

J. ABBOTT.
ALARM TELEGRAPH SIGNAL BOX.

No. 103,117.

Patented May 17, 1870.

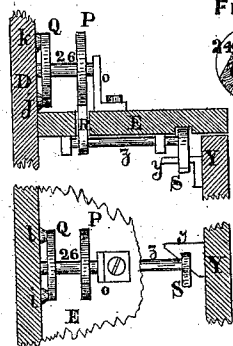
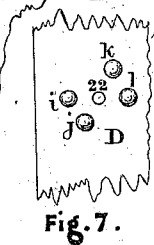
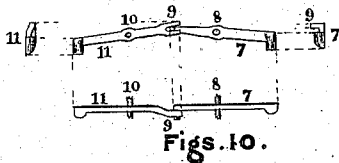
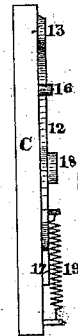
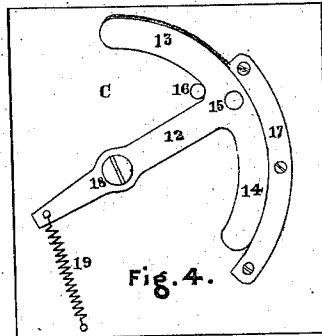
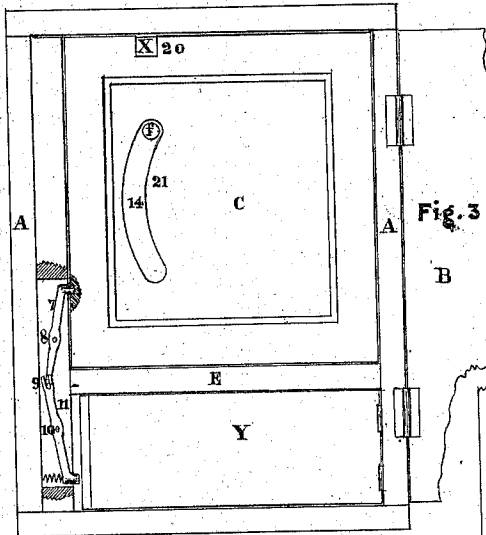
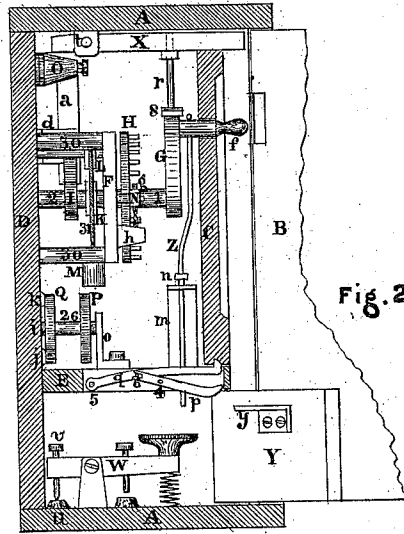
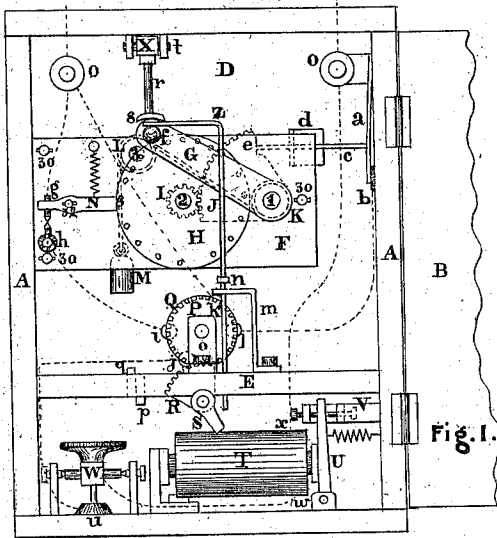
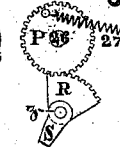


Fig. 8.

Fig. 9.



Figs. 6.

W. McKinley
D. G. Hammond } Witnesses.

J. Abbott Inventor.

United States Patent Office.

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Letters Patent No. 103,117, dated May 17, 1870.

