No. 842,861. PATENTED FEB. 5, 1907.

F. W. COLE.

AUXILIARY FIRE ALARM BOX.

APPLICATION FILED OCT. 11, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

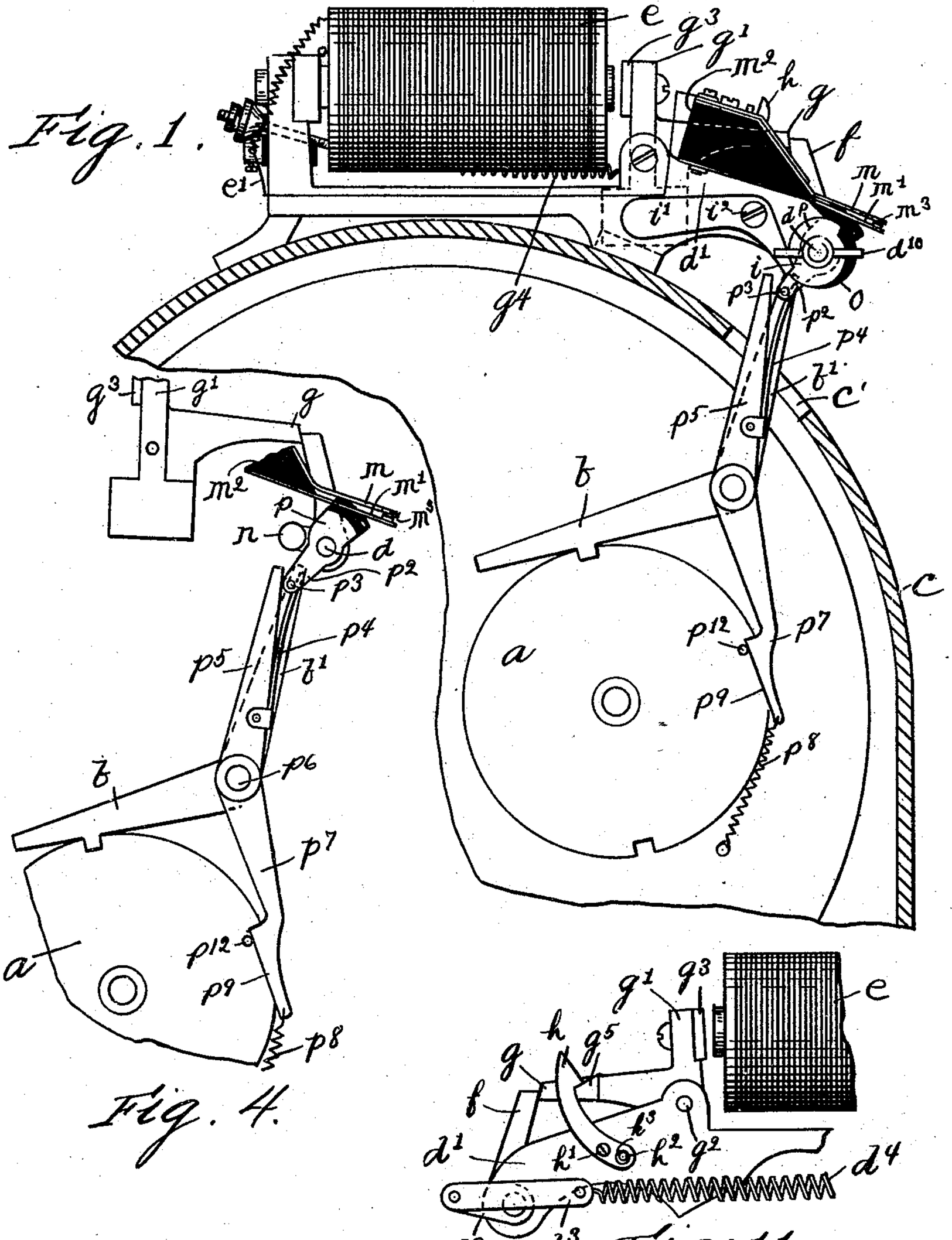

Fig. 4.

Fig. 11.

Witnesses:

H. B. Davis.

Cynthia Doyle

Inventor:

Frederick W. Cole

by Howson Harriman

Attys

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2 SHEETS—SHEET 2.

Fig. 2.

