

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN FIRE-ALARM SIGNAL-BOXES.

Specification forming part of Letters Patent No. 127,041, dated May 21, 1872.

Specification of certain Improvements in Signal-Boxes for Fire-Alarm Telegraphs, invented by GEORGE FLOYD, of Cincinnati, Hamilton county, Ohio.

This invention relates to that kind of boxes which are employed in connection with suitable telegraph apparatus for the purpose of indicating the location of a fire by means of suitable signals, such as striking the alarm-bells direct without the intervention of an operator, or by the registration of numerals or other characters at the office or central station of the superintendent or other proper officer; and

The first part of my improvements relates to the case or box proper, which, in its preferred form, has the represented circular shape, and is provided with an outer and inner door, the former being capable of being opened by the watchman or other proper person whose duty it is to "turn in an alarm," while the latter can be opened only by the superintendent having charge of the apparatus. As all the operative parts—except the trigger which is employed for starting the alarm—are inclosed behind said inner door, they are thus rendered inaccessible to any unauthorized or irresponsible person, who might otherwise tamper with them, and thereby render the apparatus inoperative at the critical moment. This arrangement of outer and inner doors also serves to exclude dust, soot, moisture, &c., from the delicate operative parts of the signal-box. The second part of my improvements consists in an arrangement of devices which renders it impossible for a second alarm to be "turned in" until the first one has been completely recorded or struck upon the fire-bells, thus effectually preventing any confusion of signals and insuring the prompt and accurate notification of the locality of the conflagration.

These devices consist essentially of an operating-trigger, that is located behind the inner door of the box and is capable of being manipulated by a suitable hook, catch, or handle, upon the outside of said door, to which handle access can be had at any time by simply unlocking and opening the outer door. This trigger has an inwardly-projecting arm, which, when the outer handle is depressed, bears against and causes the partial rotation of a pivoted detent which is thereby

disengaged from a notched wheel, and as said notched wheel is geared both with the clock-work that runs the signaling apparatus, and also with the interiorly-toothed signal-wheel proper, the latter instantly commences to rotate in such a manner as to convey the proper intelligence through a circuit-breaker. This circuit-breaker is shaped like a bent lever or bell-crank, and its upper arm is engaged with the toothed signal-wheel, so as to be moved every time one of the said teeth comes in contact with the arm, and, as the lower arm of the lever carries the circuit-connector, it will be seen that the rotation of the signal-wheel thus acts to break the circuit, and thereby sound the proper alarm. The aforesaid pivoted detent after being once disengaged from the notched wheel is maintained out of gear therewith until said wheel has performed a complete rotation, by means of a hub or disk, and thus a second or interfering-alarm is effectually prevented.

Figure 1 is a front elevation of a signal-box embodying my improvements, both doors being shown opened, and the pivoted detent represented as engaged with the notched wheel. Fig. 2 is a vertical section through the box at the line *x x*, with both doors closed. Fig. 3 is a perspective view, showing the positions the various parts assume when the operating-trigger is depressed so as to start an alarm; and Fig. 4 is a perspective view, showing the arrangement of pivoted detent, duplex ratchets, and winding-shaft.

A represents the inclosing box or shell, which is made of cast-iron, and is preferably of the represented circular shape, and of any suitable depth, say from four to six inches. This box is provided with two annular rabbets *a a'*, within which are seated the doors B B', the latter being hinged to said box at *a''*. The external door B has a lock, *b*, the key of which is in possession of the watchman or other person who is authorized to "turn in an alarm," while the key of the lock *b'* of the inner door B' is kept by the superintendent or other officer who is responsible for the perfect working of the apparatus.

Securely attached within the signal-box are two plates, C C', which afford journal-bearings for a train, D, of gear-wheels, that are set in motion at the proper time by the uncoiling of

a mainspring, *e*, upon winding-shaft or barrel E. This shaft has secured to it two similar-shaped ratchets, F F', of which the one F is located at the outer end of said shaft, while the other one, F', is situated immediately in the rear of plate C', and the rotation of said ratchet F' is prevented by the pawl *f'*, which is pivoted to the plate C'. Engaging with the outer ratchet F is a pawl, *f*, that is pivoted to a detent, G, which is journaled upon the winding-shaft E, and a spring, *g*, serves to maintain said pawl in contact with the ratchet. Projecting rearwardly from the detent G is a stud or pin, H, which is adapted to engage with a slot, *i*, in the hub or disk I, that is secured to the gear-wheel J so as to rotate in unison therewith. This pin is maintained within the aforesaid slot until intentionally disengaged therefrom, as hereinafter explained, by the stress of a spring, K, although, if preferred, a weight may be substituted for said spring, as indicated by dotted lines in Fig. 1. The wheel J gears with a pinion, L, that is secured to the rear side of the signal-wheel M, whose inner periphery is provided with teeth *m*, that are arranged so as to agree with the number of the signal-box, which, in this case, is supposed to be 73. Adapted to engage with the teeth *m*, whenever this signal-wheel rotates, is a spur, N, that is attached to the upper arm, O, of a bent lever, whose lower arm, O', is weighted at *o'* so as to cause the circuit-connection P to come in contact with the plates *p p'*, which are in communication with the proper wires leading to and from the signal-box. The plates *p p'* are secured to a shelf, Q, which also supports the lightning-conductor R and devices S S', for testing the apparatus so as to see if the circuit is in complete working order. Fitted within the door B' is a tube or bushing, T, which affords a journal-bearing for the short shaft *t*, to whose outer end is attached a hook or handle, U, while its inner end carries the operating trigger V, that is loaded at W. This trigger has an inwardly-projecting arm, Y, that is brought in close proximity to the detent G whenever the door B' is closed. Z Z' are stops which limit the upward and downward movement of the handle or catch U. The signal-wheel M is journaled upon a short stud-shaft, *e*, that is attached to the outer plate C' of the clock-work.

