3 Sheets—Sheet 1.

C. H. POND.

FIRE-ALARM TELEGRAPH SIGNAL-BOX.

No. 188,180. Patented March 6, 1877.

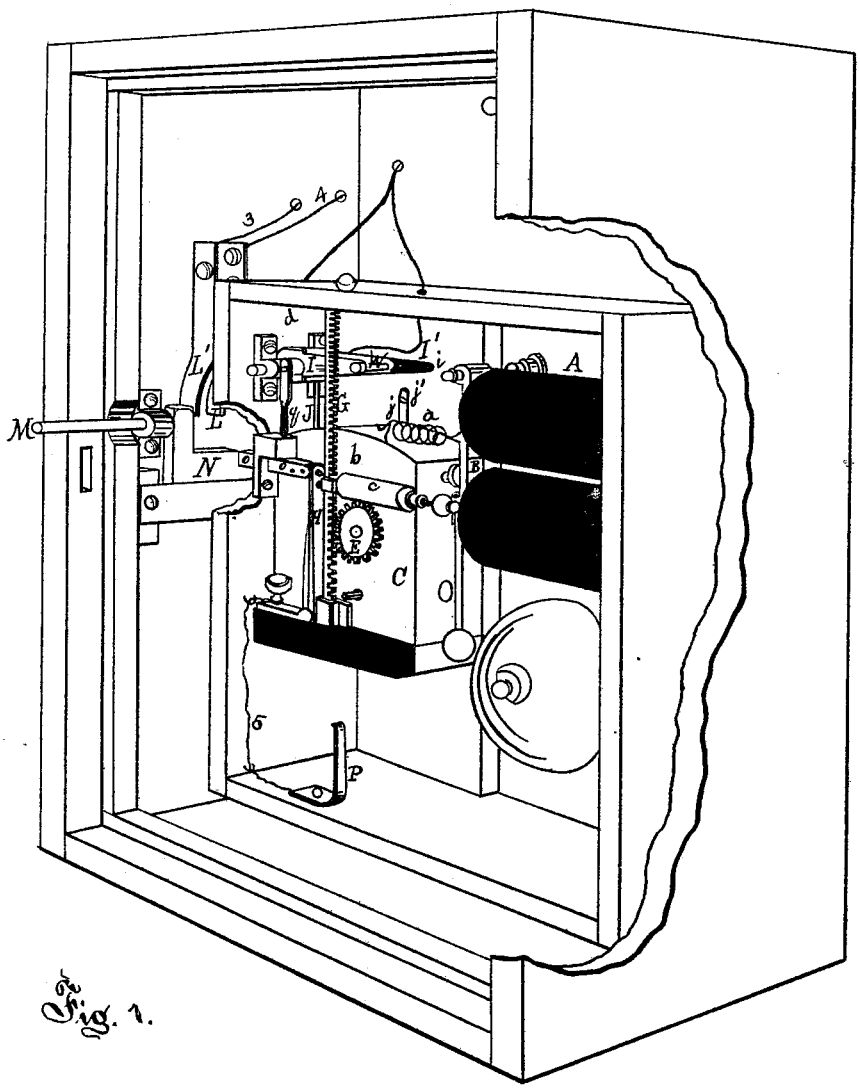

Fig. 1.

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Geo. Goldmann

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Thos. S. Sprague

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C. H. POND.

FIRE-ALARM TELEGRAPH SIGNAL-BOX.

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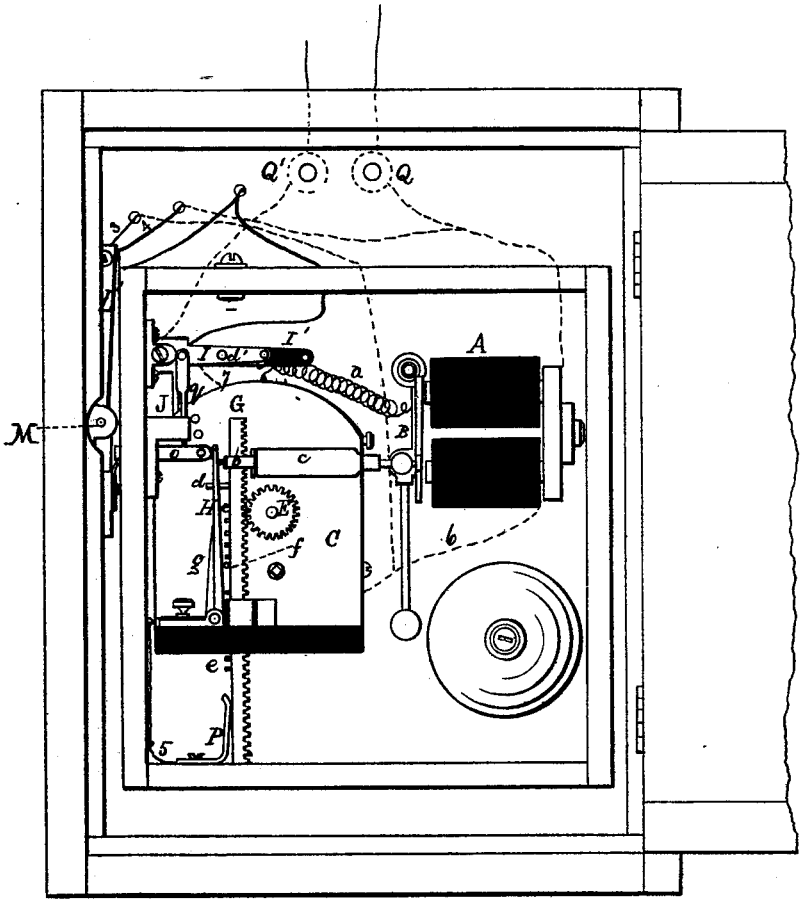

