

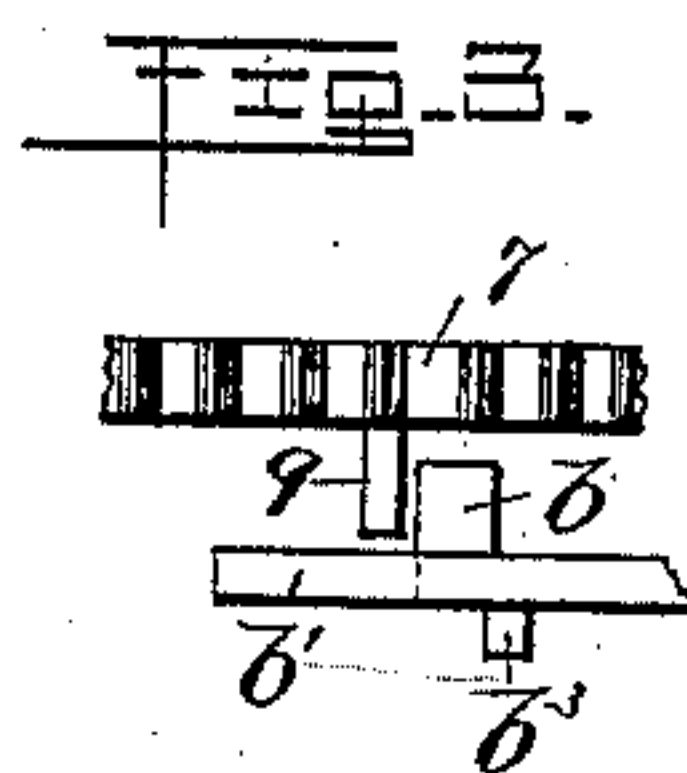
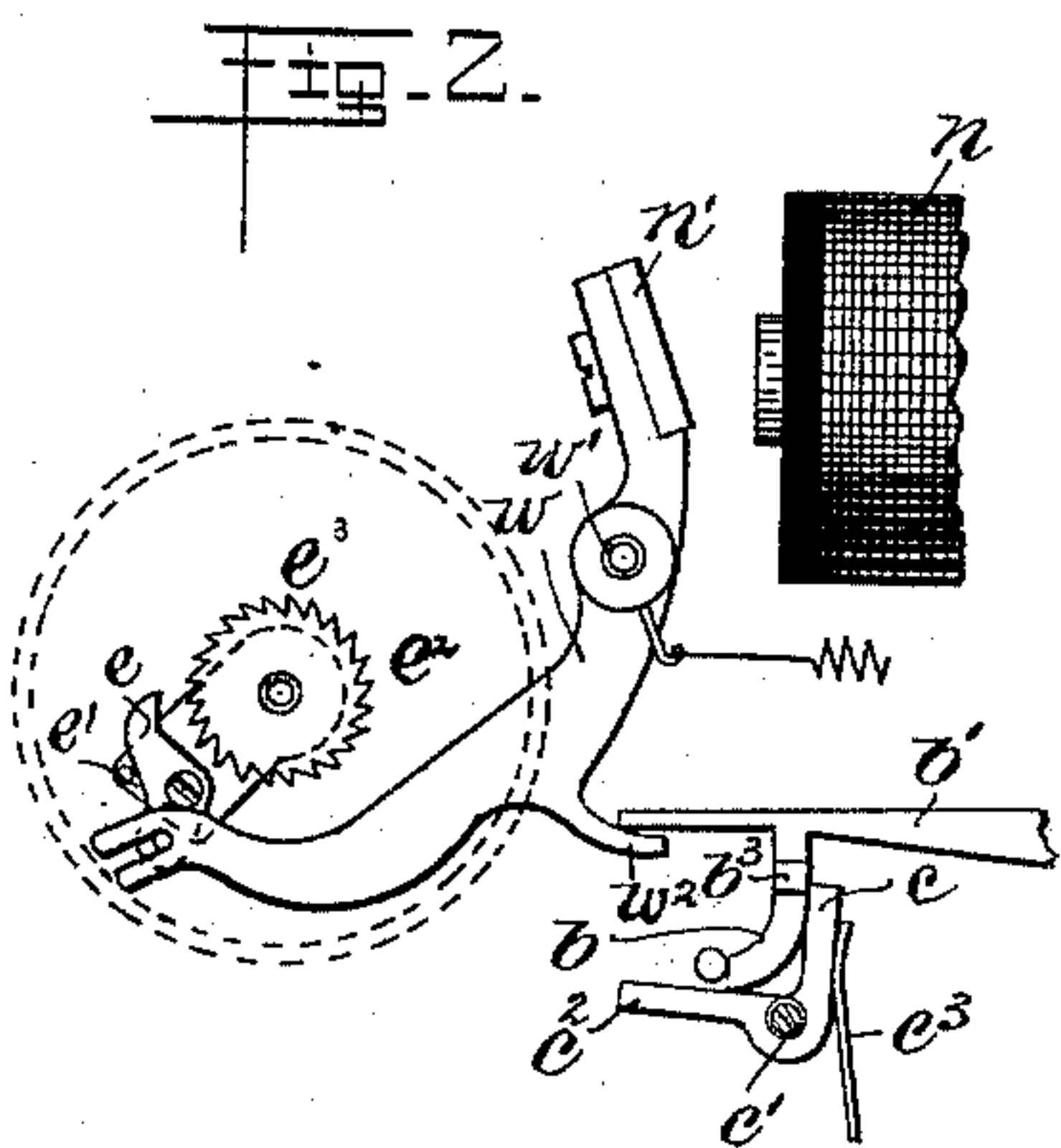
