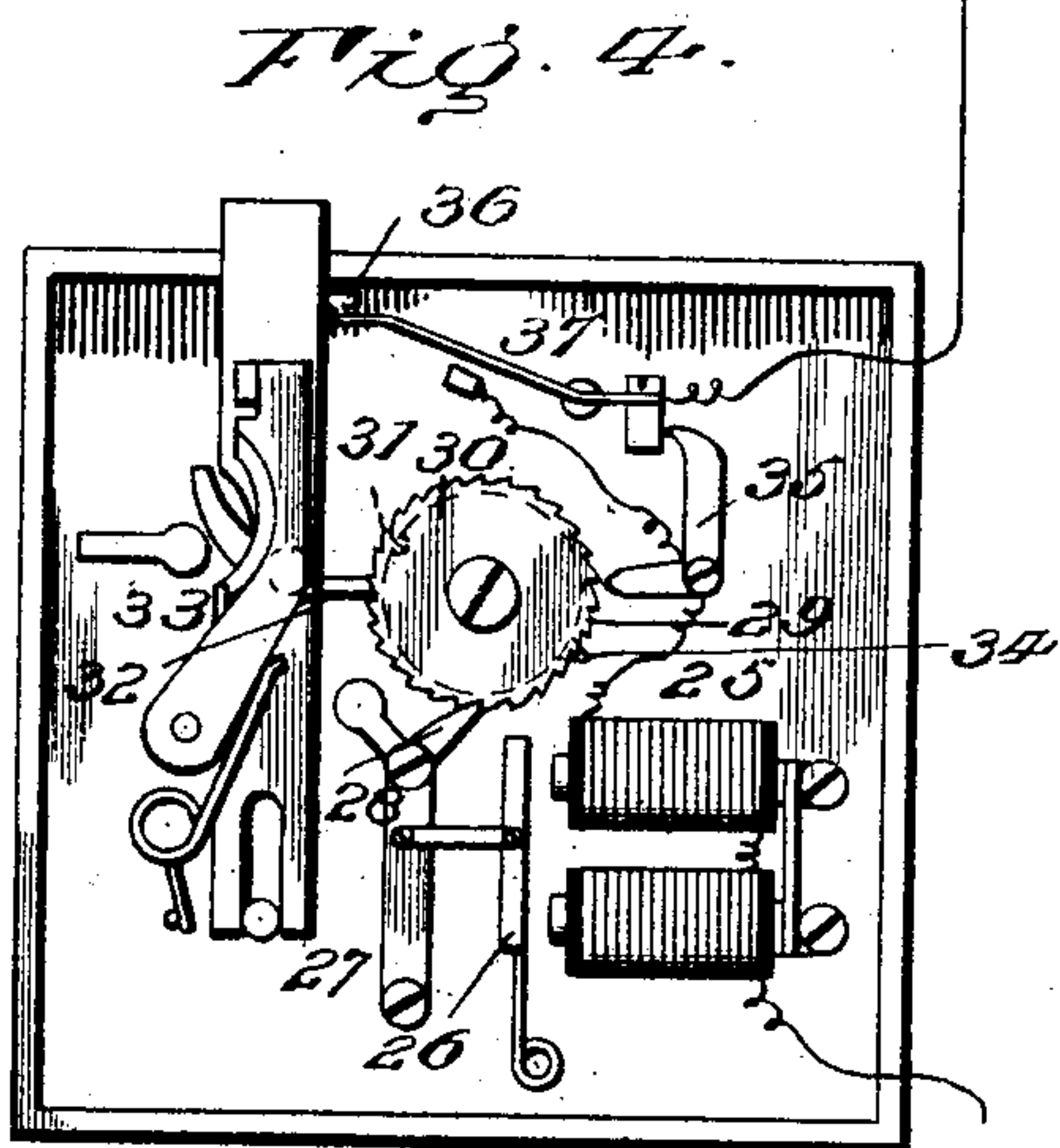
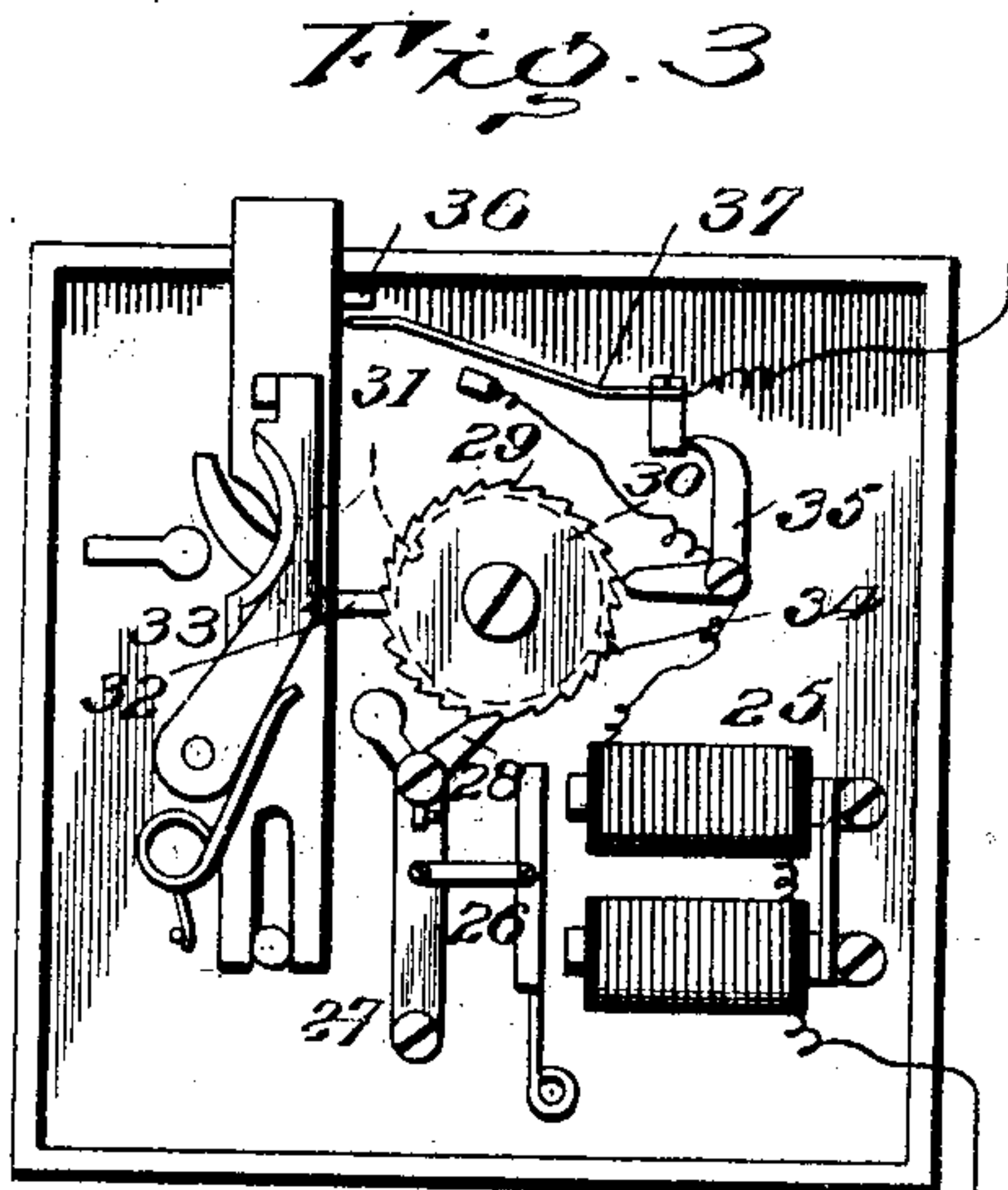
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No Model.)

