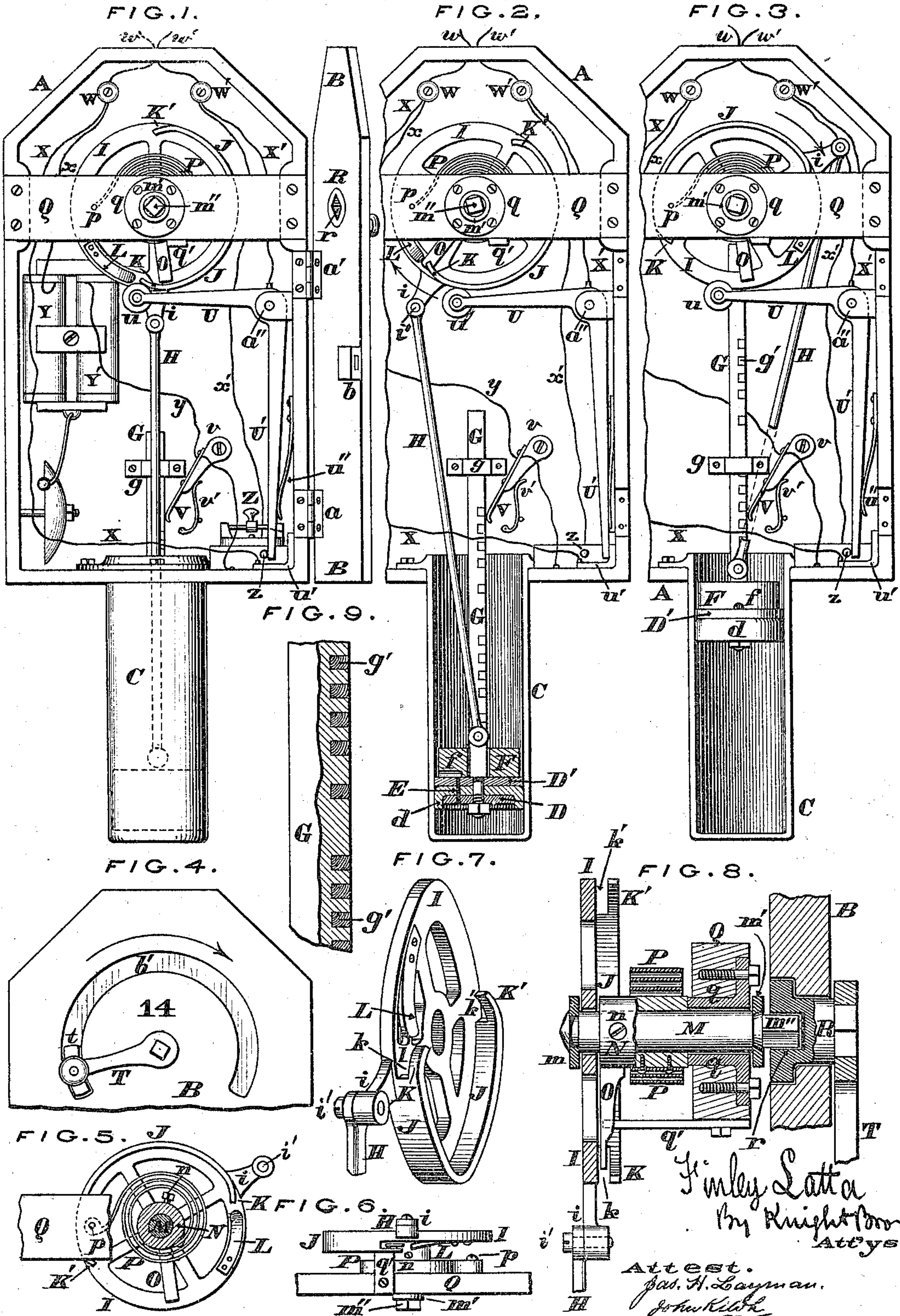


F. LATTA.

Fire-Alarm Signal-Boxes.

No. 134,552.

Patented Jan. 7, 1873.



UNITED STATES PATENT OFFICE.

FINLEY LATTA, OF CINCINNATI, OHIO.