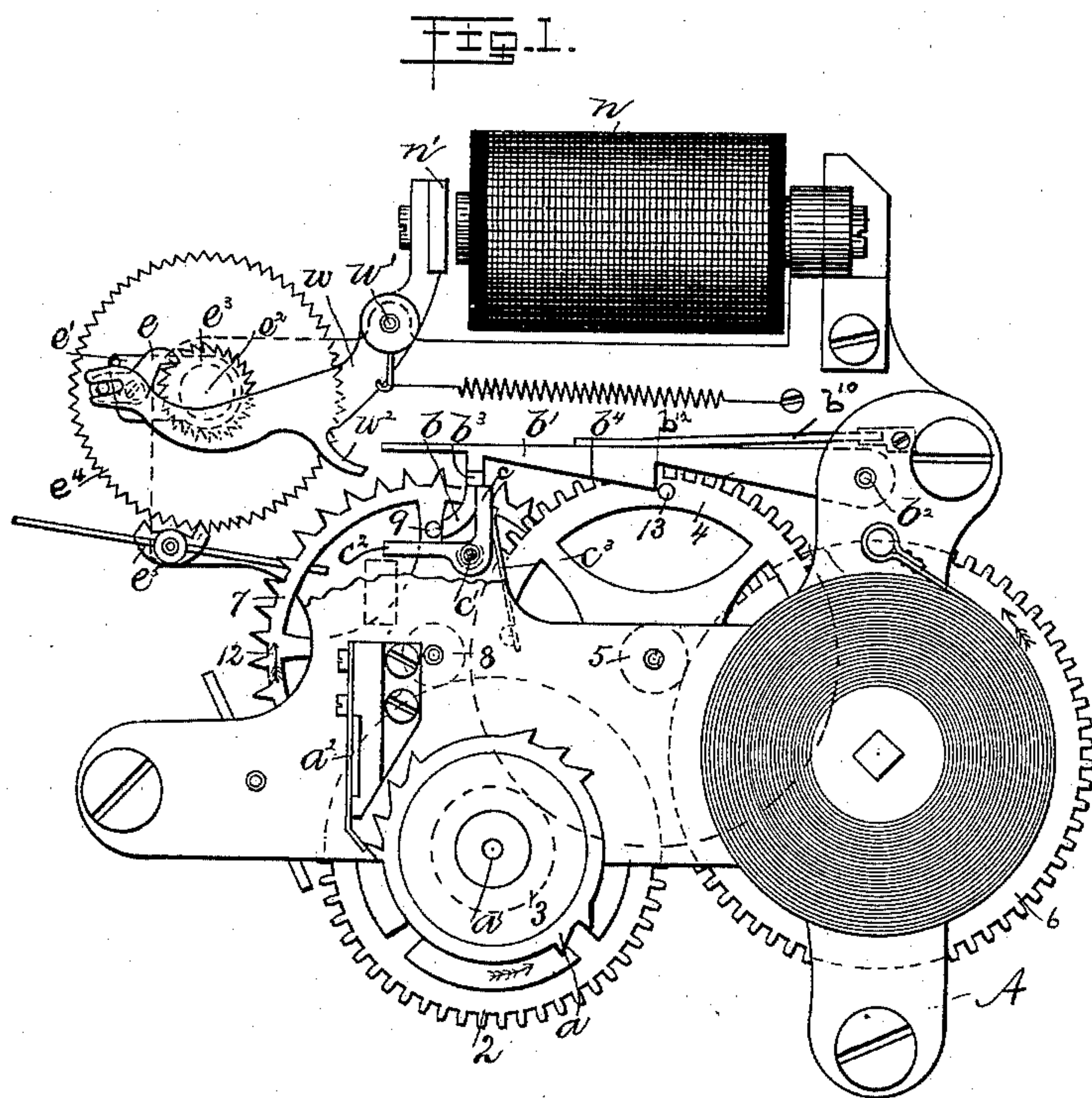
(No Model.)