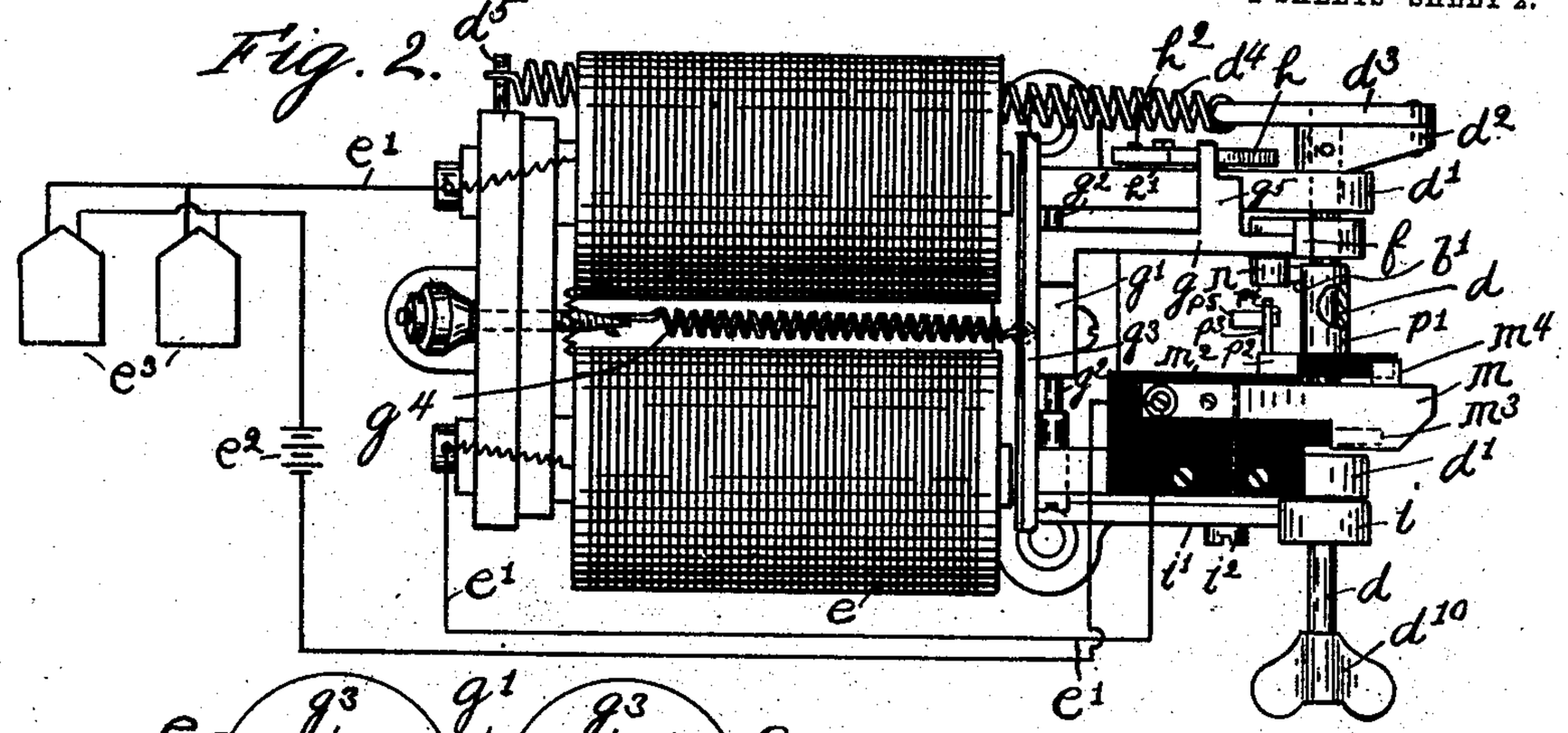

Fig. 3.