IMPROVEMENT IN ALARM-TELEGRAPH SIGNAL-BOXES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, JOB ABBOTT, of Canton, Stark county, Ohio, have invented certain new and useful Improvements in Signal-Boxes for Fire-Alarm Telegraphs; and that the following is a full, clear, and exact description thereof.

Nature and Objects of my Invention.

The first part of my invention relates to the combination with a signal-box provided with an automatic signaling mechanism, of a switch mechanism, operated by the automatic mechanism, and arranged with respect to said automatic mechanism in such a manner that said automatic mechanism closes the switch, and thus switches the whole operating mechanism out of the circuit at the completion of the giving of each fire-alarm by said mechanism, thus effecting a great saving of battery power in working the circuit, and preventing the operating mechanism from being injured by atmospheric electricity.

The second part of my invention relates to the construction of a fire-alarm-telegraph signal-box, provided with a longitudinal partition dividing its interior into two apartments, and with two hinged inner doors, one to each apartment, and with an outer door covering both of the inner doors of the box, whereby I obtain a signal-box in which the automatic signaling mechanism, and the key-telegraph mechanism can be arranged separately from each other, and which is peculiarly adapted to the use of devices for preventing the automatic mechanism and key mechanism from being operated simultaneously, thus making the signal-box of peculiar utility in single circuits which are used for both police and fire-alarm telegraph purposes.

The third part of my invention relates to the construction of a stop mechanism, operated by an arm on the main driving-shaft of the automatic mechanism, and serving to prevent the inner door from being closed until the winding-lever of the automatic mechanism is in a proper position to allow said door to be closed without injury to said lever, thus preventing the danger of bending or breaking said lever.

The fourth part of my invention relates to the combination of a pivoted shield-piece provided with a suitable knob-hole, with the inner door of the signal-box, and with the winding-lever of the automatic mechanism, said winding-lever being provided with a knob extending through the knob-hole in the shield-piece, and a slot in the inner door, so that the shield-piece is operated by the movement of the knob of the winding-lever, whereby the shield-piece can be secured directly to the inner door, and can be made to fit closely thereto, so as to effectually exclude dust and dirt from the interior of the apartment.

The fifth part of my invention relates to the com-

bination with the frame of a signal-box provided with two hinged inner doors, of a locking mechanism, operating on said inner doors in such a manner that the opening of one door causes the locking of the other door, so that it cannot be opened until the first-opened door is closed, thus preventing persons from obtaining access to but one of the inner apartments at a time, and making the automatic mechanism and key mechanism as distinct from each other (so far as access to them is concerned) as if they were placed in separate boxes, by which the danger of mixing the operations of the automatic mechanism and key mechanism may be materially diminished.

The sixth part of my invention relates to the construction of a switch-wheel, provided with three insulated conducting-strips, which is so combined with the four termini of the four parts of two electrical circuits, as that, when in one position, its outer strips serve to unite the two separate parts of each circuit, while in another position, obtained by a rotation of said wheel, its central strip serves to unite one part of one circuit with the opposite part of the other circuit, whereby I obtain a very simple means of breaking and uniting the different circuits in a signal-box, for the purpose of switching the automatic mechanism out of the circuit when the key mechanism is in operation.

The seventh part of my invention relates to the construction of a switching mechanism, which is operated by that inner door of the signal-box which incloses the key mechanism, and is combined with the different circuits in the signal-box in such a manner that the opening of said inner door causes the automatic signaling mechanism to be switched out of the circuit, thus preventing the possibility of the operator breaking in onto the circuit by operating the key mechanism while the automatic mechanism is in operation, which would confuse the signals and render the fire-alarm unintelligible.

The eighth part of my invention relates to the construction of a locking mechanism, which is operated by the automatic mechanism, and by which the inner door of the signal-box which incloses the key mechanism is kept locked until the completion of any signal commenced by the automatic mechanism, whereby I prevent the operator from interrupting the transmission of a fire-alarm by the automatic mechanism, by opening the lower inner door, and thus switching the automatic mechanism out of the circuit.

Description of Accompanying Drawings.

Figure 1 is a front view of a signal-box embodying my invention, with the inner doors removed.

Figure 2 is a side view of the same, with side of box removed.