F. W. COLE.

SUCCESSIVE NON-INTERFERENCE SIGNAL BOX.

No. 445,798.

Patented Feb. 3, 1891.



Witnesses:

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Frank 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. 445,798, dated February 3, 1891.

Application filed May 16, 1890. Serial No. 352,029. (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 boxes, the essential feature being the production of a successive box.

In accordance with this invention a signaling-train is employed comprising a circuit-changer, herein shown as a wheel secured to a shaft which is revolved by a motor. The signaling-train is controlled by a let-off, which is held in position against the tension of an actuating-spring by means of a detent which is controlled by the signaling-lever, or it may be by the signaling-lever itself. Means are provided for holding the said let-off in position to still hold the train after the signaling-lever has been operated, such means being controlled by the armature of a non-interference magnet. This holder for the let-off is herein represented as formed on or connected to the armature-carrying lever and so located with relation to the let-off as to be movable into and out of its path of movement by the movement of the armature. A retarding device is also herein shown, which co-operates with said holder to hold it in position to support the let-off a longer time than the longest closure in any signal.

Figure 1 shows in front elevation a signal-box embodying this invention; Figs. 2 and 3, details to be referred to.

The frame-work of the box A is of any suitable shape and construction to support the operating parts.

The signaling-train herein shown, and to which my invention is applied, consists of a circuit-wheel *a*, secured to a shaft *a'*, which has co-operating with it a contact pin *a²* and a train of gears for driving it, herein represented as a toothed wheel 2, pinions 3, (see dotted lines,) toothed wheel 4, pinion 5, (see dotted lines,) and toothed wheel 6, the latter

being arranged on or connected with the winding-arbor. An escape-wheel 7 is connected with the train by a pinion 8, which meshes with the toothed wheel 2. The motor mechanism thus described is normally wound up and the escape-wheel 7 has a pin 9, which is engaged by the arm *b* of the bar *b'*, pivoted to the main frame-work at *b²*. This bar *b'* and its arm *b*, or any equivalent device, constitutes the let-off for the motor mechanism or signaling-train and is acted on by a spring *b¹⁰*. The let-off is held in its elevated position, as shown in Fig. 1, against the tension of its actuating-spring by a movable member or prop *c*, pivoted at *c'*, one arm, as *c²*, of said movable member or prop being arranged to be directly engaged by the operator, or to be acted upon by an actuating lever or pull or other signaling-lever, and when said prop is moved from beneath the projection *b³* of the let-off the said let-off will be released, permitting the pin 9 to pass by the arm *b* in the direction of the arrow 12. When the train is released, the circuit-wheel revolves and transmits the desired signal.

The wheel 4 of the signaling-train has on it a pin 13, and the let-off has an inclined portion *b⁴*, which terminates at a recess *b¹²*. The wheel 4 makes one complete revolution for each signal, consisting, as herein shown, of three rounds of the circuit-wheel *a*, and hence the pin 13 describes a complete circle. With the parts at rest the pin 13 occupies a position in the recess *b¹²* at the termination of the inclined portion. After the box has been started and as the wheel 4 resumes its normal position the pin 13 will strike the under side of the inclined portion *b⁴* and will raise the let-off against the tension of its actuating-spring continuously until the pin passes by the said inclined portion and enters the recess *b¹²*, at which time the let-off will, as herein represented, fall a short distance. This pin 13 is the restoring-pin for the let-off. As the let-off is restored to its normal position and is lifted sufficiently high, the prop *c* will resume its normal position beneath the arm or projection *b³*.

The non-interference magnet *n* is provided, the armature *n'* of which is secured to a bent

or curved armature carrying lever w , pivoted at w' , said bent or curved lever being formed to present a holder or obstruction w^2 , which may be moved into the path of movement of the let-off to hold or obstruct it. When the holder w^2 is moved into the path of movement of the let-off and the latter is held up by the prop c , said holder lies a short distance below the let-off, so that if the let-off is released by removing the prop c at such time it will drop a short distance onto the holder, by which it will be caught and held. Such movement of the let-off is, however, not sufficient to release the pin 9, and thereby the train, but is sufficient to prevent the prop c resuming its normal position, it striking the projection b^3 , as shown in Fig. 2. With the parts in this position, the let-off being held by the holder, the signaling-train is entirely under the control of the non-interference magnet.