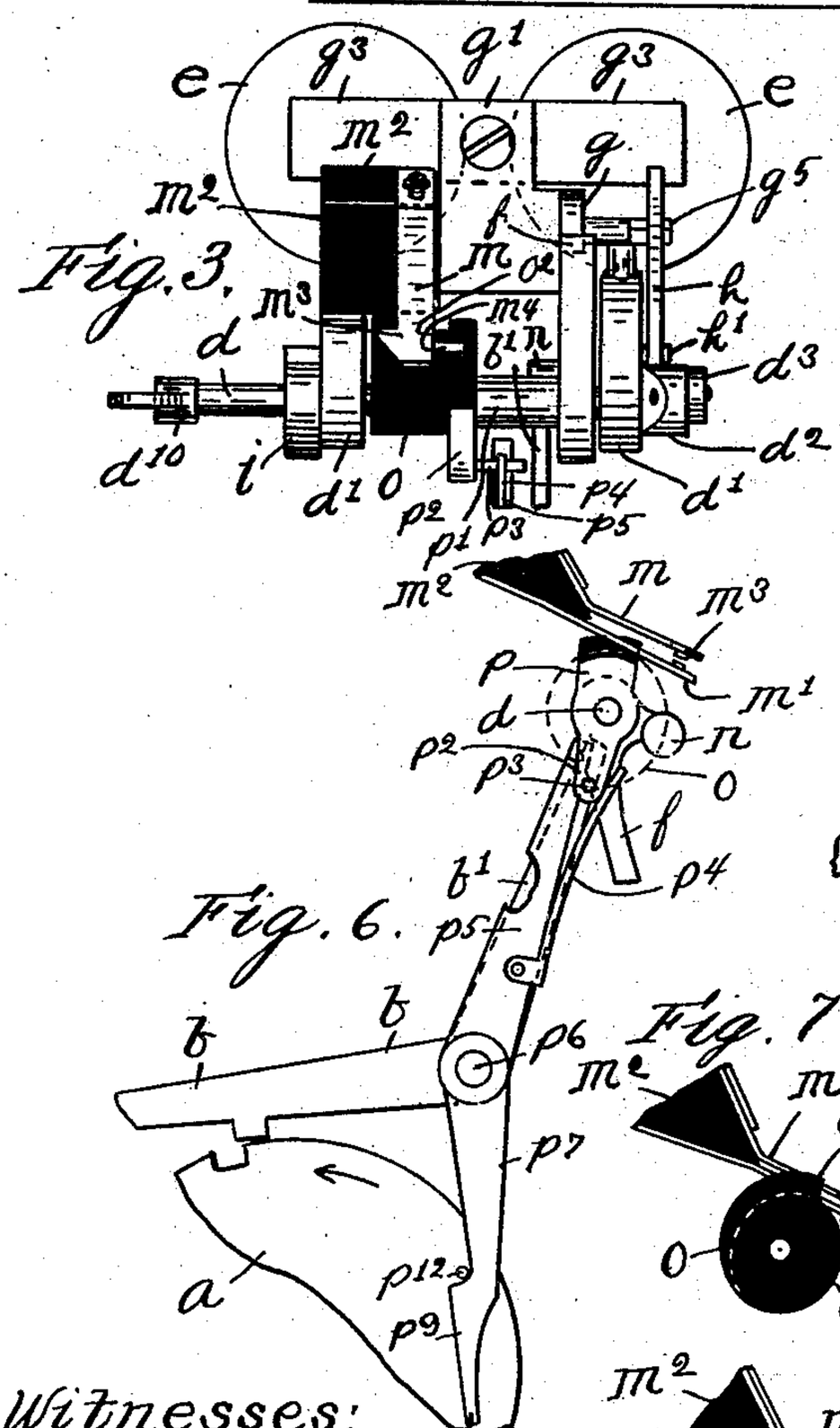

Fig. 5.

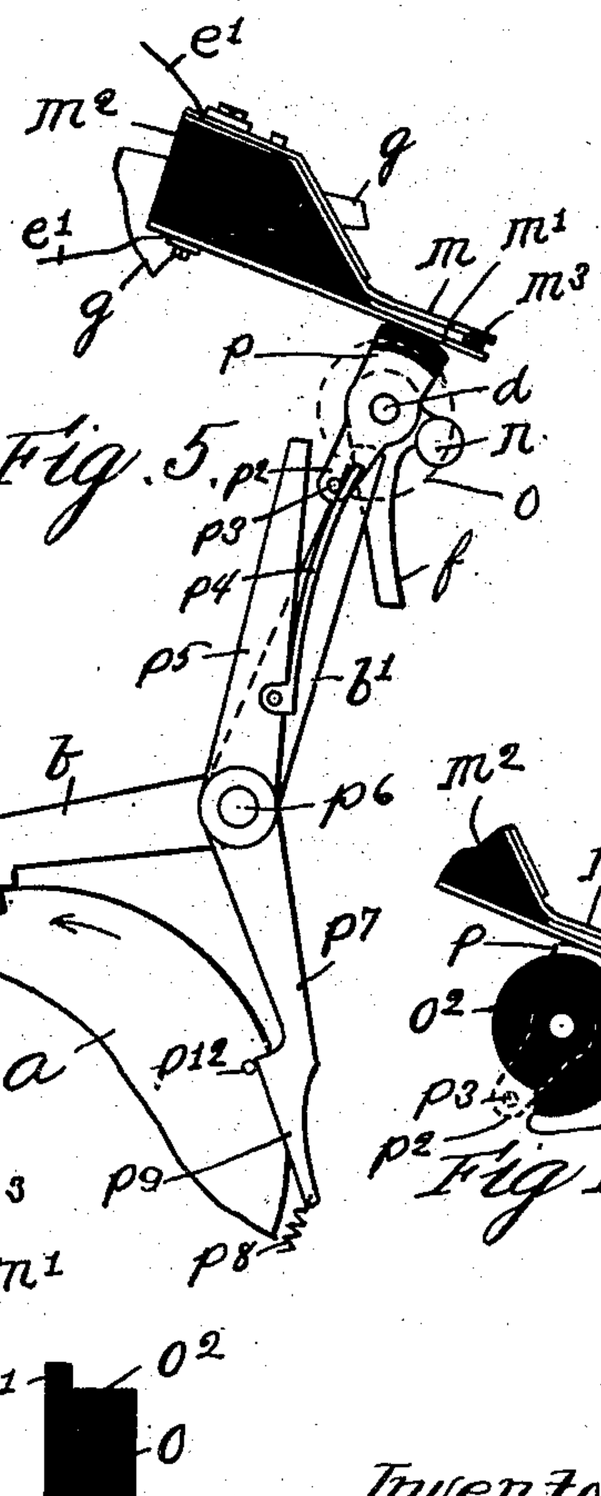

Fig. 6.

Fig. 7.

