(No Model.) 2 Sheets—Sheet 1.

M. G. CRANE.

NON-INTERFERENCE SIGNAL BOX.

No. 445,545. Patented Feb. 3, 1891.

Fig: 1.

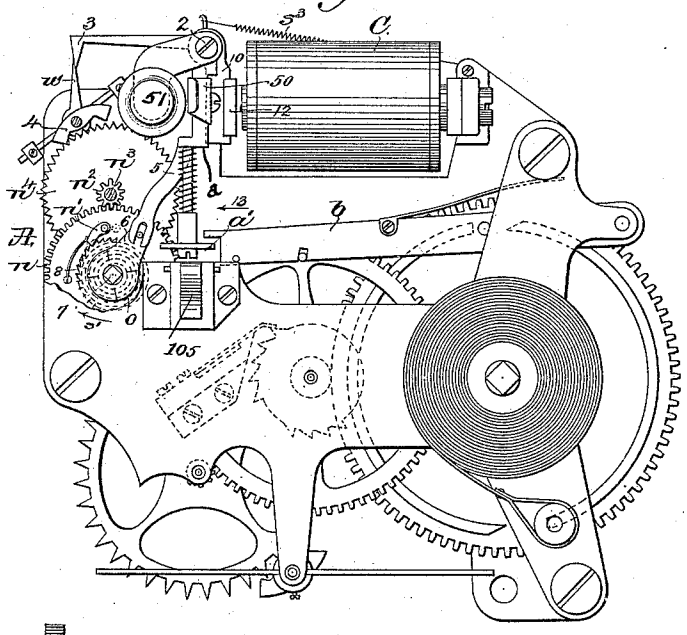


Fig: 2.

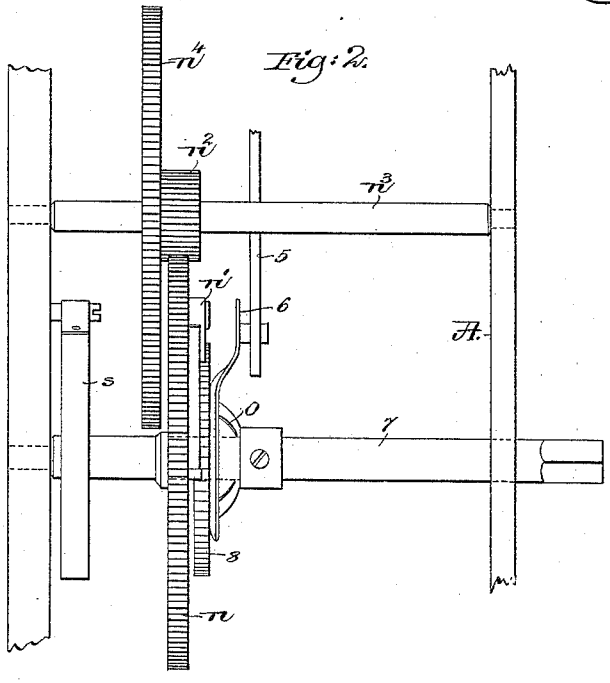
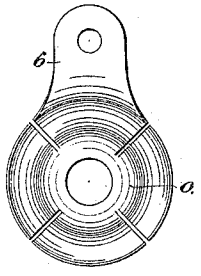


Fig: 3.



Witnesses.

Frederick L. Emery.

Edgar A. Goddin

Inventor.

Moses G. Crane,

by Crosby & Gregory Attys.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

Figs 4 & 5 Modification

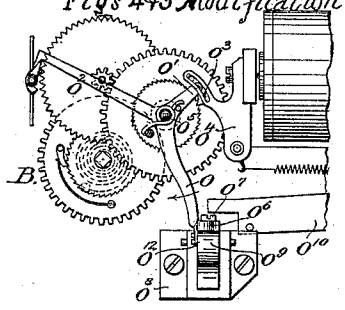


Fig. 8

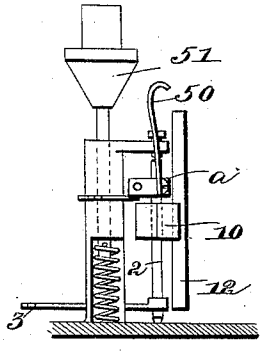


Fig. 5.

