(No Model.) 2 Sheets—Sheet 1.

F. W. COLE.

SUCCESSIVE NON-INTERFERENCE SIGNAL BOX.

No. 445,800. Patented Feb. 3, 1891.

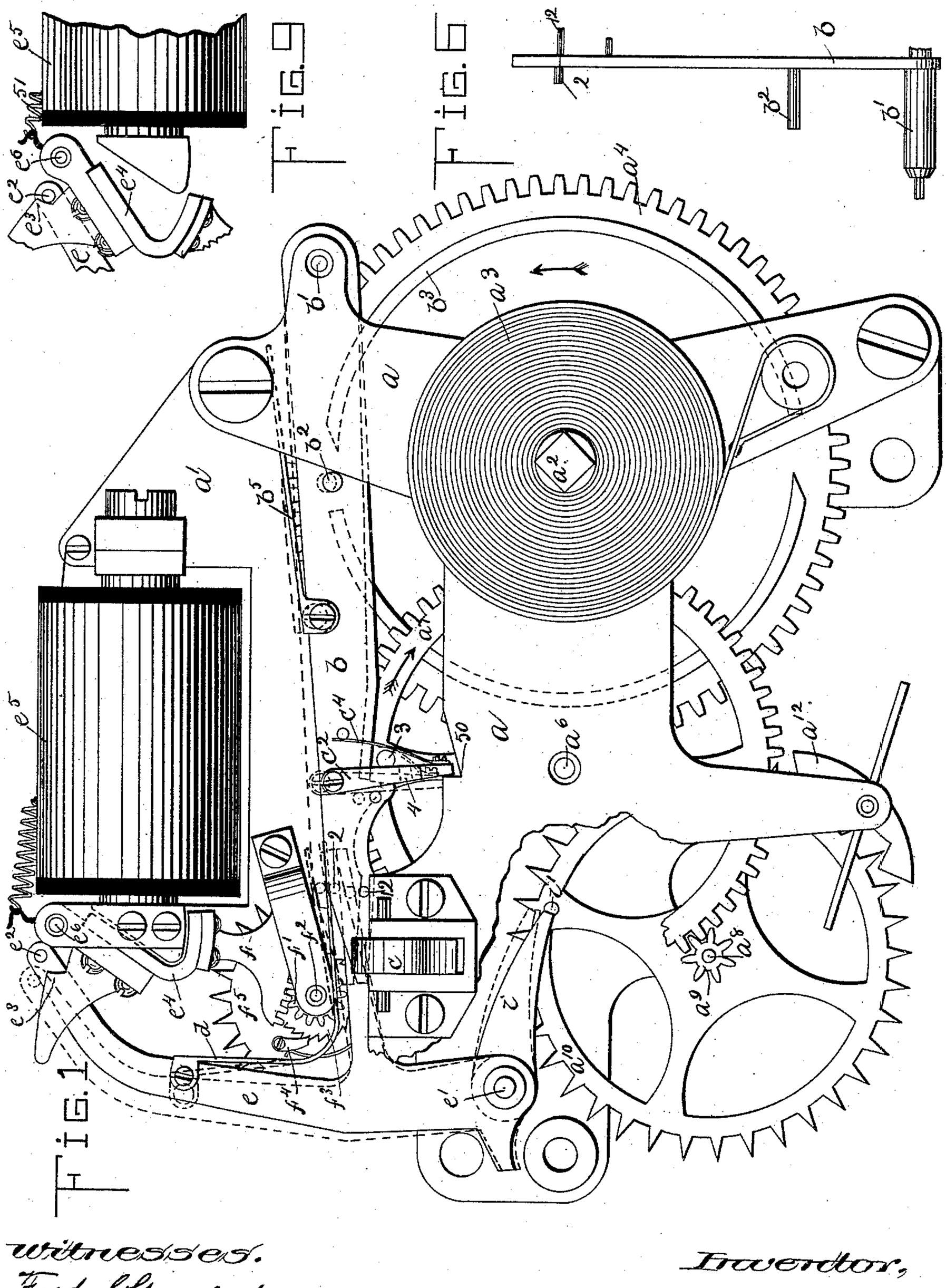

FIG. 1.