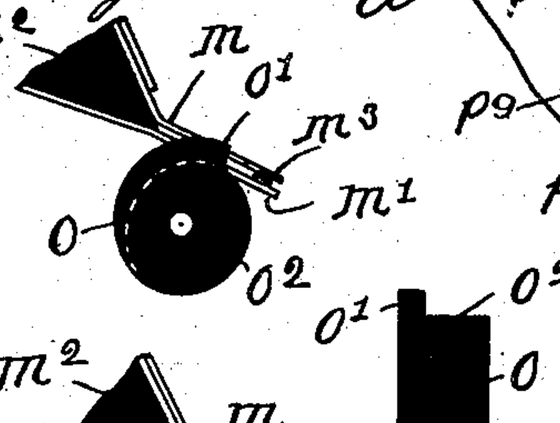

Fig. 12.

Fig. 8.

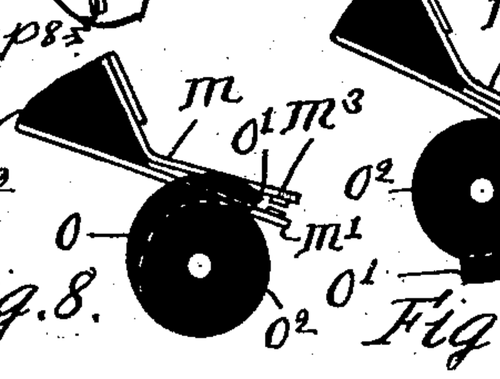

Fig. 9.

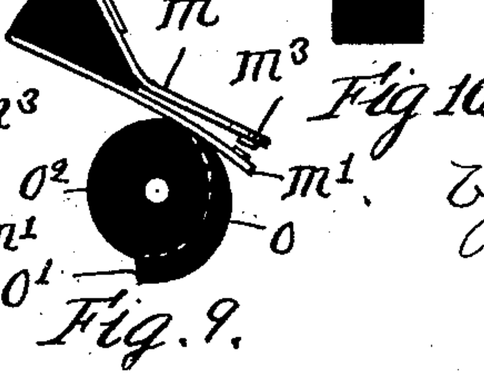

Fig. 10.

Witnesses:

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UNITED STATES PATENT OFFICE.

FREDERICK W. COLE, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO THE GAMEWELL FIRE-ALARM TELEGRAPH COMPANY, OF NEW YORK, N. Y. A CORPORATION OF NEW YORK.

AUXILIARY FIRE-ALARM BOX.

No. 842,861. Specification of Letters Patent. Patented Feb. 5, 1907.

Application filed October 11, 1905. Serial No. 282,250.

To all whom it may concern:

Be it known that I, FREDERICK W. COLE, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in Auxiliary Fire-Alarm Boxes, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to auxiliary fire-alarm boxes, and has for its object to improve and simplify the construction of the auxiliary actuating mechanism employed for releasing or otherwise operating the signaling-train; also, to provide the auxiliary actuating mechanism with means—such, for instance, as a gravitating dog—adapted to be operated by a sudden shock or jar, as when a team strikes the pole bearing the box, to engage a coöperative part of said actuating mechanism and hold it at rest, thereby obviating the liability of sending in a false alarm; also, to provide means for operating the switch for opening the auxiliary circuit, which is adapted to be operated by the joint action of the auxiliary actuating mechanism and the signaling-train to open said circuit after the signaling-train has started.

Figure 1 shows in front elevation the auxiliary-actuating mechanism for a fire-alarm box, embodying this invention, in connection with a sufficient portion of the box to illustrate the same. Fig. 2 is a plan view of the auxiliary actuating mechanism shown in Fig. 1. Fig. 3 is an end view of the auxiliary actuating mechanism shown in Fig. 2. Fig. 4 is a detail showing the switch of the local or auxiliary circuit and means for operating it, the parts being shown in the position they will occupy when the auxiliary actuating mechanism and signaling-train are at rest. Fig. 5 is a detail similar to Fig. 4, the parts being shown in the position they will occupy immediately after the auxiliary actuating mechanism has operated and has released the signaling-train, but before the switch has been opened. Fig. 6 is a detail similar to Figs. 4 and 5, the parts being shown in the position they will occupy immediately after the switch has been opened. Figs. 7, 8, 9, and 10 are details of the cam-block for operating the switch. Fig. 11 is a detail of the means employed for preventing accidental operation of the box, and Fig. 12 is another detail of the cam-block for operating the switch.

a designates the stop-wheel of any ordinary signaling-train; *b*, the locking or starting lever; *c*, the shell or case containing the signaling-train, having an opening *c'*, through which an arm *b'*, connected with the locking or starting lever projects into position to be engaged and operated by the auxiliary actuating mechanism. *d* designates the main shaft of the auxiliary actuating mechanism, having its bearings in any suitable framework, which, as herein shown, comprises a pair of parallel arms *d' d'*, projecting from the support for the electromagnet *e*, which is included in the auxiliary circuit *e'*, containing a battery e^2, and as many circuit-operating devices as desired, which latter are or may be contained in boxes e^3. The shaft *d* has fixed to it, preferably at one end outside of its bearing *d'*, a crank-arm d^2, (see Figs. 2 and 11,) to which at a point near its extremity is loosely connected one end of a link d^3, to the opposite end of which one end of a spiral spring d^4 is connected, the other end of said spring being attached to a fixed pin d^5 on the frame.

