

(No Model.)

2 Sheets—Sheet 1.

P. V. MERRIFIELD.
NON-INTERFERENCE FIRE ALARM SIGNAL BOX.

No. 442,383.

Patented Dec. 9, 1890.

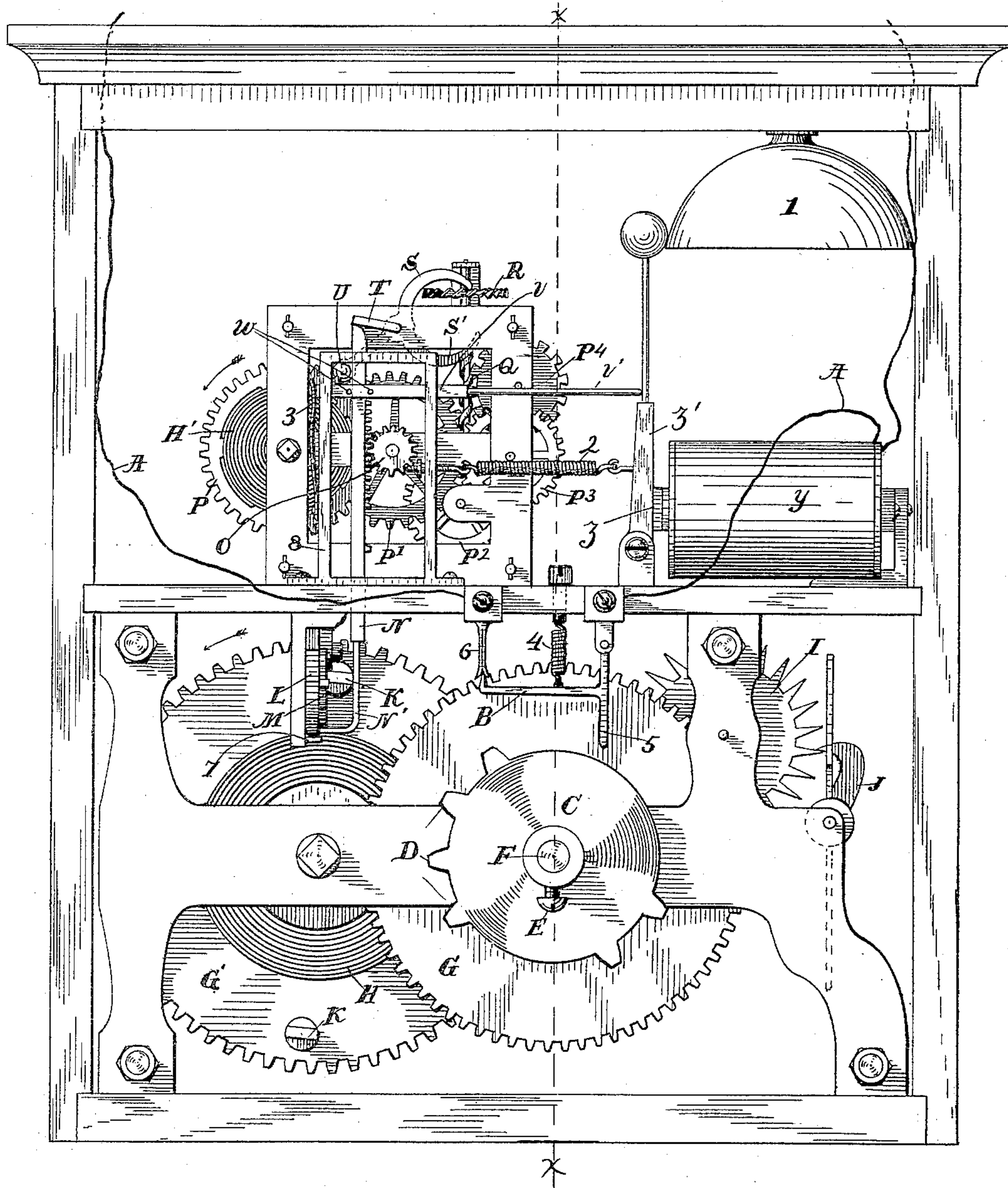


Fig. 1.

WITNESSES:

Julius B. Pierce
George W. Shook

INVENTOR

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BY

Moulton & Rogers his
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(No Model.)