Witnesses.
Fred. L. Granbaf
Frederick L. Emery

Inventor,
Frederick W. Cole,
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(No Model.) 2 Sheets—Sheet 2.

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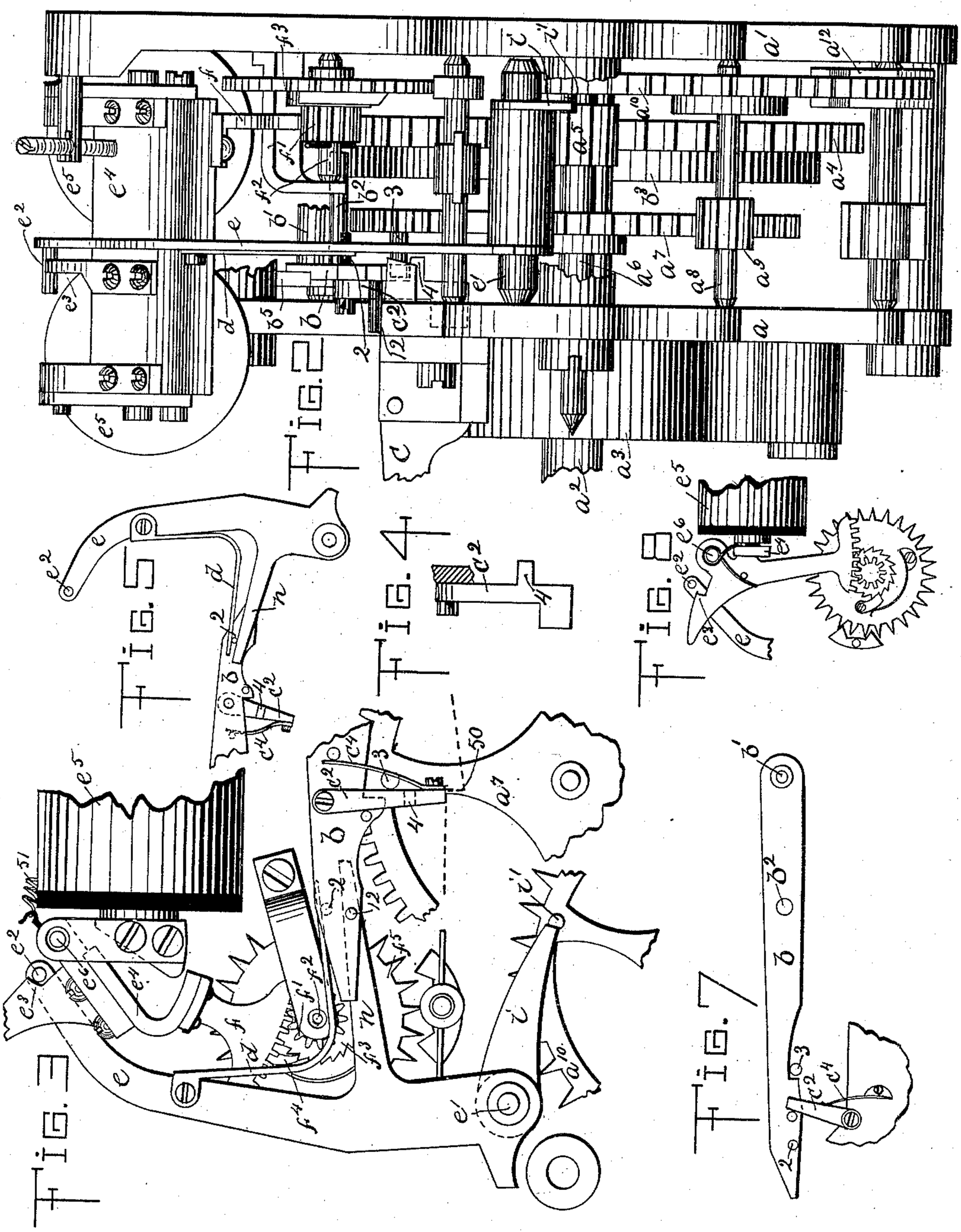

FIG. 2.