The spring d^4 serves as the actuating-spring for turning the shaft *d*, and being connected with said shaft by a crank-arm provision is made for permitting a complete rotation of the shaft.

It is designed and intended that said shaft *d* shall be turned half of a revolution or thereabout by a suitable winding device to be described and during such movement shall extend the spring d^4. The shaft then becomes locked by means to be described with the spring d^4 held under tension and the pins d^2 and d^5, to which said spring is connected, disposed in a line crossing the axis of the shaft *d*, so that said spring, although fully extended, has only a slight tendency to turn the shaft, or, in other words, the shaft is locked with the crank-arm just off its dead-center. The shaft may thus be held easily in such position, and as the spring d^4 exerts but little pressure on the locking devices said locking devices can be operated easily. It is furthermore designed and intended that said shaft *d* shall be turned the other half of a revolution or thereabout in the same direc-

tion by the action of said spring d^4 whenever it is released and the spring permitted to act and during such half-revolution to operate the starting-lever of the signaling-train, and thereby release said train or cause it to operate to transmit its signal. The shaft d thus makes a complete revolution.

The shaft d has secured to it a detent f, which is made as a short arm or finger and which projects from the shaft a sufficient distance to engage a suitable let-off, which is operated by the electromagnet e to thereby release the auxiliary actuating mechanism.

E designates the let-off, which is made as a short arm or finger projecting from the member g', which bears the armature g^3 and which is pivoted at g^2 to the frame. The armature g^3 of the electromagnet e is normally held retracted by the retractile movement of a spring g^4, which is attached at one end to the armature-support g' and at the other end to a fixed point, and when so held the let-off g occupies a position to be engaged by the detent f, which latter is brought to bear against the end thereof when the shaft d is wound and the spring d^4 placed under tension, as shown in Fig. 2.

Whenever the armature g^3 is attracted by the electromagnet e, the let-off g will be raised and the detent f thereby released, and the shaft d will be turned by the actuating-spring d^4 a half-revolution.

The let-off g has a lateral projection g^5 on one side of it, (see Figs. 2 and 11,) adapted to be temporarily engaged by a gravitating dog h, and thereby held from moving to release the detent. The gravitating dog h is loosely pivoted at h' to the frame, and its upper end is formed as a hook, and said dog is so shaped and so disposed relative to the projection g^5 that its hooked end may be moved into engagement with said projection when the let-off is in locking engagement with the detent f to thereby temporarily hold the let-off in such position. The dog h, however, normally occupies a remote position out of engagement with said projection g^5; but in case the box receives a sudden shock or jar said dog will be moved suddenly into engagement with said projection g^5, as shown in Fig. 11, and will immediately fall back by gravity. The dog h has a hole h^3 through it for a pin h^2, although said hole is made much larger than the pin, so that the dog will have considerable free play; yet said pin limits the movement of the dog. This gravitating dog is very important in fire-alarm boxes of the type having a normally wound actuating mechanism, as it frequently happens that the actuating mechanism is released by a severe shock or jar, and a false alarm is consequently sent in, and such result is prevented by the employment of said gravitating dog. It is therefore obvious that while the dog is instantly responsive to shocks or jars and effectively operates to temporarily engage the let-off, and thereby prevent the same from operating, yet said gravitating dog may be employed in connection with any other coöperative part of the auxiliary actuating mechanism or may be used in connection with auxiliary mechanisms and with normally wound mechanisms of different constructions from that herein shown without departing from the spirit and scope of this invention.

For the purpose of winding the shaft d, and thereby placing the spring d^4 under tension, I have attached to its front end a thumb and finger piece d^{10}, which is readily accessible, so as to be engaged and operated by a person to turn the shaft.

The shaft d is always turned in the same direction while being wound and also while being operated by the spring d^4, and means are provided for preventing backward rotation of said shaft, which also assists in locking it, and, as herein shown, said means consists of a double cam-disk i, (see Figs. 1 and 2,) secured to the shaft d, with which coöperates a suitable weighted pawl i', pivoted at i^2 to the frame. The cam-disk i serves as and acts after the manner of a ratchet-wheel, the pawl i' engaging or abutting against the shoulders formed thereon when an attempt is made to turn the shaft backward.

When the shaft is wound up and its detent f thereby brought into engagement with the let-off g, the cam-disk i will have been turned sufficiently for the pawl i' to slip over one of the projections of the cam-disk, so as to occupy a position to abut against one of the shoulders if it is attempted to turn the shaft backward, and when the parts are thus relatively disposed the shaft can be turned neither backward nor forward, as it is positively held from turning in both directions by the conjoint action of the pawl i' and the let-off g. The shaft d is thus effectively locked when set in position to be released by the electromagnet e. The shaft d has also secured to it a projection n, which when the shaft is released and is turned a half-revolution by the spring d^4 will engage and pass by the upper end of the arm b', which is connected with the starting-lever of the signaling-train, and by so acting upon said arm b' will move the starting-lever to disengage the stop-wheel a and thereby release the signaling-train.