IMPROVEMENT IN FIRE-ALARM SIGNAL-BOXES.

Specification forming part of Letters Patent No. 134,552, dated January 7, 1873.

To all whom it may concern:

Be it known that I, FINLEY LATTA, of Cincinnati, Hamilton county, Ohio, have invented an Improved Signal-Box for Fire-Alarm Telegraphs, of which the following is a specification:

Nature and Objects of the Invention.

Signal-boxes now in use are commonly arranged so as to indicate the location of a fire by the rotation of a circuit-wheel which is armed with a set of teeth or spurs that correspond in number with that of the box from which the alarm is "turned in;" but this method of signaling has proven to be, at times, very perplexing, and frequently unintelligible. This defect of the circuit-wheel system is due to the fact that there is no means of preventing said wheels being rotated too rapidly, and it frequently happens that, owing to the excitement attending the breaking out of a fire, the most experienced person will turn the operating crank or handle so fast as to confuse the sounds of the bell, where the signal is an audible one, or, where registration is employed, to confuse one character with another, thereby causing the pen of the instrument to record an unmeaning arrangement of dots and dashes, or else a continuous dash or scratch upon the paper.

My invention belongs to the class of devices designed to remedy this serious defect and to insure a prompt and absolutely correct signal, no matter how rapidly the operating-crank may be rotated. I accomplish this desirable result in the following manner: The rotating circuit-wheel is dispensed with and a gravitating-bar substituted therefor, which bar has the signal-characters arranged on one side of it. This signal-bar is rigidly attached to a piston or plunger which plays snugly within a cylinder that depends from the bottom of the signal-box proper, and said piston is capable of being elevated within said cylinder and allowed to descend therein, as hereinafter more fully described. The piston has a small channel in it, through which the imprisoned air within the cylinder gradually and uniformly escapes during the descent of said piston, it being understood that the cylinder is open at top, (except as it is closed by the piston,) but closed at bottom. The signal or character bar may be elevated either by a vertical-acting lifter or handle or by the rotation of a crank in the usual

manner; but whatever device may be employed for this purpose must be arranged in such a manner as to leave the bar free to descend as soon as it has reached the utmost limit of its upward stroke, and not be arrested or otherwise interfered with until the piston has reached the bottom of the cylinder. As the instrument records the characters only during the fall of the piston, and as the latter is compelled to descend at a perfectly uniform and regular speed, it will be seen that there can be no possible chance for a confusion of signals, although the operating crank or lifter be manipulated with the greatest rapidity.

Description of the Accompanying Drawing.

Figure 1 is an elevation of a fire-alarm signal-box embodying my improvements, the operating devices being shown in their normal condition and the door of the box thrown open. Fig. 2 is a vertical section through the operative parts of the box, showing the position they assume during the ascent of the piston or while an alarm is being "turned in." Fig. 3 is another vertical section through the box, showing the piston in the act of descending. Fig. 4 is an elevation of a portion of the door of the box, showing the groove which the operating crank or handle traverses. Fig. 5 is a front elevation of the wheel which elevates the character-rod, the shaft of said wheel with its accessories being shown in section. Fig. 6 is an edge view of said wheel and its accessories. Fig. 7 is a perspective view of the same wheel detached from its shaft. Fig. 8 is an axial section through the wheel and its accessories, the door of the signal-box being closed; and Fig. 9 is a longitudinal section of a portion of the character-bar.

Of the above illustrations, Figs. 7, 8, and 9 are drawn on an enlarged scale.

A represents a customary cast-iron box, to which is hinged, at *a a'*, the door B that is maintained in a closed condition by a lock, *b*, or otherwise. Fitted to the lower end of this box is a tube or cylinder, C, which is open at top, but closed at bottom, as clearly shown in Figs. 2 and 3; and said cylinder is traversed by a plunger or piston, which is constructed as follows: Securely clamped between two disks, D D', is a cupped leather or other suitable packing, *d*, which enables the piston