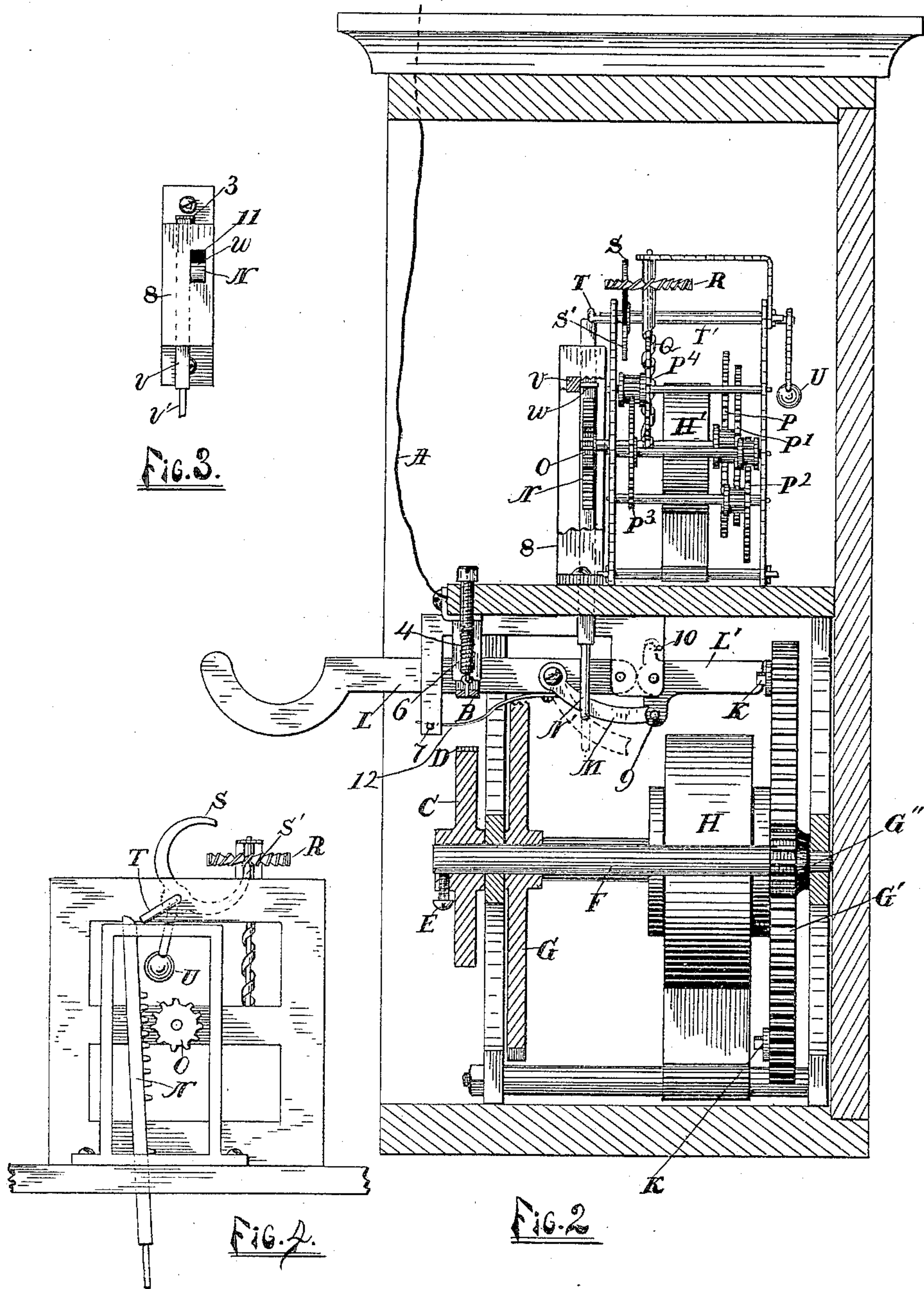
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NON-INTERFERENCE FIRE ALARM SIGNAL BOX.

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WITNESSES:

Ruby E. Pierce,
George W. Shook

INVENTOR

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UNITED STATES PATENT OFFICE.

PRESTON V. MERRIFIELD, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO JOHN PERRY, HARRY W. LONG, AND JACOB KLEINHAUS, ALL OF SAME PLACE.

NON-INTERFERENCE FIRE-ALARM SIGNAL-BOX.

SPECIFICATION forming part of Letters Patent No. 442,383, dated December 9, 1890.

Application filed March 7, 1890. Serial No. 343,077. (No model.)

To all whom it may concern:

Be it known that I, PRESTON V. MERRIFIELD, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Non-Interference Fire-Alarm Signal-Boxes; 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.