FIG. 5.

FIG. 4.

FIG. 6.

FIG. 3.

FIG. 7.

Witnesses.
Fred. S. Grinnell
Frederick L. Emery

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UNITED STATES PATENT OFFICE.

FREDERICK W. COLE, OF NEWTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO MOSES G. CRANE, OF SAME PLACE.

SUCCESSIVE NON-INTERFERENCE SIGNAL-BOX.

SPECIFICATION forming part of Letters Patent No. 445,800, dated February 3, 1891.

Application filed May 31, 1890. Serial No. 353,845. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. COLE, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in Successive Non-Interference Signal-Boxes, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve the construction of non-interference fire-alarm boxes.

In accordance with this invention a motor mechanism, starting-lever, and actuating-lever are employed, the starting-lever having suitable means by which when raised it will be held in elevated position until the signaling mechanism has operated. A non-interference magnet is also employed, the armature of which has a locking projection, and a locking-lever is provided, which is acted upon by the starting-lever and which co-operates with the locking projection of the armature of the non-interference magnet, said locking-lever controlling the signaling-train. Means are also provided for returning the parts to their normal position just as or before the signaling mechanism is brought to rest.

Figure 1 shows in front elevation the signaling mechanism of a fire-alarm box embodying this invention; Fig. 2, an end view of the signaling mechanism shown in Fig. 1; Figs. 3, 4, 5, 6, and 9, details to be referred to, and Figs. 7 and 8 modifications to be referred to.

The main frame-work comprises the side plates a a'. A shaft a^2 is journaled in the frame-work, upon which the main spring a^3 is wound, said shaft having mounted upon it the driving-pinion a^4. A ratchet-wheel (not shown) is fixed to the shaft a^2, and a pawl is fixed to the face of the driving-wheel a^4, so that as the shaft is turned in one direction the spring will be wound, which acts when released to drive the motor mechanism. The driving-wheel a^4 meshes with a pinion a^5, (see dotted lines, Fig. 1,) fixed to a shaft a^6, journaled in the frame-work. A toothed wheel a^7 is also fixed to the shaft a^6, which meshes with a pinion a^9, fixed to a shaft a^8, journaled in the frame-work. An escape-wheel a^{10} is fixed to the shaft a^8, with which co-operates the pallet a^{12}.

The starting or main controlling lever b is pivoted to the frame-work at b', and has a pin b^2, which enters a cut-away portion or notch in a flange having, as herein shown, two such cut-away portions or notches. A spring b^5 is employed to normally hold the starting-lever b in engagement with the driving-wheel a^4, and a pin 12 near the outer end of said lever, striking on the frame or other fixed part, limits its movement in the direction of the force of the spring. A pivoted arm or actuating-lever c is employed to lift the starting-lever. A prop c^2 is provided for holding the starting-lever in its elevated position, or in position to allow the train to operate, it being represented in Figs. 1 to 4 as pivoted to the front side of the starting-lever. The outer or lower end of the prop bears against a projection or shoulder 50, formed on the frame or other part, and a spring c^4 presses on the prop, acting to throw said prop over upon the shoulder 50, as shown by dotted lines, Fig. 1, and full lines, Fig. 3, when the starting-lever is lifted, to thereby hold the lever in its elevated position. The starting-lever, when once moved by the actuating-lever to start the train, will thus be held in suspension or propped up until the said prop is restored to its normal position. Near the outer end of the starting-lever a pin 2 is secured, (see Figs. 5 and 6,) upon which bears one end of a spring d, the opposite end of which spring is attached to a locking-lever e, fixed to a shaft e'. This spring d is bent, as shown, so that when its outer or free end is lifted the lever e will be moved toward the left, rocking the shaft e'. An arm i is secured to said shaft e', which engages a pin i' on the escape-wheel to hold the train at rest. The locking-lever e has a pin e^2 at its upper end, which is adapted to engage a shoulder formed on a projection e^3 on the armature e^4 of the non-interference electro-magnet e^5. The armature is herein shown as an angular bar pivoted at e^6, although any other form may be employed. The non-interference magnet e^5 is included directly in the signaling-circuit. A sector f is secured to or controlled by the armature e^4, which engages a toothed wheel f',