to move comparatively air-tight within the cylinder on its descending or effective stroke, and without sensible friction on its ascending or non-effective stroke. These three members, $D D' d$, of the piston are traversed by a minute aperture, E , which passes completely through them, as shown in Fig. 2; and this aperture communicates with a channel, f , in the under side of a weight, F , that rests upon the piston. This weight should be heavy enough to overcome the friction of the piston within the cylinder, and to compel the descent of the former at any determined and uniform speed. Projecting from the piston is a rod, G , which is confined to a vertical path by a guide, g , and said bar has inserted in it fillings g' , of wood, India rubber, or other suitable non-conductor of electricity. These fillings correspond in number and arrangement with the number of the signal to be indicated from the box, which, in the present illustration, is 14, and this numeral may be repeated twice on the character-bar, as represented, or it may be repeated three or more times, if desired. Attached to the character-bar, near the lower end of the same, is a connecting-rod or pitman, H , whose upper end takes hold of a wrist, i' , that projects horizontally from a lug, i , that radiates from the wheel I . This wheel or disk has a circumferential flange, j , which extends around about one-half the periphery of said wheel and terminates in two inwardly-projecting spurs, $K K'$, which are slotted at $k k'$ for a purpose which will be presently made to appear. These cam terminations permit the roller U to impinge against and leave the flange J as gradually as possible, and thus avoid jarring. The rim of this wheel is recessed at l to receive a tongue or spring, L , whose free end protrudes from the recess and is presented toward the front of the signal-box. The wheel I rotates freely upon a shaft, M , and it is prevented moving longitudinally of said shaft by the collar m and thimble N , the latter being secured to said shaft by set-screw n . Projecting from this thimble is an arm, O , that is capable of a semi-rotation in front of the wheel I . Secured to the thimble N is one end of a spiral or volute spring, P , whose other end is attached to a pin, p , that projects rearwardly from the bar Q , which is placed transversely of the box A , and supports the wheel I and its accessories. Fitted in the bar Q is a bushing, q , which serves as a journal-bearing for the shaft M . An outer collar, m' , in connection with the thimble N , prevents longitudinal movement of the shaft M within the bushing q . The exposed end of shaft M terminates in a square head or arbor, m'' , that is adapted to enter the correspondingly-shaped socket r of hub R , which latter is journaled horizontally within the door B of the box. The hub R is rotated by a crank, T , whose handle is loaded at t , and said loaded portion traverses a groove, b' , on the outside of the door, the groove being concentric with the axis of the hub. Pivoted to a bracket, a'' , is a circuit-

connector having the shape of a bell-crank, whose short arm U projects toward the wheel I , while the long arm U' extends down almost to the bottom of the box. Journaled in the free end of the short arm U is a small roller, u , which is composed of glass, hard rubber, or other non-conductor. V is a platinum point or finger that is attached to a pivoted arm, v , and said finger is maintained in contact with the character-rod by a spring, v' . $W W'$ are two cups, to which are secured the two customary wires $w w'$ that project through the top of the box. The cup W has also secured to it two wires, $X x$, of which the one X communicates with a plate, w' , below the long arm of the circuit-connector, while the wire x is attached to the magnet Y . Extending from the other magnet Y' is a wire, y , which passes down to the arm v and thence to key Z . The other cup W' has secured to it two wires, $X' x'$, the one X' communicating with the circuit-connector. The other wire x' leads to the testing apparatus or key Z . Projecting horizontally from the key Z is a pin, z , which limits the vibration of the long arm U' of the circuit-connector. This connector is maintained "out of circuit" by the spring u'' . Secured to the under side of the bar Q is a stud, q' , which limits the distance to which the mainspring P can rotate the arm O .

Operation.

My signal-box is operated in the following manner: In the normal condition of the apparatus the door B is closed, the hub R engaged over the arbor m'' of shaft M , and the weight t of the crank T rests at the left end of groove b' , the arm U' of the connector being in contact with the pin z . As soon as a fire occurs the person who is authorized to "turn in the alarm" has simply to rotate the crank T until the weight t comes in contact with the right end of groove b' , and then quit his hold of the crank, as the action of the instrument from this moment is entirely automatic. This movement of the crank causes a corresponding semi-rotation of the shaft M with its attached thimble N and arm O . As soon as the arm O begins to rotate it comes in contact with the spring-tongue L , and thus compels the wheel I to turn in unison with said shaft, thimble, and arm. During the rotation of wheel I the piston $D D' d$ is being elevated through the instrumentality of connecting-rod H , and the leather cupping around the piston allows air to enter freely below it, so as to destroy the tendency to create a vacuum within the cylinder C . When the rotation of wheel I has brought its flange J in contact with the non-conducting roller u the arm U' strikes against the plate w' , thereby throwing the box "out of circuit," and consequently there is no recording of signals while the bar G is being elevated. The positions which the various operative parts assume during the elevation of the piston is clearly seen in Fig. 2. When the handle T reaches the limit of the groove b' the wheel I will then