Figure 3 is a front view of the same, with inner doors closed.

Figure 4 is a view of the rear side of the inner door inclosing the automatic mechanism.

Figure 5 is an edge view of the same.

Figure 6 are detail side view and plan of a portion of the box, showing the construction of the switch-wheel mechanism.

Figure 7 is a view showing the arrangement of the anvils under the switch-wheel.

Figure 8 is a view of the rear face of the switch-wheel.

Figure 9 is a front view of the gear-wheel, segment, and lever-arm for operating switch-wheel.

Figure 10 are side views and plan of mechanism for locking the inner doors.

General Description.

The signal-box consists of the frame A A, in which is secured the removable back D and the longitudinal partition E, which divides the interior into two apartments.

The inner doors C and Y are hinged to the frame A A, and serve to inclose the upper and lower apartments of the box, and the outer door B is hinged to the frame A A, and covers both the interior doors C and Y, as shown.

The posts 30 30 30 are inserted in the back D, and the plate F is secured on their front ends, and the shafts 1, 2, and 3 are arranged in the back D and plate F, as shown.

The geared sector J is secured on the main shaft 1, and meshes into the pinion I on the shaft 2, on which is secured the circuit-wheel H.

The pulley K is secured on the shaft 1, and has secured to it the cord 31, which passes up over the pulley L on the shaft 3, and has the weight M attached at its end, as shown in figs. 1 and 2.

The key N is pivoted on a standard, 32, and has the pin g inserted in its end, which is kept pressed against a pin in the standard h by means of the spiral spring shown in fig. 1.

Pins are inserted in the face of the circuit-wheel H, in a manner depending on the particular signal required, and a sliding rod, with beveled lower end, is arranged in the end of the key N, so that, as the circuit-wheel H is revolved from left to right by the downward movement of the geared sector J in drawing up the weight M, the pins in the circuit-wheel H strike the beveled end of the rod in the key N, and slide it forward, so as to allow of their passing said rod without vibrating said key, and thus breaking the circuit; while in the automatic rotation of said circuit-wheel from right to left, caused by the action of the weight M, the pins in said circuit-wheel strike the square side of the rod in the key N, thus vibrating said key, and breaking the circuit by drawing the pin g back from the pin in the standard h, as is readily seen.

The general construction of this automatic mechanism is the same as that shown in Letters Patent granted to Alexander Allen for an improved automatic fire-alarm apparatus, on the 1st day of June, 1869, to which reference is made for a more detailed description.

The key mechanism W is an ordinary telegraph-key, arranged to work on a closed circuit, (the circuit being broken by depressing the knob, so as to raise the screw v from the anvil u,) and is arranged in the lower apartment of the box, as shown, being separated from the automatic mechanism by the partition E.

The sounder mechanism consists of the electro-magnets T, having the pivoted armature U arranged at their end, as shown, the movements of said armature being controlled by screws in the standard V, in an ordinary manner.

The screw-cups O O, in which are secured the ends of the main circuit wires, are arranged on the back, D, of the box, as shown, and insulated wires are arranged as indicated by dotted lines, so as to form one circuit, commencing at the right-hand screw-cup O, thence to the electro-magnets T, at the point x; thence through the wire on said magnets to the point w; thence to the screw v in the key W; thence from the anvil u, through the points j i, to the standard h; thence through the pin in said standard, and the pin g in the key N, to the left-hand screw-cup O. And a second circuit is formed by the switch a; thence from the anvil b, through the points l k, to the left-hand screw-cup o, which last-described circuit is called the "switch circuit."

The switch a, represented in drawings, consists of a plate of sheet-brass, cut out in an 7-shape, and having one leg bent at right angles to the plane of the plate, and secured under the screw-cup O, while the body of the plate sets up on the face of the frame A, as shown.

The anvil b is secured in the frame A under the free end of the switch a, and the rod c has one end secured in the switch a, and passes through a hole in the standard d, secured on the back D.

The notch e is formed in the geared sector J, and when said sector completes its upward movement, the face of this notch strikes the end of the rod c and presses the plate a down on the anvil b, thus closing the switch.