Fig. 2.

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3 Sheets—Sheet 3.

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FIRE-ALARM TELEGRAPH SIGNAL-BOX.

No. 188,180. Patented March 6, 1877.

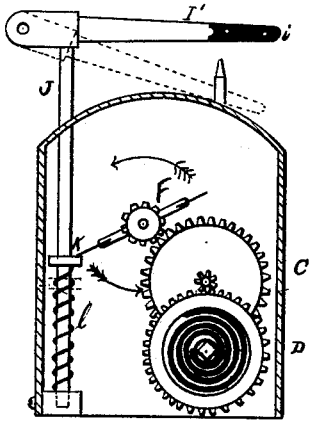

Fig. 3.

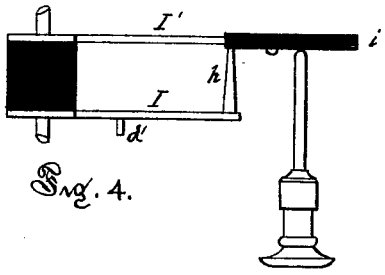

Fig. 4.

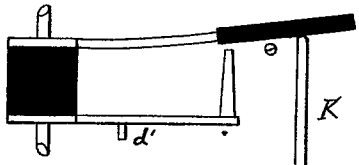

Fig. 5.

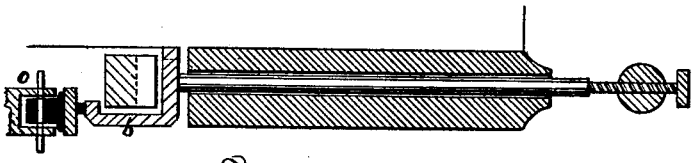

Fig. 6.

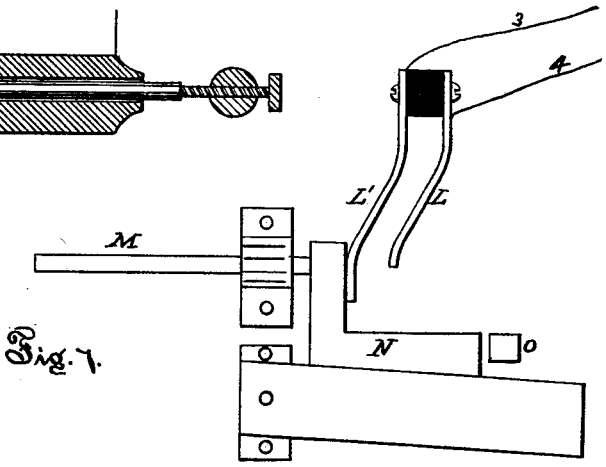

Fig. 7.

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Inventor:
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By Atty
Thos. S. Sprague.

UNITED STATES PATENT OFFICE.

CHESTER H. POND, OF JACKSON, MICHIGAN, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHARLES R. KNICKERBOCKER AND DOUGLASS GIBSON, OF SAME PLACE.

IMPROVEMENT IN FIRE-ALARM-TELEGRAPH SIGNAL-BOXES.

Specification forming part of Letters Patent No. **188,180**, dated March 6, 1877; application filed January 15, 1877.