fixed to a shaft f^2. A ratchet-wheel f^3 is also fixed to said shaft f^2, which is engaged by a pawl f^4, secured to the face of an escape-wheel f^5, mounted loosely on the shaft, a suitable pallet being employed to co-operate in usual manner with the escape-wheel. As the armature is attracted, the pinion f', ratchet-wheel f^3, and escape-wheel f^5 are revolved, thereby retarding its movement; but said armature upon being retracted by the action of the retractile spring 51 simply turns the pinion f' and the ratchet-wheel f^3 in the opposite direction. This retarding device enables the armature to be retracted freely or quickly and attracted slowly.

In Fig. 8 the retarding device is shown on the locking projection e^3 instead of on the armature e^4, yet substantially the same results are produced.

When it is desired to transmit the fire-alarm signal, the armature e^4 being normally attracted and occupying the position shown in Fig. 1, and the locking-lever e off from the projection e^3, the starting-lever b is lifted, as above described, its outer end raising the spring d, causing the locking-lever e to move farther toward the left until the arm i, fixed to the shaft e', is moved sufficiently to disengage the pin i' of the escape-wheel a^{10}, thereby releasing the motor mechanism. As the train of wheel-work revolves, the lever b is further raised by the inclined face of the flanges b^3 A pin 3 is secured to the wheel a^7, which, it will be understood, makes four complete revolutions while the driving-wheel a^4 makes one-half of a revolution, and as the said pin returns to its normal position on the completion of the fourth revolution it strikes a pin 4 on the prop c^2 and returns the latter to its normal position, so that as the parts all resume their normal position the starting-lever will also return to its normal position. An arm n is secured to or forms a part of the locking-lever e, and by the pin 2 the downward movement of the starting-lever strikes the top of said arm n and depresses it, thereby restoring the lever e to its normal position just as the starting-lever resumes its normal position. If, however, when the actuating-lever is moved a signal is being transmitted from another box, the armature e^4 will be found retracted, as shown in Fig. 3, or the locking projection e^3 retracted, as shown in Fig. 3, and as the starting-lever is lifted the prop c^2 will be moved toward the left by the action of the spring, as indicated by the dotted line, Fig. 1, and full lines, Fig. 3. The spring d allows the starting-lever to be lifted, as described, even though the locking-lever e is held in a fixed position, owing to its elasticity. With the parts in this position the train will be held by the locking-lever e, which is engaged and held by the projection e^3. As soon as the signal from the remote box has been completed or the condition of the circuit has been restored a sufficient length of time for the armature to be attracted or for the projection e^3 to resume its normal position the said projection e^3 will release the lever e, and the latter being moved away by the stored-up action of the spring d, raised or strained abnormally by the elevated starting-lever, will effect the release of the train in the manner before described. It will thus be seen that if the actuating-lever is operated to lift the starting-lever while another signal is being transmitted the mechanism will be set ready to be released as soon as the signal from the remote box has been completed.

In Fig. 7 I have shown the prop or holder for the starting-lever as pivoted to the frame and co-operating with a shoulder or pin on the starting-lever substantially the reverse of that shown in Figs. 1 to 5.