The projection n for simplicity of construction is herein shown as formed as a lateral opjection on the hub of the detent f; yet obviously it may be otherwise constructed and connected to the shaft d, so as to be operated by said shaft to in turn operate the starting- lever of the signaling-train.

Each time the main shaft is turned by the spring d^4 the projection n will engage and operate the starting-lever and release the signaling-train.

In signal-boxes having an auxiliary actuating mechanism a switch is usually employed for opening the auxiliary circuit, and said switch is usually operated either by the auxiliary actuating mechanism or by the train in running; but herein a switch is provided which is adapted to be operated by the conjoint action of both, thus having the advantage of not operating until after the signaling-train has been released by the auxiliary actuating mechanism.

The switch herein shown is composed, essentially, of two members m and m', made as spring-acting contact-pens, attached one to the upper and the other to the under side of a block m^2 of insulating material and projecting therefrom short distances, the projecting portions of said springs occupying positions one above the other and adapted to be moved one into engagement with the other, and the circuit-wires e' of the auxiliary circuit are respectively connected to said contact-pens.

The switch may be operated by the joint or combined action of the auxiliary actuating mechanism and the signaling-train in many different ways, and as I am the first, so far as I am aware, to provide a switch for opening the auxiliary circuit d', adapted to be operated by the joint or combined action of the auxiliary actuating mechanism and the signaling-train in running, I therefore desire to broadly include the same within the scope of my invention. One way of carrying out this part of my invention is herein shown merely for the sake of illustration.

The inherent tendency of the contact-pens m m' of the switch herein shown is to separate and thereby open the auxiliary circuit e', although normally they are held in engagement with each other, so as to maintain the auxiliary circuit e' closed at this point.

To the shaft d an approximately cylindrical block of insulating material o is secured having two cams or cam-surfaces formed on it, as o' o^2, one for engaging and lifting the contact-pen m and the other for engaging and lifting the contact-pen m', and said block is so placed on the shaft that its cam portions will engage and lift the contact-pens while said shaft is being wound, and consequently they are thus operated by the winding device.

The contact-pen m has formed on it a lateral extension m^3 for engagement with the cam o', and the contact-pen m' has formed on it a lateral extension m^4 for engagement with the cam o^2.

When the shaft d is turned by the winding means, the cams o' o^2 will respectively engage and lift the contact-pens to a predetermined elevation, and while lifting them will hold them separated, as shown in Fig. 8, until just before the shaft is completely wound, at which time the cam o' passes by or out of engagement with the projection m^3, and thereby allows the contact-pen m to fall by its inherent spring-action into engagement with contact-pen m', as shown in Fig. 7. The free ends of both contact-pens at such time are supported by the cam o^2 in an elevated position and in engagement with each other. This operation of the switch m m' by the winding device constitutes resetting it, and the cams o' o^2 employed for resetting it constitute a switch-controller; yet the most important function of said switch-controller is not to reset the switch, but when operated by the shaft d to control the position of said switch, as will be described.

When the switch is reset and its free ends thus supported in an elevated position and in engagement with each other by the cam o^2, the lateral projection m^4 on the under contact-pen m' will overlie a suitable prop or support p. This prop or support p and means for operating it adapted to be operated by the signaling-train, as will be described, constitute the switch-operating device.

The prop or support p (see Figs. 4 and 5) is made as a sector and its outer edge is faced with insulating material, and said sector is rigidly secured to a hub or sleeve p', loosely mounted on the shaft d, and beneath said sector or the hub or sleeve p' a short arm p^2 is provided having a laterally-extended pin p^3, which is engaged by the upper or free end of a flat spring-acting arm p^4, attached at its lower end to an arm p^5, which is pivoted at p^6. The arm p^5 is made as long or longer than the spring-acting arm p^4, and the pin p^3 occupies a position between said arms p^5 and p^4, so as to be engaged by one or the other of said arms when said arm p^5 is moved on its pivot. An arm p^7 extends radially from the hub of the arm p^5 in a downward direction, and to its extremity one end of a spring p^8 is connected, the opposite end of which is attached to a fixed point, and said arm p^7 has formed at or near its extremity a projection or hook p^9. The arm p^7 is normally held by the spring p^8, with its projection or hook p^9 in engagement with a pin p^{12} on the stop-wheel a of the signaling-train when said train is in its normal position of rest. As soon as the stop-wheel a has started and moved a short distance in the direction of the arrow thereon the pin p^{12} passes by or beyond the projection or hook p^9, and the arm p^7 is then moved by the spring p^8 from the position shown in Figs. 4 and 5 to the position shown in Fig. 6, and when so moved the arm p^5 will be correspondingly moved and will engage the pin p^3 and turn the hub or sleeve p' on the shaft d and move the prop p from beneath the projection m^4 on the under contact-spring from the position shown in Fig. 4 to the position shown in Fig. 6. The prop, however, is not moved from beneath the pro-

jection m^4 until operated by a coöperative part of the signaling-train, and consequently not until after said train has started.