My invention relates to fire-alarm signal-boxes and to that class of such boxes termed "non-interference signal-boxes;" and it consists in certain novel features of construction, combination, and arrangement of parts hereinafter more fully described, and pointed out in the claim, reference being had to the accompanying drawings, wherein—

Figure 1 is a front elevation of a signal-box embodying my improvements, with the front and rear doors removed to show the parts more clearly; Fig. 2, a vertical section on the line *xx* of Fig. 1; Fig. 3, a detail of the frame 8, and Fig. 4 a detail showing the position of the rack-bar and pawl when any box in the circuit is in action.

Like letters and figures of reference indicate like parts throughout the drawings.

The box, which is of suitable material, size, and shape, is divided by a shelf of insulating material (not lettered) into an upper and lower chamber. The lower chamber contains the motor striking mechanism journaled and supported in a suitable frame resting upon the bottom of the box. The upper chamber contains the non-interference mechanism and the devices for operating the same.

The current of electricity enters and leaves the box upon the wire A, passing through the magnet Y and the circuit-breaker B, of any suitable construction, and to which it may be attached in any suitable manner. While the particular form of circuit-breaker used is not material, I prefer the form shown, consisting of a pendent T-lever pivoted to the shelf at the upper end of the cross-arm 5, the lower free end being adapted to engage the teeth of the number-wheel, and having a horizon-

tal arm B, adapted to engage a post 6, and provided with a closing-spring 4. The number-wheel C, having teeth D properly located upon its periphery for indicating the number of the box, is secured upon the shaft F by set-screw E, said shaft being rotated by the driving-wheel G', actuated by spring H and pinion G'' and governed by gear G in a well-known manner by the usual escapement-wheel I and a vibrating pallet J. The driving-wheel G' is provided with a series of stop-pins K, secured upon its forward face, and which successively engage the stop-latch L' as the wheel rotates, the distance between the stop-pins being adjusted to correspond with the revolution of the number-wheel. The stop-latch L' is a continuation of the pull-lever L and is pivoted in a line with and to the rear of the latter in a suitable frame secured to the under side of the shelf and is T-shaped and pivoted at the junction of its vertical and horizontal arms, the former being provided with a stop-pin 10, secured to said frame, for limiting the downward movement of the horizontal arm, and also with a stop-pin 9, secured to the end of the lever, for engaging the end of the pawl M, which is pivoted to pull-lever L, which is provided with a stop-pin 7 and a lifting-spring 12. It is evident that when pawl M is in engagement with pin 9 depressing the pull-lever L lifts the latch L', releasing one of the stop-pins K, which when the box is set is by the tension of spring H constantly pressing against the side of latch L', and as soon as the latch is thus lifted wheel G' rotates upon its axis and through the train of gears described causes a revolution of the number-wheel, the teeth of which engaging the circuit-breaker break the circuit successively a number of times corresponding to the number of teeth on the number-wheel, thereby ringing an alarm both in the box itself and at a central station in the usual manner. It is also evident that when the pawl M is not in engagement with pin 9 the box cannot be pulled, and the mechanism for operating the pawl is arranged in the upper chamber, operated mechanically and controlled magnetically. The magnet Y is provided with an ar-

armature Z, which is secured to a pivoted lever Z', having a hammer attached for striking the gong 1, and is provided with a retracting-spring 2. Within said chamber is also arranged clock-works inclosed in an ordinary clock-work frame having a mainspring H' and ordinary train of gears P P' P² P³ P⁴, a worm-escapement Q, provided with a fly R. The object of said clock-works is to rotate the pinion O for vertically moving the rack-bar N, which passes downward through a suitable opening in the shelf and is provided at its lower end with a hook N', which engages with and lifts the pawl M. In the clock-frame is journaled a shaft T', which has its end projecting from the side and turned at right angles, forming a lever T for engaging the end of bar N, and the opposite end of the said shaft is provided with a weighted lever U.

Secured upon the shaft T' is a crescent-pawl having arm S, adapted to engage the upper side of fly R, and arm S', adapted to engage the under side of the same for arresting its motion. The upper end of bar N is beveled, forming an inclined plane, for a purpose which will be explained hereinafter. At right angles to the bar N is placed the horizontally-movable bar V, provided with a thrusting-spring 3 and stop-pins W, for engaging the opposite sides of rack-bar N, and an extension V', for engaging the arm of the armature. This horizontal bar, the rack-bar N, and its pinion O are arranged in a frame 8, secured to the shelf at the side of the clock-frame.