My signal-box is operated in the following manner: The box is first secured in its proper position, and the wires attached thereto in the usual way, after which the clock-work D is wound up by the superintendent. This winding operation is accomplished by simply elevating and depressing the detent G by hand until the mainspring *e* has been sufficiently coiled upon the driving-shaft E. After the mainspring has been wound up the detent G is liberated and its pin H engaged in the slot *i* of wheel I, and maintained therein by the stress of spring K or a suitable weight. This engagement of the aforesaid pin within the

slot effectually locks the clock-work and prevents the mainspring rotating any of the wheels or other parts of the signaling devices. In this locked condition of the clock-work the spur N of the circuit-breaker occupies the long space between the teeth on the interior periphery of the signal-wheel M. The clock-work being wound up, the superintendent now closes and locks the inner door B', and thereby prevents any person obtaining access to the interior operative parts of the box. The outer door B is then closed and locked, and in this closed condition of the two doors the hook or handle U occupies the space between them, as shown in Fig. 2, and the arm Y of trigger V is brought in close proximity with the detent G, but not in actual contact therewith, the stop Z allowing said arm to be elevated a slight distance above the detent. The box is now ready for use; and the moment a fire breaks out in the neighborhood of the station the watchman or other person who is authorized to "turn in an alarm" has simply to unlock and open the outer door B so as to obtain access to the handle U. He then depresses this handle until it strikes the stop Z', when he liberates it, and the weight W restores the trigger V to its normal condition. The depression of the handle, and consequently of the trigger, causes the arm Y of the latter to bear against the pivoted detent G and carry it around to the position shown in Fig. 3, which act disengages the pin H from slot *i*, and, there being no longer anything to resist the action of mainspring *e*, the clock-work is at once set in motion. The movement of the clock causes a gradual rotation of the signal-wheel M, and the teeth *m*, upon the interior periphery of said wheel, produce an alternate elevation and depression of the bent lever O O', thereby breaking the current in such a manner as to sound an alarm corresponding with the arrangement of said teeth *m*, which alarm will be repeated until the movement of the clock-work is automatically checked. This automatic checking of the alarm is accomplished as follows: The moment the trigger V is allowed to assume its normal position and the handle U brought in contact with the stop Z, there is no longer anything to retain the detent G in its depressed condition, and the stress of spring K causes said detent to turn around upon shaft E in such a manner as to elevate the portion carrying the pin H. The rotation of this detent would cause its pin H to enter the slot *i* were it not for the fact that the movement of disk I had carried its slot around to a position where the pin cannot enter it, and consequently the latter simply rides upon the smooth periphery of said hub or disk. When the disk I has made an entire revolution and the slot *i* has been brought around to its original position, the tension of spring K forces pin H into said slot and prevents any further rotation of the signal-wheel M, and accordingly stops the alarm. When thus

checked the spur N of the circuit-breaker occupies the same position that it did before the alarm was started—that is, the long space between the teeth *m*. The clock-work D may be so geared as to insure any desired ratio of rotation between the disk I and signal-wheel M. In the present illustration it is supposed that the wheel M performs three entire revolutions during the time the disk I is making one, and therefore the signal 73 will be repeated three times before the alarm is automatically stopped. The depression of detent G not only liberates the clock-work, as above described, but it also causes a rotation of shaft E through the medium of pawl *f* and ratchet F, and thus winds up the mainspring *e* enough to compensate for the uncoiling of the same in striking the alarm. This automatic winding of the clock-work by the act of starting the alarm prevents the apparatus running down, and therefore it will never require special winding after the box has once been put in order.

One great advantage peculiar to my box consists in the fact that it is an absolute impossibility for a second alarm to be "turned in" before the first one has been fully and distinctly struck, and there is therefore no chance for a second alarm to interfere with the first one, and thus cause a perplexing confusion of signal, which would mislead the fire department at the very moment when their services are of the greatest value—that is, at the commencement of a conflagration. The reason why an interfering alarm cannot be struck until the first one has been completely recorded will be readily understood when it is remembered that after the pin H has once been liberated from slot *i* it

cannot again enter said slot until the disk I has made an entire revolution, and consequently any second depression of arm Y would simply carry said pin away from the smooth periphery of the disk without having any effect whatever on the signal-wheel M.

When the inner door B' is closed the operative parts are not only concealed so as not to be tampered with, but they are also protected from dust, soot, and moisture, which would have a tendency to impair their efficiency. The shaft *t* being accurately fitted within the bushing T, dust cannot enter at this point, and as the rotation of said shaft causes the trigger V to describe an arc of a circle, as great a movement of the latter may be obtained as is necessary without making slots or other large openings in the inner door, which openings will always admit dust and other obstructions.

Claims.

I claim as my invention—

1. In combination with the pivoted detent G H K for liberating the signaling apparatus of a fire-alarm telegraph, I claim the shaft *t*, operating device U, trigger V W Y, and stops Z Z', or their mechanical equivalents, for the object designated.

2. In combination with the interiorly-toothed signal-wheel M *m*, I also claim the circuit-breaker O O' o P, for the purpose set forth.

In testimony of which invention I hereunto set my hand.

GEO. FLOYD.

Attest:

GEO. H. KNIGHT,
JAMES H. LAYMAN.