2 Sheets—Sheet 2.



Witnesses:

*Wm. H. ...*  
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# UNITED STATES PATENT OFFICE.

CHRISTOPHER J. ROACH, OF HARTFORD, CONNECTICUT.

## RECORDER.

SPECIFICATION forming part of Letters Patent No. 704,925, dated July 15, 1902.

Original application filed October 2, 1901, Serial No. 77,323. Divided and this application filed November 27, 1901. Serial No. 83,945. (No model.)

*To all whom it may concern:*

Be it known that I, CHRISTOPHER J. ROACH, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Recorders; and I do hereby 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.

This invention relates to improved means for automatically recording the time at which any one of a series of circuit-closing locks or their equivalent is operated.

The primary object of the invention is to provide a simple and highly-efficient recorder for use in conjunction with a series of electrically-connected locks of the character outlined in my application for patent filed October 2, 1901, Serial No. 77,323, of which this is a division. In that application I showed and described a system of locks for mail-boxes, the several locks being electrically connected in series, to the end that they may be opened only successively. It is important that the fact and time of opening each box of the series should be indicated or recorded at a central point—as, for instance, at the post-office of the district to which the several boxes belong.

The present invention has reference to the means for recording the opening of each box within the series of which the recorder forms part, and means comprehending such improvements will hereinafter be fully described, and the invention will be particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of the recorder, a portion of the dial being broken away. Fig. 2 is a longitudinal sectional view on line 2 2, Fig. 1, the clock mechanism being omitted. Figs. 3 and 4 represent two locks in conjunction with which the recorder may be used, the cover-plates of the locks being omitted. Fig. 5 is an enlarged detail.

Referring to the drawings, 1 designates an inclosing case wherein is located a magnet 2, which is in circuit with a series of locks connected in series, two of such locks being indicated in Figs. 3 and 4. The armature 3 of magnet 2 is connected by a spring 4 to a le-

ver 5, fulcrumed at one end. At its free end this lever carries a pawl 6, adapted to engage a ratchet-wheel 7, mounted on arbor 8. Also upon this arbor is a gear-pinion 9, having a segmental toothless or smooth portion 10, equal in length to the space of two teeth. This gear-pinion meshes with a rack-bar 12 and effects the longitudinal movement thereof in one direction. On one end of this rack-bar is mounted a small cylinder or housing 13 of a punch or marker 14, having a collar 15, engaged by a spring 16, which serves to normally hold the punch or marker withdrawn. Upon an arm 17, projecting from rack-bar 12, is fulcrumed a bell-crank lever 18, one arm of which is designed to engage the punch and force the same outward as against its spring when the other arm of the lever is engaged by an extension 19 of armature 3.

A paper dial 20 is designed to be actuated by suitable clock mechanism (not shown) located within a chamber 21. (Shown in Fig. 2.) This dial is divided into twelve equal parts, representing the hours, while the subdivisions of each part represent five minutes each.

The energizing of magnet 2 will attract armature 3, causing lever 5 to move sufficiently to effect the turning of ratchet-wheel 7 the extent of one tooth, any further movement of the lever being limited by a stop 22. The turning of gear-pinion 9 in conjunction with the turning of the ratchet-wheel will move rack-bar 12 toward or over one face of the paper dial. When lever 5 is brought up against stop 22, the spring 4 will allow the armature to move to its magnet, and in doing so the extension 19 thereof will engage lever 18 and actuate the same to cause the projection of the punch and the forcing of the point thereof into or through the dial, thus recording the time at which a mail-box is opened and indicating by the number of punches at the end of the operation of the entire series the exact time at which each box thereof was opened. A bar 23, (shown broken away in Fig. 1,) extending over one face of the dial, serves as an anvil or resistance of the punch to prevent tearing the paper. As soon as the punch has performed



its work the circuit will be broken and the spring 4 will return armature 3 to its normal position, the lever 5 likewise resuming its normal position, and the spring 16 will again withdraw the punch.