A retarding device is provided, herein shown as a pawl e , pivoted to a pawl-carrier e' , loosely mounted on a shaft e^2 , said pawl being turned on its pivot into and out of engagement with a ratchet-wheel e^3 by the armature-carrying lever. The ratchet-wheel e^3 is fixed to the shaft e^2 , and the escape-wheel e^4 is also fixed to said shaft, with which a suitable pallet e^5 co-operates. The retarding device is timed to consume a longer time in operating than the longest closure in any signal. When a signal is being transmitted from another box, on opening the door in the home-box, or box from which it is desired to send a signal, and operating the signaling-lever the armature will be found retracted and the holder w^2 will be in position to catch and hold the let-off as it is released, so as to hold the train in suspension. As soon as the circuit has been closed a longer time than the longest closure in any signal the retarding device permits the holder to release the let-off and thereby the signaling-train.

The retarding devices of the several boxes in circuit will be differently timed. Hence it will be understood that if several boxes are operated at or about the same time the first one which opens the circuit will obtain the line and the rest will be held by the holders w^2 , and as soon as the first box has ceased to operate a longer time than the longest closure in any signal one of the holders w^2 , having the shortest-timed retarding device, will release its train, opening the circuit, and will thereby obtain the line, and so on with the other boxes.

I do not desire to limit my invention to its employment in connection with any particular form or construction of signaling-train nor to any particular form or construction of retarding device, although the particular form herein shown is of material value, as it is susceptible of considerable movement or play and yet offers but little resistance.

I claim—

1. In a signal-box, a signal-transmitter and motor for driving it and a let-off for said mo-

tor and means for moving it, combined with a non-interference magnet, its armature movable quickly in one direction and slowly in the opposite direction, and a holder for the let-off controlled by said armature, substantially as described.

2. In a signal-box, a circuit-controller and motor for driving it, and a let-off for said motor and detent for said let off, and an actuator for said detent, combined with a non-interference magnet, its armature, and a holder moved by the armature for said let-off, and a retarding device for the armature, substantially as described.

3. In a signal-box, a circuit-changer and motor for driving it, one of the members of which has a projection, a let-off for said motor and means for holding it in engagement with said projection, and means, substantially as described, for restoring said let-off after it has been released, combined with a non-interference magnet, its armature, and a holder controlled by the armature for said let-off, and a retarding device, substantially as described.

4. In a non-interference signal-box, a non-interference magnet and its armature, and a retarding device consisting of a loose pawl carrier and pivoted pawl thereon, a ratchet-wheel and escapement, and an arm or bar w , connected with the said pawl and moved by said armature, substantially as described.

5. In a non-interference signal-box, a non-interference magnet, its armature, and a retarding device therefor, consisting of a ratchet-wheel, pawl-carrier, and pawl pivoted thereon, an arm controlled by the armature and positively moving the pawl in both directions, and an escape-wheel and pallet, substantially as described.

6. In a signal-box, a signaling mechanism and a let-off for it, combined with a movable member for normally holding the said let-off in position to lock the signaling mechanism, a non-interference electro-magnet, its armature, a retarding device, a holder controlled by the armature and acted on by the retarding device for holding the let-off in position to still lock the signaling mechanism after it has been released by said member, and independent means for restoring said let-off to its normal position, substantially as described.

7. In a signal-box, a signaling mechanism and a let-off for it, and a non-interference electro-magnet included in the signaling-circuit, combined with a holder controlled by the armature of said electro-magnet and co-operating with said let-off to catch and hold it after it has been moved to release the train, thereby holding the train in suspension until the line is clear, substantially as described.

8. In a signal-box, a signaling mechanism, a let-off therefor, a non-interference electro-magnet, its armature, and a retarding device, combined with a holder controlled by the armature of said electro-magnet and acted on by the retarding device and co-operating

with said let-off to prevent its movement when the signaling-circuit is deranged, and means, substantially as described, for restoring said let-off to its normal position after a
5 signal has been transmitted, substantially as described.

9. In a signal-box, a signaling mechanism, a let-off, and a spring for moving it to release the signaling mechanism, combined with a
10 movable member for normally holding said let-off in position against the tension of its actuating-spring to lock the signaling mechanism, a pin on one of the wheels of the train for moving said let-off into its locking po-
15 sition against the tension of its actuating-spring, and a spring acting on the movable member to throw it into position to support the said let-off when the latter is restored by its restoring-pin, substantially as described.

20 10. In a signal-box, a signaling-train, a let-

off therefor, a spring-actuated movable member for holding said let-off in position to lock the signaling-train, a pull for moving said member against the tension of its actuating-spring to release the let-off, and a pin car- 25 ried by one of the wheels of the train for moving said let-off into its normal position to lock the train, the actuating-spring of the movable member moving said member into its normal position to support the let-off when 30 the latter has been restored by its restoring-pin, 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,
ANNIE S. WIEGAND.