have been rotated so far toward the right as to carry the stud *i* beyond the center of said wheel, and consequently the weight *F* begins to act upon the latter in such a way as to continue its rotations. The wheel *I* having thus made a semi-rotation, the roller *u* escapes from under the flange *J*, and the spring *u''* instantly forces the arm *U'* away from the plate *u'* and against the pin *z*, thereby throwing the box "in circuit," and consequently the proper signal is recorded as the bar *G* passes down in contact with the finger *V*. As the imprisoned air within the cylinder *C* can escape only through the minute aperture *E*, it will be seen that the descent of the piston is correspondingly gradual and uniform, and consequently there is no chance whatever for the signals ever becoming confused with one another. As previously stated, the operator quits his hold of the crank *T* as soon as it strikes the right end of groove *b'*; and as this turning of said handle caused a slight winding up of the main-spring *P*, it will be seen that the moment the crank is free the tendency of said spring to uncoil itself will instantly return the arm *O* to its normal position and maintain it in contact with the stop *q'*. But should the operator inadvertently continue to operate the handle during the action of the signal, no motion will thereby be communicated to the wheel *I*, and thus all chances of an interfering signal is effectually guarded against.

The slots *k k'* in the cam-shaped terminations *K K'* of the circumferential flange *J* are for the purpose of allowing the free end of arm *O* to sweep through said terminations without coming in contact with them. As such contact would cause an improper rotation of the wheel *I* the advantages of the slots will be readily understood.

The drawing represents only the internal portion of the signal-box; but it is to be understood that the parts represented are to be inclosed within an outer shell or case, in the usual manner.

Instead of the rigid piston-rod herein represented, a flexible band of steel or other suitable material may be attached at one end to the plunger *D*, the other end of said band being secured to a segment-wheel in such a manner that the descent of the piston will cause the characters upon the band to be brought in

contact with the finger *V*. Or the piston-rod *G* may be geared to a signal-wheel having the usual characters upon it, as the gist of my invention consists in the gravitating-piston, which is arranged so as to descend in a perfectly uniform and gradual manner, no matter whether said descent is regulated by the compression of air, water, oil, or other fluid beneath it or by friction merely.

Useful novelty is believed to exist in the rigid character-rod projecting from a piston that traverses a vertical tube or cylinder, open at top and closed at bottom, said piston being arranged so as to be elevated within the cylinder without sensible friction, and to have its descent within the same automatically retarded by the compression of air beneath said piston.

I am aware that fire-alarm telegraph-boxes have been devised which have comprised a gravitating motor or weight, which, after being once started, has operated independently of the prime impulse, and that such uniform action of such motor has been sought to be attained by means of various horological expedients, such as escapements and springs; but such devices are believed to be objectionable by reason of their expense, consumption of power, and liability to deterioration. I therefore make no claim, broadly, to such expedients.

Claims.

I claim as my invention—

1. In telegraph-fire-alarm signal-boxes, the character bar or rod *G* brought into registering action by the descent of a gravitating-piston, *D D' d*, within a suitable tube or cylinder, *C*, the descent of said piston being regulated substantially as herein described and set forth.

2. The combination of the tube *C*, perforated piston *D E*, character-bar *G g'*, pitman *H*, wheel *I i J K K' k k'*, spring *L*, shaft *M m''*, thimble *N n*, arm *O*, operating-spring *P*, hub *R r*, and crank *T*, as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

FINLEY LATTA.

Attest:

GEO. H. KNIGHT,
JAMES. H. LAYMAN.