One revolution of gear-pinion 9 determines the extreme forward movement of rack-bar 12, so that when the segmental toothless portion 10 is brought into contact with the rack-bar the latter will be thrown out of engagement with the teeth of the pinion. Thereupon coil-spring 23<sup>a</sup>, attached to the outer end of the rack-bar, will return the latter to its starting-point in readiness for a second operation. When, therefore, the circuit is first closed, as upon the opening of the first mail-box of the series, the segmental toothless portion of pinion 9 will be caused to move out of engagement with the rack-bar without advancing the position of the latter and at the same time the first hole in the dial will be made. When the circuit is next closed, the bar will be then moved forward the extent of one tooth, as before described. A dog 24 prevents the backward movement of the ratchet-wheel and pinion when the rack-bar is being returned to its starting-point.

To the end that the use and application of my present invention, in conjunction with the system for which it is specially designed, may be understood, I have illustrated and shall now describe the general features of the mail-box locks.

Each lock is the duplicate of the other; but the controlling mechanism of all the locks—that is, the means which allows them to be opened or operated—is differently set and relatively arranged so that all the locks in a series must be successively actuated—that is, in a step-by-step order. The description of one lock will apply to all. In each lock is a magnet 25, the armature 26 of which is connected to a lever 27, which carries a pawl 28, engaging a ratchet-wheel 29. Fast to this ratchet-wheel is a tumbler 30, having a notch 31, which, when in line with a lever 32 on the locking-bolt 33, allows the latter to be withdrawn. A trip-lip 34 of the tumbler engages a circuit-closing lever 35 for breaking the circuit when the tumbler-notch is in line with lever 32. The relative arrangement of the controlling mechanism of the several locks is such that when the trip-lip of the first lock acts on its circuit-closer the trip-lip of the second lock is moved a point nearer its contact-lever and a corresponding movement occurs in all the remaining locks. Upon the insertion of a key in the first lock bolt 33 thereof may be withdrawn or turned back, its tumbler-notch being in line with the bolt-lever, and upon such withdrawal of the bolt the pin 36 thereof engages a second circuit-closer 37, thereby reestablishing or again closing the circuit previously broken through the circuit-closer 35. Thus the ratchet-wheels of the several locks will be again rotated the extent of one tooth, and the second lock of the series may

then be operated upon the insertion of a key; but the locks of the series must be opened successively, beginning with the first and ending with the last. The number of the teeth of ratchet-wheel 7 of the recorder corresponds to the number of ratchet-teeth of wheels 29 of the lock-controlling mechanisms, with which it is designed to move in unison. In the drawings the ratchet-wheel 7 and the ratchet-wheels 29 are shown as equipped each with twenty-four teeth, representing twenty-four boxes comprised within a series or district. If a lesser number of boxes be used than there are teeth in the ratchet-wheels, such wheels can be made to travel a greater distance at each operation. For instance, if there were but six boxes the wheels could be made to travel the extent of four teeth at each operation. It is not necessary, therefore, to substitute different ratchet-wheels. In practice each time one of the locks of the series is actuated by the withdrawal of its bolt the circuit in which the magnet 2 of the recorder is included will be established the latter will be actuated and the fact and time of such operation of the lock will be indicated, the dial being moved by the clock.

No claim is herein made to the lock mechanism or to the system independently of a recorder, since the same forms the subject-matter of my before-noted application for patent.

I claim as my invention—

1. The combination with a recorder having controlling mechanism, a series of locks, an electric circuit embracing all the locks and the recorder, said locks having controlling mechanisms so arranged relatively that each lock may be opened only in its successive order, means in each lock for breaking the circuit as its respective controlling mechanism is set to allow the lock to be manually operated, and means for closing the circuit as each lock is so operated so that the controlling mechanisms of all the locks and that of the recorder will be actuated, as set forth.