When the shaft d of the auxiliary actuating mechanism is released, the cams o' o^2, which are secured to said shaft d, will be turned by said shaft from the position shown in Fig. 7 to the position shown in Fig. 12, thereby disengaging the contact-pens m m'; but at such time said contact-pens will still be supported in elevated position and in engagement with each other by the prop p, as shown in Fig. 5, and when said prop p is thereafter moved from beneath the projection m^4 said contact-pens will be disengaged from each other to open the auxiliary circuit, the uppermost contact-pen falling slightly or perhaps not at all, while the lowermost contact-pen falls onto the cam o^2, as shown in Fig. 9.

It will thus be seen that the auxiliary circuit is opened by the switch only after the switch-controller has been operated by the auxiliary actuating mechanism and the switch-operating device has been moved by the signaling-train. Therefore the switch is operated to open the auxiliary circuit by the combined action of the auxiliary actuating mechanism and signaling-train.

As the signaling-train ceases to operate and the coöperative parts thereof resume their normal positions its starting or locking lever b reënters the notch in the stop-wheel a. The pin p^{12} on said stop-wheel engages the projection p^9 on the arm p^7 and moves said arm p^7 outward to the position shown in Fig. 4, and as said arm p^7 is thus moved outward the spring-acting arm p^4, borne by the arm p^5, will engage the pin p^3 and will exert its pressure thereupon and tend to restore the prop to its normal position—that is, to the position shown in Fig. 4; but said prop will only be moved into engagement with the edge of the projection m^4 and will remain in such position under the tension of the spring-acting arm p^4 until said projection m^4 is lifted by the cams sufficiently to allow said prop to pass beneath it. Hence the switch-operating device is restored by means operated by the signaling-train, but will not resume its normal position until after the switch-controller has been reset.

The auxiliary-circuit contacts m m' will remain open until the winding device has been operated and the auxiliary actuating mechanism reset.

When resetting the auxiliary actuating mechanism, the shaft d is turned by the finger-piece d^{10}, and the cams o' o^2 are correspondingly turned and the contact-pens m m' lifted until the lowermost contact-pen m' is raised high enough for the prop to pass beneath it and also until the cam o' passes by the projection m^3 on the uppermost contact-pen m, whereupon said contact-pen m falls onto the contact-pen m', thereby restoring all the parts to their normal or reset position.

Whenever the auxiliary circuit e' is operated, the electromagnet e attracts its armature, the let-off g is lifted. The detent f is thereby released, and the shaft d is turned by the spring d^4 a half-revolution. During such movement of the shaft d the projection n on said shaft, is moved from the position shown in Fig. 4 to the position shown in Fig. 5, and during such movement it engages and moves the arm d', which is connected with the starting-lever b of the signaling-train, and thereby lifts said starting-lever to release the signaling-train; also during such movement of the shaft d the cams o' o^2, which are secured to said shaft, are moved from the position shown in Fig. 7 to the position shown in Fig. 12, disengaging the contact-pens m m'; but said pens still remain in engagement with each other, being held by the prop p. As the stop-wheel a of the signaling-train moves in the direction of the arrow thereon the pin p^{12} soon passes by the end of the arm p^7, and said arm is then moved on its pivot by the spring p^8, and the arm p^5, which is connected with said arm p^7, is moved and strikes the pin p^3 on the prop p and moves said prop from beneath the contact-pens. The contact-pens then immediately separate, as shown in Fig. 6, opening the auxiliary circuit. As the signaling-train ceases to operate and the parts thereof resume their normal positions the pin p^{12} on the stop-wheel moves the arm p^7 and the spring-acting arm p^4 engages and moves the prop into position to again pass beneath the contact-pens. The shaft d is then turned by the finger-piece a half-revolution, which resets it and the parts connected with it. During such winding movement of the shaft the spring d^4 is placed under tension, the cams o' o^2 operated to lift the contact-pens, so that the prop can pass beneath them, and the detent f is brought into engagement with the let-off g. The parts are then in position to be operated again by the electromagnet e.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an auxiliary fire-alarm box, a signaling-train, auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a winding device for said actuating mechanism, a switch in said auxiliary circuit and means operated by the auxiliary actuating mechanism and the signaling-train in running, for operating said switch to open said auxiliary circuit, substantially as described.

2. In an auxiliary fire-alarm box, a signaling-train, auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a winding device for said actu-

ating mechanism, a switch in said auxiliary circuit, two coöperating operating devices for said switch, one of which is adapted to be operated by the auxiliary actuating mechanism, and the other by the signaling-train, substantially as described.

3. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a winding device for said auxiliary actuating mechanism, a switch in said auxiliary circuit, a switch-controller connected with and operated by the auxiliary actuating mechanism, and a switch-operating device adapted to be operated by the signaling-train after said switch-controller has been operated, substantially as described.

4. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a winding device for said auxiliary actuating mechanism, a switch in said auxiliary circuit, a switch-controller consisting of a cam connected with and operated by the auxiliary actuating mechanism and a switch-operating device adapted to be operated by the signaling-train after said switch-controller has been operated, substantially as described.

5. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a winding device for said auxiliary actuating mechanism, a switch in said auxiliary circuit, a switch-controller adapted to be operated by the auxiliary actuating mechanism, a switch-operating device consisting of means for holding the members of the switch in engagement when disengaged by the switch-controller, and means operated by the signaling-train for subsequently separating said members to open the auxiliary circuit, substantially as described.

6. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a winding device for said auxiliary actuating mechanism, a switch in said auxiliary circuit, a switch-controller adapted to be operated by the auxiliary actuating mechanism, a switch-operating device consisting of a prop for holding the members of said switch in engagement when disengaged by the switch-controller, and means operated by the signaling-train for moving said prop out of engagement with said switch, substantially as described.

7. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a winding device for said auxiliary actuating mechanism, a switch in said auxiliary circuit, a switch-controller connected with and operated by the auxiliary actuating mechanism, a switch-operating device consisting of a prop for holding the members of said switch in engagement and a lever operated by the signaling-train for moving said prop out of engagement with said switch, substantially as described.

8. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a winding device for said auxiliary actuating mechanism, a switch in said auxiliary circuit, a switch-controller connected with and operated by the auxiliary actuating mechanism, and a switch-operating device adapted to be operated by the signaling-train after said switch-controller has been operated, and to be subsequently restored after the switch-controller is reset, by means operated by the signaling-train.

9. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, a switch in said auxiliary circuit, a switch-controller operated by the auxiliary actuating mechanism when released, means for winding said auxiliary actuating mechanism and resetting said switch-controller, and a switch-operating device adapted to be operated by the signaling-train after the switch-controller has been operated, and to be subsequently restored by means operated by said train, resuming its normal position after the switch-controller has been reset, substantially as described.

10. In an auxiliary fire-alarm box, a signaling-train, auxiliary actuating mechanism for it, an electromagnet included in an auxiliary circuit for releasing said auxiliary actuating mechanism, and means operated by the joint action of the auxiliary actuating mechanism and the signaling-train for opening said auxiliary circuit, substantially as described.

11. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it comprising essentially a shaft, a crank-arm thereon, an actuating-spring for said shaft connected at one end to the extremity of said arm and at the other end to a fixed point, means for locking said shaft with the crank-arm just off its dead-center and means operated by said shaft for operating the starting-lever of the signaling-train, substantially as described.

12. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it comprising essentially a shaft, a crank-arm thereon, an actuating-spring con-

nected to said crank-arm, a locking device for the shaft, means for turning said shaft half a revolution to extend the actuating-spring, and means operated by said shaft during the succeeding half-revolution for operating the starting-lever of the signaling-train, substantially as described.

13. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it comprising essentially a shaft, an actuating-spring therefor, a detent on the shaft, a let-off in engagement with which said detent is normally held by said spring, means for moving the shaft half a revolution to wind the actuating-spring and bring the detent into engagement with the let-off, an electromagnet for operating the let-off, and means operated by the shaft during its succeeding half-revolution for operating the starting-lever of the signaling-train, substantially as described.

14. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it comprising a shaft and means operated by it for operating the starting-lever of the signaling-train, means for winding, locking and releasing said shaft, a switch adapted to open the auxiliary circuit, and a resetting device for said switch operated by said shaft, substantially as described.

15. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it comprising a shaft and means operated by it for operating the starting-lever of the signaling-train, means for winding, locking and releasing said shaft, a switch adapted to open the auxiliary circuit, and cams on said shaft for resetting said switch, substantially as described.

16. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it comprising a shaft, means operated by it for operating the starting-lever of the signaling-train, an actuating-spring for turning it half a revolution, a winding device for turning it half a revolution in the same direction to wind said actuating-spring, and means for preventing backward rotation of said shaft, substantially as described.

17. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it and a gravitating dog adapted to engage one of the coöperative parts of said actuating mechanism, substantially as described.

18. In an auxiliary fire-alarm box, a signaling-train, an auxiliary actuating mechanism for it comprising a detent, a let-off for said detent connected to the armature of an electromagnet which is included in the auxiliary circuit and a gravitating dog adapted to engage said let-off, substantially as described.

19. A normally wound mechanism, means for releasing it and a gravitating dog adapted to be thrown into temporary engagement with one of the coöperating parts to temporarily check the operation of said mechanism, substantially as described.

20. A normally wound mechanism, a detent, a let-off for said detent connected to the armature of an electromagnet, and a gravitating dog adapted to be thrown into temporary engagement with said let-off to hold it, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK W. COLE.

Witnesses:
B. J. NOYES,
H. B. DAVIS.