The plate a, being made of elastic metal, and of such form as to stand away from the anvil b, when not pressed down by the rod c, it is evident that when the geared sector J is turned down, in winding up the weight M, the plate a will spring away from the anvil b, thus opening the switch and breaking the switch circuit o a b l k o, which causes the electric current to pass over the circuit o x w v u j i h g o, which brings both the key mechanism and the automatic mechanism into the main circuit, so that either of them can be used for purposes of transmission.

As soon, however, as the automatic mechanism completes its operation, the geared sector J moves up against the rod c, thus pressing the plate a onto the anvil b, which closes the switch and completes the switch circuit, thus switching out the operating mechanism by forming a shorter circuit between the screw-cups O O.

The winding-lever G is secured on the main shaft 1, and is provided with the knob f, which extends through the circular slot 21, formed in the inner door C, as shown in figs. 2 and 3.

On the back of the door C is secured the pivoted shield piece 12, by means of the pivot screw 18, said pivot screw being in line with the shaft 1, when the door C is closed, and the arms, 13 and 14, of said shield-piece being of the proper shape to cover the slot 21 in the door C.

The stop-pin 16 limits the upward rotation of the head 13 14, and the spiral spring 19 keeps the shield piece drawn up against the stop-pin 16, as shown in figs. 4 and 5.

The outer edges of the head 13 14 can be beveled off, and a press strip, 17, can be arranged, as shown, in order to hold the head 13 14 down close to the slot 21, if desired.

The knob-hole 15 is cut in the head 13 14, and the knob f of the winding-lever G passes through said hole, as shown in fig. 3, from which it is seen that, by grasping the knob f on the outside of the door C, the winding-lever G may be drawn down to wind up the automatic mechanism, and that the shield piece 12 13 14 will be rotated by this movement of the knob, so that the slot 21, in the door C, will remain covered during the whole of this movement.

As the shield piece 12 is kept up against the stop-pin 16 by the spring 19, it is evident that if the door C were open, and an attempt were made to close it

before the winding-lever G was in the proper position to allow the knob *f* to pass into the knob-hole 15, said knob would be struck by the arm 14 of the shield piece, and the knob or winding-lever would be liable to be bent or broken.

To prevent this difficulty, the lever X is pivoted on the pin *t*, secured in lugs at the top of the frame A, and a rod, *r*, with base piece *s*, is secured in said lever over the winding-lever G in such a manner that, when said winding-lever is at the end of its upward movement its end rests under the base piece *s*, and thus supports the lever X, so that it passes through the hole 20 in the door C, thus allowing said door to be closed.

But if the winding-lever G were drawn down while the door C was open, the forward end of the lever X would drop down until its rear end struck the frame A, so that if an attempt were then made to close the door C, it would strike the end of the lever X, and be thus held open until the winding-lever G came up to raise the lever X, thus preventing the knob or winding-lever from being injured.

For the purpose of greater security against false alarms, it may be found advisable to operate the automatic mechanism from the inside of the inner door, C, or, in other words, not to have any projecting knob or other contrivance for operating the winding-lever from the outside of the door C, but to compel the operator to unlock both the outer and inner doors, and open them, before being able to give an alarm, and it is always desirable to prevent the operator from manipulating but one mechanism at a time, so that he could not confuse the automatic alarm signals by attempting to operate with the key mechanism while the automatic mechanism is in operation.

To effect this result in the construction just indicated, the lever *q* is pivoted on a pin, 5, in a slot cut in the partition E, and a second lever, *p*, is pivoted on a pin, 4, in the same slot, and has a forked end, which sets over a pin, 6, in the lever *q*.

A lock-pin is formed on the end of the lever *q*, and a corresponding hole is made in the bottom of the door C, and the several parts are so arranged that when the lower door, Y, is opened, the weight of the forward end of the lever *p* causes it to fall, and thus raises the lever *q*, so as to shoot the lock-pin at its end into the hole in the bottom of the door C, thus locking said door, as shown in fig. 2. The end of the lever *p* being made sloping on its under side, as shown, as the lower door Y is closed it raises that end of the lever *p*, thus drawing down the lever *q* and unlocking the door C, as is readily seen.