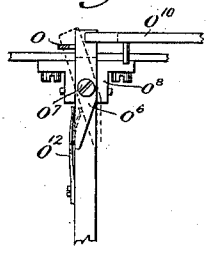


Fig. 9.

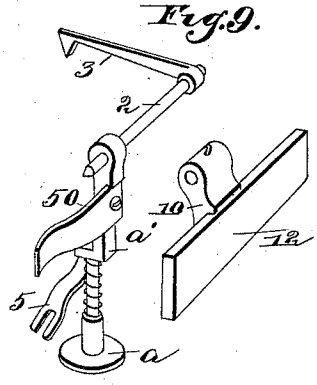


Fig. 6.

Modification

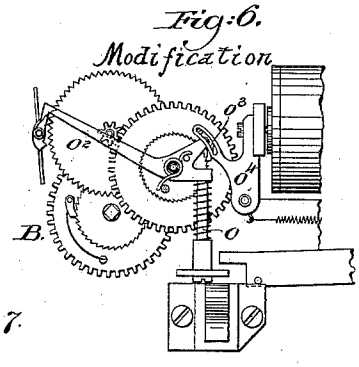
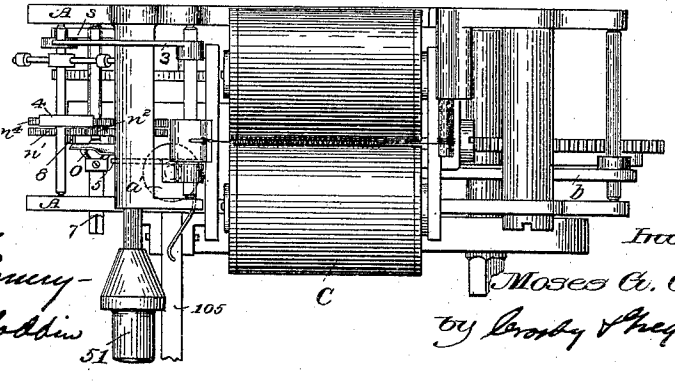


Fig. 7.



Witnesses.

Frederick L. Emery

Edgar A. Goddin

Inventor.

Moses G. Crane,

by Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

MOSES G. CRANE, OF NEWTON, MASSACHUSETTS.

NON-INTERFERENCE SIGNAL-BOX.

SPECIFICATION forming part of Letters Patent No. 445,545, dated February 3, 1891.

Application filed November 22, 1889. Serial No. 331,190. (No model.)

To all whom it may concern:

Be it known that I, MOSES G. CRANE, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in 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 construct a non-interference signal-box by which the signaling mechanism is rendered inoperative to effect the transmission of a signal if, at the moment that it is desired to transmit the signal, the line is in use.

The invention consists in the combination, with the signaling mechanism and actuating pull or signaling lever and a movable connecting-plate co-operating with the signaling-lever to control the transmission of the signal, of an electro-magnet for moving the said connecting-plate from its normal into its abnormal position quickly and a motor mechanism for moving the said connecting-plate from its abnormal into its normal position slowly.

Figure 1 shows in front elevation a well-known form of signaling mechanism provided with non-interfering devices embodying this invention; Figs. 2 and 3, enlarged details to be referred to; Figs. 4 and 5, front and plan views of a modification to be described; Fig. 6, another modification to be referred to; Fig. 7, a top view of the signal-box shown in Fig. 1, and Figs. 8 and 9 details to be referred to.