To all whom it may concern:

Be it known that I, CHESTER H. POND, of Jackson, in the county of Jackson and State of Michigan, have invented an Improvement in Fire-Alarm-Telegraph Signal-Boxes, of which the following is a specification:

The nature of my invention relates to an improved signal-box for municipal fire-alarm telegraphs, having for its object, first, greater security in non-interference—that is to say, as soon as an alarm is started from any one box, the box so transmitting an alarm of fire cannot be in any manner interrupted or interfered with by an attempt to send an alarm from any other until the first box has completed its proper signal and stopped; secondly, the reduction of resistance in the line or circuit by cutting out or switching off the electro-magnets from the circuit when the outside door of the box is closed, the object of this being to admit of a large reduction of battery-force and lessen the liability to be damaged by lightning; thirdly, to provide a more simple and convenient circuit-breaker, a vertically-moving circuit-bar, which, as well as its actuating-train, is in circuit when the box is in operation, but otherwise said bar and train are cut out of the circuit, so that there is no chance for any of the circuit-connections or the circuit-bar being fused by lightning.

Figure 1 is a perspective view looking into the box, all of whose doors have been removed, showing the relative position of the parts in the normal condition of the box. Fig. 2 is a front elevation of the same, showing the positions of the circuit-bar and switch when dropped to send an alarm. Fig. 3 is a cross-section through the train at *x x*, showing the stop-motion. Fig. 4 is a sectional plan of the drop-switch in its normal position. Fig. 5 is a similar view of the same, showing the circuit through it broken by the push-pin. Fig. 6 is a horizontal section at *y y*, through the sliding bolt and the guide-yoke of the circuit-bar. Fig. 7 is an elevation of the magnet cut out and its door-operating pin or lever.

In the drawing, A represents the electro-magnets of the box, and B its end-pivoted armature, carrying a hammer, which announces the signal on the bell below. C represents a frame-case, inclosing a train of spring-driven gears, of which there are but three shafts, one being the arbor for the mainspring D, another carrying the pinion E, projecting at the front, and the third one a fly, F, to regulate the motion. G is a toothed circuit-bar, playing vertically through a slot in the ledge at the bottom and front of the case C; it passes behind a guide-hook, *b*, playing through a horizontal guide-sleeve, *c*, fixed to the front of the case C. On the back of the circuit-bar there is a pin, *d*, near the top, and below it a series of groups of points, *e*, corresponding with the number of the box.

a is a spring, which retracts the armature from the magnets when the circuit is broken. H is a lever, pivoted at the foot on the ledge at the foot of case C, with a spring, *g*, at its back, which presses its upper end against the guide-hook *b*, between which and said lever an insulating-point is interposed, carrying the circuit-bar into mesh with the pinion E. *f* is a short platina leaf-spring, projecting from the face of the lever H, in the path of the points *e*, each of which closes the circuit as it rises past in contact with it. I I′ is a combined drop-switch and circuit-breaker, the longer leaf I′ being at the rear, and the shorter one I at the front. Both are secured at one end to an insulating-block, and pivoted at that end with trunnions to hangers at the side of the box. *d′* is a pin projecting to the front from I, in the path of the pin *d* on the circuit-bar, which lifts up the switch when said bar has nearly completed its upward movement. *h* is a point at the extremity of the part I, projecting to the rear, so that the spring I′ will be against it, the outer portion of the latter or extending end being beveled like a knife blade, and faced with rubber or other non-conductor, as at *i*, below which is a post, *j*, on the train-case, with a beveled notch, *j′*, on the top and front side, into which the spring I′ will drop when the circuit is broken at any other box on the line.

Under the insulating-block at the head of the switch is a rod, J, passing down into the

train-case C at one side of the fly F, with a collar, *k*, on it below the fly. Below the collar is a spiral spring, *l*, which, when the switch is raised, pushes up the rod until the collar comes in contact with the fly, and arrests the motion of the train. K is a push-pin, projecting through the inner door of the signal-box, in the path of the projecting end of leaf I′ of the switch, when the latter is in its normal position above the post *j*. L L′ is a spring cut-out, or, more properly, a short-circuiting device, to cut out the magnets, placed against the left side of the outer case of the signal-box, on a non-conducting block between their upper ends, and wires 3 and 4 extend from them to the wires at each side of the magnet, so that the latter will be short-circuited when the free ends of L L′ are brought together. A rod, M, when the outer door of the box is closed, is pushed against the leaf L′, thus short-circuiting the magnet.

O is a bar, pivoted to the top of lever H, but insulated from it, and extends horizontally through the left side of the inner case of the box, in the path of an annular wedge-ended head, N, attached to the inner end of the rod M, and when the outer door is closed it passes behind the bar O and pushes it in, which, in turn, moves up the circuit-bar into mesh with the pinion, and keeps it so, or prevents the circuit-bar from dropping down when the magnets are cut out by reason of the outside door being shut. When the circuit is broken in the box, by pressing in the push-pin K against spring I′ of the cut-out switch, the circuit-bar being no longer held in mesh by the magnet, but pushed out of gear by the backward motion of the armature-lever, it drops of its own weight to the bottom of the inner case. The switch, being no longer held up by the circuit-bar, also drops down, the leaf I′ passing behind the post *j* and resting on the train-case C, thus making a break in the circuit passing through the switch, and compelling the current through circuit-bar and points *e* to spring *f* on lever H as the bar rises.