It is also readily seen that a similar device could be used to lock the lower door Y, by the opening of the upper door C, from which it is seen that the opening of either door would lock the other door, so that but one door could be opened at the same time for the purpose before shown.

A modification of the same device is shown in the inner side strip, in fig. 3, in which the levers 7 and 11, of the form shown in fig. 10, are arranged on the pins 8 and 10, the forked end of lever 11 setting over the pin 9, in the lever 7, and the lower end of the lever 11 being thrown out when the door Y is opened by the spring, shown in fig. 3.

When a projecting knob or other contrivance is used, by which the winding-lever G can be operated from the outside of the inner door C, it is evident that the use of a locking mechanism, which would lock either door by the opening of the other door, as has just been shown, would not be of any use, for the operator could pull down the knob *f*, and thus put the automatic mechanism in operation, even when the lower door, Y, were opened, and the upper door, C, were locked, as shown in figs. 2 and 3.

In order to meet this difficulty I switch the automatic mechanism out of the main circuit, when the lower door is opened, and the key mechanism is exposed by breaking the switch-circuit *o a b l k o*, and the combined key and automatic circuit *o x w v u j i h g o* by disconnecting the points *l* and *k*, and the points *j* and *i*, and by connecting the points *j* and *k*, so as to form a key circuit, *o x w v u j k o*, into which the automatic mechanism does not enter, as is readily seen.

To effect this breaking of two circuits, and joining the opposite parts of the different circuits, I arrange the four anvils, *i j* and *k l*, which form the termini of the parts of said circuits, on the ends of the opposite sides of a hexagon having its center at 22, as shown in fig. 7.

The switch-wheel Q is secured on the shaft 26, which has a bearing in the hole 22, and on this wheel is arranged the three metallic strips, 23, 24, and 25, which are insulated from each other, as shown in fig. 8, either by the wheel Q being made of non-conducting material or in any other suitable manner.

The switch-wheel Q being placed over the anvils *i j k l*, with the outer strips 23 and 24 resting on the anvils *i j* and *k l*, said anvils will be electrically connected, thus forming the switch-circuit and the combined key and automatic circuit before described; but if the switch-wheel Q be now turned an angular distance of sixty degrees to the right, the connection between the anvils *i* and *j* and the anvils *k* and *l* will be broken, and the central strip 25 will then rest on and electrically connect the anvils *j* and *k*, thus forming a key-circuit independent of the automatic mechanism, as before described.

The shaft 26 of the switch-wheel Q is journaled in the hole 22 in the back D, and on the standard *o* on the partition E, and has secured on it the gear-wheel P, which meshes into the gear sector R on the shaft *z*, which is arranged in lugs on the under side of the partition E, as shown in fig. 6.

The arm S is secured on the end of the shaft *z*, and a bracket, *y*, with an angular inside face, is secured on the lower door Y, as shown in figs. 2 and 6, so that as said door is closed, the bracket *y* strikes the arm S, and moves it from right to left, which causes the gear-wheel P and switch-wheel Q to rotate in the same direction, as will be readily seen by noticing that the rotation of the arm S is under its axis of rotation, while that of the switch and gear-wheel is over and around their axis of rotation.

A spiral spring, 27, (see fig. 9,) is attached to a pin on the gear-wheel P and to the side of the frame A, and acts to produce a rotation of the gear-wheel and switch-wheel from left to right, and the several parts are so arranged as that when the door Y is closed, as represented in fig. 6, the arm S will have the angular position shown in fig. 9, and the strips 23 and 24 of the switch-wheel Q will rest on the anvils *i j* and *k l*.

Now, if the door Y be opened so as to draw the bracket *y* away from the arm S, the spring 27 will cause the switch-wheel Q to rotate an angular distance of sixty degrees to the right, thus bringing the strip 24 onto the anvils *j* and *k*, and switching out the automatic mechanism, as before explained, and it is readily seen that the closing of the door Y will restore the switch-circuit and the combined key and automatic circuit. But if no precaution were taken to prevent opening the lower door Y while an automatic signal was being transmitted, the operator might open said door, which would switch the automatic mechanism out of the circuit, as just shown, thus cutting off and destroying the automatic signal.