The signaling mechanism herein shown is substantially the same as shown and described in United States Patent No. 223,218, granted to M. G. Crane and E. Rogers; but so far as the present invention consists any well-known or suitable form of signaling mechanism may be employed.

As herein shown, the member which is interposed between two of the parts of the actuating mechanism and which by its position determines whether or not the signaling mechanism shall operate consists of a plate or bar *a*, herein denominated a "connecting-plate," attached to a bent lever *a'*, pivoted at 2, one arm of the said lever, as 3, having a tooth at its outer end, which engages an arm *w*, fixed to the pallet 4 of an escape-wheel n^4 of a normally-wound motor mechanism A and the other arm 5 of said bent lever engaging by a pin-and-slot connection an arm or projection 6 of a friction plate or disk *o*, mounted loosely upon the winding-shaft 7. The friction plate or disk *o* (see Fig. 3) is formed to present a convex bearing-surface, and is slitted, as shown, to provide additional elasticity. The plate or disk bears frictionally against a ratchet-wheel 8, fixed to the winding-shaft 7. A wheel *n* is loosely mounted on the winding-shaft 7, which carries a spring-controlled pawl *n'*, engaging the teeth of the ratchet-wheel 8. A pinion n^2, fixed to a shaft n^3, is engaged by the toothed wheel *n*, and the escape-wheel is also fixed to the said shaft n^3. The mainspring *s* is secured on the winding-shaft in usual manner. This train of gearing constitutes the motor A. Yet it is obvious that any other well-known construction may be employed. As herein represented, the connecting-plate is lifted directly by means of a pull 105 or other actuator, termed the "signaling-lever." The armature-carrying lever 10 (see Figs. 1, 7, 8, and 9) is loosely mounted upon the pivot 2, its armature 12 being long enough to overreach the independently-movable bent lever *a'*. The armature 12 of the electro-magnet is retracted when released by a spring s^3. When the armature 12 is retracted, the bent lever lying in its path of movement will be moved in the direction indicated by the arrow 13 moving the plate *a* attached to it from beneath the overhanging end of the starting-lever *b*, also by means of the arm 5 moving the friction-plate *o* so that its arm 6 occupies substantially a vertical position, and also by means of the arm 3 releasing the escapement of the motor A, the force or power being a retractile spring s^3. As the friction plate or disk *o* is thus moved into vertical position by the force of the said retractile spring it slips frictionally over the face of the ratchet-wheel 8 without moving it. The motor A thus released continues to operate until stopped by the arm 3, and during such movement the ratchet-wheel 8 is revolved in the direction of the arrow *s'*, and by the frictional engagement therewith of the plate or disk *o* said plate or disk is moved in the same direction, so as to restore the arm 5 and the connecting-plate *a* to their normal position slowly.

As the connecting-plate a is gradually restored by the motor, the armature 12, responding to the successive impulses, strikes the bent lever a', and thereby successively returns the connecting-plate a to its extreme abnormal position until such impulses cease, when it will immediately thereafter be slowly restored to its normal position.

A flat spring 50 is fixed to the bent lever a', the front end of which lies in the path of movement of a spring-controlled knob 51, which is pressed inwardly by the box-door when closed to thereby hold the armature against the poles of the non-interference magnet C and the friction plate or disk in its normal position.

I do not desire to limit myself to the employment of any particular construction of time-train.