The device operates substantially as follows: Two or more boxes forming a system being provided and suitably located, connected with a battery and central alarm-station, and the current turned on, the boxes, being wound, are ready for action, the parts being normally in the positions shown in full lines in Figs. 1 and 2. To operate the box, press down upon the hook at the outer arm of lever L, thus lifting latch L', disengaging the stop K, when the wheel G', actuated by spring H, will revolve upon its axis, causing a revolution of wheel C upon its axis and the alternate breaking and closing of the circuit by the engagement of teeth D and arm 5, as described. Breaking the circuit demagnetizes the magnet Y. Spring 2 draws back the armature-lever Z', carrying the horizontal bar V. One of the pins W, engaging rack-bar N, throws it backward out of gear of its pinion O, as shown in Fig. 4, and it falls by gravity to the position shown in dotted line in Fig. 2, the pawl M following by the same force and remaining thus in its lower position until wheel C has completed its revolution, or, in other words, until the box has finished striking. As soon as bar N is thrown backward, disengaging the end of lever or arm T of the shaft T', the weighted lever U at the other end causes a partial revolution of the shaft T' and of the crescent-pawl, the arm S releases the fly R, and the arm S' re-engages it upon

the under side, as shown by dotted lines in Fig. 4. Each opening and closing of the circuit consequent upon the engagement of teeth D and lever 5 remagnetizes the magnet Y, drawing to it the armature and its arm Z', the hammer strikes upon the gong, and the spring 3 causes the bar V to follow, carrying the bar N with it, as described. The inclined plane at the upper end of N permits of its engagement with the end of T and lifts the end of T slightly, just enough to disengage the arm S' and permit the fly R to revolve until re-engaged by the upper arm S. This momentary releasing of R permits the clock to operate and the pinion O to engage momentarily the teeth of rack-bar N, lifting it slightly. The opening through the shelf which permits the passing of N is of such size that the lower tooth of N rests upon its edge to prevent it from dropping too far; but the distance that it falls in the first instance is such that this momentary engagement of rack and pinion is not sufficient to lift pawl M into engagement with pin 9 until the circuit is again permanently closed by the revolution of C, and the re-engagement of stops K and latch L'. As soon as this is accomplished the attraction of the magnet, overcoming the tension of spring 2, causes rack N and its pinion O to engage lifting-lever T, releasing fly R and permitting the clock to operate until bar N has resumed its normal position, carrying with it the pawl M, when arm S, engaging fly R, stops the clock, holding it thus in suspense until the pull-lever is again operated. It is obvious that the non-interference mechanism in all the boxes in the circuit operates simultaneously, and that a second engagement of the pawl with the pin is impossible until the alarm rung by the first pull is completed, and consequently when any box is striking no other box in that circuit can be operated.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

A non-interference fire-alarm signal-box consisting of the following elements, to wit: a main case, a horizontal insulated partition dividing said case into an upper and lower compartment, a gear-wheel G', provided with stop-pins, a spring H on the shaft of said wheel, a pinion G'', engaging said wheel, a pull-lever L, pivoted at its rear extremity and provided with a stop-pin 7 and lifting-spring 12, a latch pivoted at its forward end to the rear of and in line with said pull-lever and formed at such pivoted end with upward and downward extending projections, the latter having a stop-pin 9 and the former engaged by a stop-pin 10 and the rear end of said latch engaged by said stop-pins on wheel G', a pawl pivoted to said pull-lever and engaging stop-pin 9, a numbering-wheel having teeth spaced as described, a horizontal T-lever, the upper end of the vertical portion of which is pivoted to said partition, the lower

end thereof in the path of the teeth of the numbering-wheel, and the free end of the horizontal portion of which is adapted to engage a post depending from said partition, a
5 spring having its respective extremities secured to said partition and horizontal portion of the T-lever, all of said parts being arranged in the lower compartment of the case, a magnet in the upper compartment, its armature
10 carrying a hammer, a gong adjacent to said hammer, a vertically-moving rack-bar also located in the upper compartment and having at its lower end a hook extending through the partition into the lower compartment and
15 engaging the pawl therein, a spring connecting said rack bar and armature, a pinion engaging said rack-bar, a clock-work mechanism

operating said pinion, a horizontally-moving bar having stop-pins engaging said rack-bar and an arm engaging said armature, a thrust- 20 ing-spring at the forward end of said horizontally-moving bar, a shaft having a bent end engaging the upper end of said rack-bar, a crescent-pawl on said shaft, a weight also secured to said shaft and operating said pawl, a fly 25 engaged by said pawl, and a worm-escape-ment.

In testimony whereof I affix my signature in presence of two witnesses.

PRESTON V. MERRIFIELD.

Witnesses:

DENNIS L. ROGERS,
JOHN PERRY.