While I herein define the holder for the starting-lever as a "prop," I desire it to be understood that I consider as an equivalent therefor anything which will hold the starting or actuating lever in its abnormal position to set the train in readiness to run as soon as released, and thereby requiring no further action on the part of the operator.

I claim—

1. In a signal-box, the motor mechanism, starting-lever, and actuating-lever, combined with the plate having the shoulder 50, and the spring-controlled prop on the starting-lever, said prop when the starting-lever is lifted by the actuating-lever resting on the shoulder and holding the starting-lever in elevated position, substantially as described.

2. In a signal-box, the motor mechanism, starting-lever, and actuating-lever, combined with the shouldered plate and with a spring-controlled prop c^2, normally resting at one side of said shoulder, but resting on the top of the shoulder to hold the starting-lever in elevated position when lifted by the actuating-lever, and a pin on one of the wheels of the train for restoring said prop to its normal position, substantially as described.

3. In a signal-box, motor mechanism and starting-lever, combined with a prop for said lever and a locking-lever moved by said starting-lever, substantially as described.

4. In a signal-box, motor mechanism and starting-lever, combined with a prop for said lever and a locking-lever moved by and elastically connected with said starting-lever, substantially as described.

5. In a signal-box, a signaling-train, a non-interference magnet, and its armature, combined with a locking-lever for the signaling-train which is restrained from movement by the said armature when the latter is retracted, a spring to exert a tension on said locking-lever, and a lever separate from the armature for moving the spring to effect the movement of the said locking-lever in one direction when not restrained by the said armature, substantially as described.

6. In a signal-box, a signaling-train, a non-interference magnet, its armature, and a locking device moved by the armature, combined

with a locking-lever for the signaling-train, with which the locking device moved by the armature co-operates, and an actuating-lever for exerting a tension on the locking-lever by which it is moved when not engaged or as soon as released by the said locking device, substantially as described.

7. In a signal-box, the motor mechanism, starting-lever and actuating-lever, the non-interference magnet, and its armature having the projection e^3, combined with the locking-lever having the spring acted upon by the starting-lever, said locking-lever co-operating with the said projection, substantially as described.

8. In a signal-box, the motor mechanism, starting-lever and actuating-lever, the non-interference magnet, its armature, and the retarding device, substantially as described, therefor, combined with the locking-lever e, acted upon by the starting-lever and co-operating with the projection e^3 on the said armature, the arm i, and pin i', substantially as described.

9. In a signal-box, the motor mechanism, starting-lever and actuating-lever, the non-interference magnet e^5, and its armature having the locking projection, combined with the locking-lever e, the arm n thereon, and the spring d, substantially as described.

10. In a signal-box, the motor mechanism, starting-lever, and actuating-lever, combined with the non-interference magnet e^5, its armature, the locking projection e^3, the retarding device, the locking-lever, the spring d, attached to the said lever and acted upon by the starting-lever, the arm i, and pin i', substantially as described.

11. In a signal-box, a motor mechanism, starting-lever having the spring-controlled dog c^2, the actuating-lever for the starting-lever, and the notched plate, combined with the non-interference magnet, its armature, the retarding device, substantially as described, combined with the locking projection on the said armature, and the locking-lever acted upon by the starting-lever and co-operating with the said locking projection, substantially as described.

12. In a signal-box, the motor mechanism, starting-lever, the non-interference magnet, and its armature, combined with a three-armed lever, one of the arms of which controls the operation of the motor mechanism, another arm of which is elastic and is engaged by the starting-lever or actuator, and the other arm of which is engaged by a projection moved by the armature of the non-interference magnet, substantially as described.

13. In a signal-box, a motor mechanism, a non-interference magnet and its armature, and a locking-lever for said motor mechanism, controlled by said armature, combined with a starting-lever elastically connected with and to move said locking-lever, and a prop for said starting-lever, substantially as described.

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

FREDERICK W. COLE.

Witnesses:
BERNICE J. NOYES,
EMMA J. BENNETT.