2. The combination of a recorder, a series of locks, such locks and recorder being electrically connected together, controlling mechanism in the several locks relatively arranged so that each lock can be opened only in its successive order, means for actuating the recorder and the controlling mechanism upon the closing of the circuit, means for breaking such circuit as the controlling mechanism of any one lock of the series is positioned to permit of the manual operation of such lock, and means for reestablishing such circuit when such lock is so operated, the recorder being actuated upon the operation of each lock.

3. The combination of a time-recorder, a series of locks electrically connected together and with said recorder, controlling mechanism for the several locks relatively arranged so that upon the closing of the circuit the controlling mechanisms of all the locks will be actuated but that of only one lock at a



time will be positioned to permit of the operation of such lock, means for breaking the circuit as the mechanism of one lock is so positioned, and an auxiliary circuit-closer for each lock designed to be actuated by the withdrawal of the bolt of any one lock, whereby the controlling mechanism of all the remaining locks will be actuated as will also the recording mechanism of the time-recorder, as set forth.

4. The combination of a series of locks and a time-recorder, said locks being electrically connected to each other and to the time-recorder, each lock having controlling mechanism and means to break the circuit as such mechanism of any one lock is positioned to permit of the withdrawal of the bolt thereof, means for closing such circuit by such withdrawal of the locking-bolt, said time-recorder having mechanism actuated upon the closing of the circuit in any one of the locks, a recording-dial, and a marker for indicating thereon when the circuit is closed by the withdrawal of the bolt of any one of the locks, as set forth.

5. The combination with a series of locks electrically connected together and having controlling mechanism operated in step-by-step order upon the closing of the circuit, means for breaking the circuit as the controlling mechanism of any lock is brought into position to permit of the withdrawal of the bolt thereof, the controlling mechanisms of the several locks being relatively arranged so that each lock may be opened only in its successive order, and means for reestablishing the circuit upon the withdrawal of the bolt of any one lock, of a time-recorder in electric circuit with said locks having recording mechanism actuated as the circuit is reestablished by the withdrawal of the bolt of any lock of the series, as set forth.

6. In combination with a series of locks electrically connected together and having controlling mechanism relatively arranged so that each lock may be opened only in its successive order, of a time-recorder in circuit

with said locks, such recorder having controlling mechanism corresponding to that of the locks, means for actuating the controlling mechanism of the locks and recorder upon the closing of the circuit in the operation of any one of the locks, and means actuated by the controlling mechanism of the recorder for indicating the time at which any lock is manually operated, as set forth.

7. In a time-recorder, a dial, a marker, a longitudinally-movable rack-bar carrying the latter, a toothed pinion engaging the rack-bar, means for rotating such pinion, a magnet for actuating such means, and means for operating such marker, such latter means being also operated by the magnet, as set forth.

8. In a time-recorder, a dial, a marker, a longitudinally-movable rack-bar carrying the latter, a toothed pinion engaging the rack-bar, having a segmental toothless portion, means for rotating such pinion, a magnet for actuating such means, means for operating such marker also actuated by the magnet, and means for returning the rack-bar to its normal position when it is engaged by said segmental toothless portion, as set forth.

9. The combination, in a time-recorder, of a recording-dial, a magnet and its armature, a ratchet-wheel, a pawl engaging therewith, a lever carrying such pawl, said lever being connected to said armature, a gear-pinion carried by the ratchet-wheel, a rack-bar with which such pinion engages, a marker on said rack-bar, a lever engaging such marker and designed to be actuated by the armature, said pinion having a segmental toothless portion, and a spring connected to said rack-bar for returning the same to its normal position when the bar is engaged by said toothless portion, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHRISTOPHER J. ROACH.

Witnesses:

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WM. C. RODGERS.