Referring to Figs. 4 and 5, a wound-up time-train B is employed and a bent lever having three arms o o' o^2. The arm o' carries a pawl o^3, having a pin projecting from it at one side, which pin enters and traverses a slot in a plate or member o^4, carrying or connected with the armature. As the plate o^4 is moved the pawl o^3 engages and disengages a ratchet-wheel driven by the time-train. A spring o^5 is arranged on the shaft of the lever o o' o^2, the action of which is to throw said lever in the direction of the arrow, releasing the time-train B. The arm o, when in its normal position, as shown in Fig. 4, bears against a plate o^6 near one end. The plate o^6 constitutes the connecting-plate, and is pivoted to the signaling-lever o^9, which is in turn pivoted to the bracket o^8. When the connecting-plate o^6 is held in its normal position by the arm o, connection between the signaling-lever o^9 and the starting-lever o^{10} is completed; but when the lever o o' o^2 is moved by the spring o^5 the connecting-plate o^6 is turned on its pivot o^7 by a spring o^{12} into the dotted-line position shown in Fig. 5. When in this dotted-line position, the actuating mechanism is dismembered. When the armature is restored to its normal position or against the pole of the non-interference magnet, the pawl o^3 is moved into engagement with the ratchet-wheel, so that as the time-train B continues to operate the lever o o' o^2 is restored to its normal position.

In Fig. 6 is shown a very similar arrangement of parts to that shown in Fig. 4, except that the arm o carries the connecting-plate represented in Fig. 1.

Substantially the same results are obtained in all the instances shown.

I claim—

1. In a signal-box, signaling mechanism and a movable connecting-plate which controls its operation, combined with a non-interference magnet, its armature, and retractile spring, the latter operating to positively move said connecting-plate from its normal into its abnormal position when the magnet is demagnetized, and a motor mechanism for moving said connecting-plate from its abnormal to its normal position, substantially as described.

2. In a signal-box, signaling mechanism, a connecting-plate which controls its operation, and a two-armed lever 3 5 for effecting movement of said connecting-plate, combined with a non-interference electro-magnet and its armature, which, when retracted, moves said two-armed lever and connecting-plate into its abnormal position, and the independent motor mechanism A, operatively connected with the said arm 5 for returning said lever and connecting-plate to its normal position, substantially as described.

3. In a signal-box, a connecting-plate interposed between the signaling-lever and signaling mechanism for controlling its operation, the electro-magnet C and its armature, which, when retracted, moves the said connecting-plate into its abnormal position, combined with motor mechanism operatively connected with said connecting-plate for positively but slowly moving it into its normal position, substantially as described.

4. In a signal-box, the starting-lever, the connecting-plate, the signaling-lever, the electro-magnet C, and its armature, combined with a motor mechanism A and the friction-plate o, operatively connected with the said connecting-plate and with the said armature, said friction-plate being moved by the motor mechanism in one direction and by the armature in the opposite direction, substantially as described.

5. In a signal-box, the lever carrying a connecting-plate controlling the operation of the signaling mechanism, the non-interference electro-magnet C, and its independently-movable armature by which the said lever is moved into its extreme abnormal position on each movement of the armature, combined with the motor mechanism A and the friction-plate o, operatively connected with the said connecting-plate and frictionally engaging one of the wheels of the motor mechanism, to be moved in one direction by said connecting-plate and in the opposite direction by the motor mechanism, substantially as described.

6. In a signal-box, signaling mechanism comprising motor mechanism, a signaling-lever, a circuit-wheel, and co-operating contact-pen, combined with a non-interference magnet, its armature 12, pivoted armature-carrying lever 10, a pivoted lever carrying the connecting-plate for controlling the operation of the signaling mechanism, arranged adjacent to but independent of the said armature 12 or its carrying-lever, to be moved directly by it into its abnormal position, and means, substantially as described, continually in engagement with the said pivoted lever for restoring it to its normal position slowly, substantially as and for the purposes set forth.

7. In a signal-box, signaling mechanism and a connecting-plate constituting a part of

the actuating mechanism, combined with a non-interference magnet and its armature, a three-armed lever, one of which arms carries the connecting-plate, said lever being moved into its abnormal position by the retraction of said armature, and an independent time-train controlled by another one of the arms of said three-armed lever for restoring the three-armed lever to its normal position, the operative connection of said train being formed by the third arm of this three-armed lever, substantially as described.

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

MOSES G. CRANE.

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