When the bar drops it falls in contact with a circuit-closing spring, P, at the bottom of the case, which is connected by wire 5 with the foot of the lever H. The train being then in motion, the circuit-bar is moved into gear by the spring *g*, and is locked in gear by a pin, *q*, pendent from the switch-leaf I, dropping into a hole drilled in the bar O for that purpose, and so remains until the alarm is completed and the switch raised to its normal position by the circuit-bar. As the switch I I′ is closed at all times, (except when leaf I′ has been pushed back by the push-pin K, and then dropped down behind post *j*,) and when so closed the circuit-bar is cut out or short-circuited, it follows that in order to give an alarm from any box it is necessary, upon opening the outside door, to find the switch in its normal position, in order that the push-pin K may open the switch and cause it to drop down behind post *j*.

Should the box be opened to give an alarm while one is being sent from some other box, the circuit-bar and switch will instantly drop upon the outer door being opened, and hence no alarm can be started until the first alarm has been finished.

Q Q′ are the pole-posts, to which the wires 1 and 2 are connected. From the pole Q a wire passes into and through the magnets; thence into the train-case by wire 6. Another wire, 7, connects the train-case with the front of the switch I. A wire, 8, passes from the back leaf of the switch I′ to the pole Q. The main-line circuit being closed, and also the outer door of the box, the electric current passes from the pole Q into the leaf L′; thence into the leaf L; thence into the train-case; thence through wire 7 to the front leaf I of the switch; thence into the back leaf I′; thence through wire 8 into wire 2 of the main line at pole Q′. If the door of the box is opened, the current could not pass through the cut-out L L′, but would be compelled to pass through the magnet. Otherwise the course of the current would be the same. Now, if the push-pin be pressed against leaf I′ of the switch, receding from the point on the front leaf, the circuit in the main line will be broken and the switch and rack-bar will drop, as hereinbefore mentioned, when the circuit will be closed through the circuit-bar and the small spring *f* as the circuit-bar rises to its normal position. This closure of the circuit allows the circuit-bar to move forward into gear, and is held there by the locking device before mentioned. The train, being released, is at once set in motion, which raises the circuit-bar to its normal position, giving the same number of alarm-signals as there are points on the back of said bar.

The break in the line caused by pushing in the push-pin K against leaf I′ of the switch serves as a warning signal to the fire-department that an alarm is about to be sounded.

The object in using a double door to the outside box is twofold: first, to give more time after opening the first door for the magnets to throw the circuit-bar out of gear, provided another distant box has been previously pulled and not yet completed its alarm; secondly, to secure greater protection to the inner works from rain or driving snow.

From the preceding description it is seen that an alarm can only be started from any box when the switch I I′ is held in its normal position by the circuit-bar as it stands at rest. Hence, in order that one box shall interfere with another by sending a simultaneous alarm, it is necessary that the push-pins K in the two boxes should be pushed so as to break the electric circuit precisely at the same instant—a thing practically impossible to be done. As each break made by the distant box causes the circuit-bar to drop, the switch I I′ cannot be raised to position, so as to admit of being opened by push-pin K, until the distant box has ceased to operate.

What I claim as my invention is—

1. In a fire-alarm-telegraph signal-box, substantially as described, a vertically-moving circuit-bar, dropped by gravity, when its containing-box is opened, to position for signaling, and raised by a spring-driven train to signal.

2. In a fire-alarm-telegraph signal-box, substantially as described, a drop-switch or cut-out, adapted to be sustained by a vertically-moving circuit-bar, or its equivalent, when the main-line circuit is complete, but when said circuit is broken to drop below the plane of its circuit-breaking push-pin or equivalent device, subtantially as and for the purpose set forth.

3. In a fire-alarm-telegraph signal-box, substantially as described, the combination, with a switch or cut-out adapted to short-circuit the magnet, of a rod having the wedge-shaped projection at its end, operated by the door to simultaneously close the cut-out or switch and hold the rock-bar in gear with its pinion.

4. In a fire-alarm-telegraph signal-box, substantially as described, an intermediate door between the outer door of the box and that through which the circuit-breaking push-pin or starting device protrudes, as and for the purposes set forth.

CHESTER H. POND.

Witnesses:
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H. S. SPRAGUE.