To prevent this difficulty the sliding rod Z is arranged in a hole in the partition E, and in the standard *m* on said partition and the upper end of said rod

is bent so as to stand over the knob *f* on the winding lever *G*.

A hole is made in the bracket *y*, on the lower door *Y*, so that when said door is closed and the rod *Z* is allowed to slide down until stopped by the collar *n*, the end of said rod drops into the hole in the bracket *y*, thus locking said lower door.

The rod *Z* is of such length as that when the winding-lever *G* is at the end of its upward movement, the knob *f* supports the rod at such a height as to allow the bracket *y* to pass under the end of said rod, from which it is seen that the lower door *Y* can be opened at any time when the winding-lever *G* is not drawn down and the automatic mechanism is not in operation, but that as soon as said lever is drawn down, the rod *Z* locks the door *Y*, and keeps it locked until the automatic mechanism completes the signal.

I am aware that switches have been before used in signal-boxes; hence I lay no claim to a switch mechanism, except when operated by the automatic signaling mechanism and acting to switch the operating mechanism out of the main circuit, as is herein shown. Nor do I claim dividing a signal-box into two apartments by means of a longitudinal partition, nor the arrangement of the automatic mechanism and key mechanism in separate apartments, nor the use of a single inner door in a signal-box, nor the use of a separate inner cover or door for each apartment of the signal-box, except when said two inner doors are hinged, so as to swing open by turning on an axis; nor do I claim the use of a pivoted shield-piece for covering the slot in the inner door, except when the same is provided with a knob-hole through which the knob of the winding-lever is extended, so that said shield-piece is operated by the action of the knob of the winding-lever, in place of being operated by a knob secured on itself, and serving as a means of operating the winding-lever, as in previous constructions.

Claims.

What I claim herein as new and of my invention, and desire to secure by Letters Patent, is—

1. A signal-box provided with an automatic signaling mechanism, and with a switch mechanism operated by said automatic mechanism, and so arranged that said automatic mechanism closes the switch, and thus switches the whole operating mechanism out of the circuit at the completion of each fire-alarm given by said automatic mechanism, substantially as is herein specified.

2. A signal-box divided by a horizontal partition into two apartments, and provided with a separate hinged inner door to each of said apartments, and with

an outer door inclosing both the inner doors of the box, one of said apartments containing the automatic signaling mechanism, and the other the key mechanism, substantially as is herein specified.

3. In combination with the inner door of a signal-box, a stop mechanism arranged in the interior of the box, and operated by an arm on the main shaft of the automatic mechanism, for the purpose of preventing said inner door from being closed until the winding-lever is in such a position as to prevent its injury by the closing of said door, substantially as is herein specified.

4. The combination of the inner door *C*, provided with the slot 21, pivoted shield-piece 12 13 14, with knob-hole 15 and spring 19, or its equivalent, and winding-lever *G*, with knob *f*, said knob extending through the knob-hole 15 and the slot 21, substantially as and for the purpose specified.

5. In combination with a signal-box provided with two hinged inner doors, a locking mechanism operated by and acting upon said inner doors, in such a manner that the opening of either door causes the locking of the other door, so that it cannot be opened until the first opened door is closed, substantially as and for the purpose specified.

6. The switch-wheel *Q*, having the insulated metallic strips 23 24 25 arranged on its face, when used in combination with the four anvils, *i j k l*, forming the termini of the parts of two circuits, the several parts being arranged as and for the purpose specified.

7. In combination with a signal-box having the automatic mechanism and key mechanism arranged in separate apartments, a switching mechanism operated by the inner door which incloses the key mechanism, and combined with the different circuits in the signal-box in such a manner that upon opening the inner door inclosing the key mechanism, the automatic mechanism shall be switched out of the main circuit, substantially as is herein specified.

8. In combination with a signal-box provided with automatic and key mechanism and switching mechanism, arranged and operating as specified in seventh clause, a locking mechanism operated by the automatic mechanism, and serving to keep the inner door inclosing the key mechanism locked, until the completion of any signal commenced by the automatic mechanism, substantially as is herein specified.

As evidence of the foregoing, witness my hand this 20th day of April, 1870.

JOB ABBOTT.

Witnesses:

A. M. STOUT,
A. M. STOUT, Jr.