(No Model.) 3 Sheets—Sheet 1.

B. FRESE.

ELECTRIC FIRE ALARM BOX.

No. 277,020. Patented May 8, 1883.

Fig. 2.

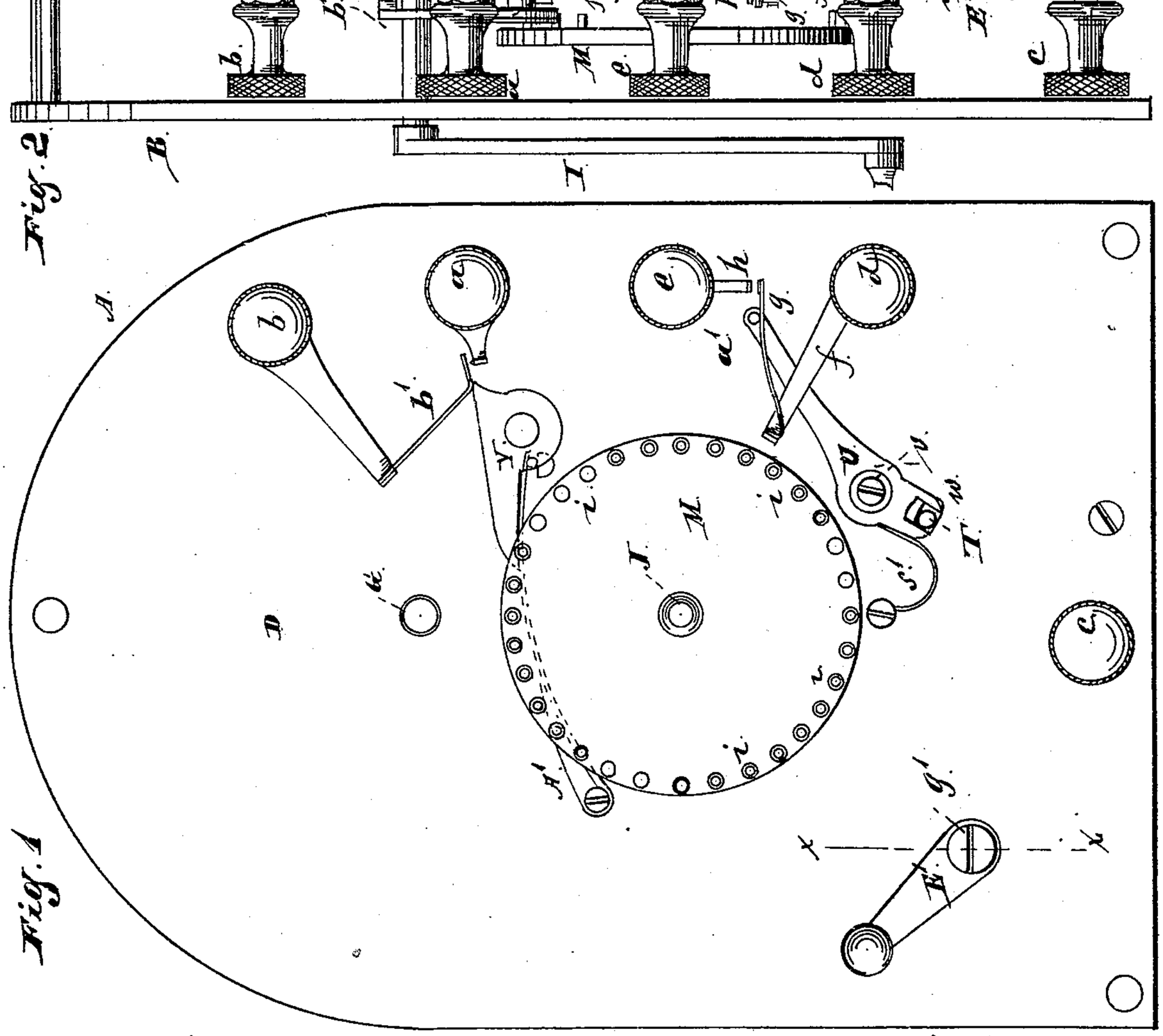

Fig. 1.

Witnesses:
Chas. W. Bond
Albert H. Adams.

Inventor:
Bernard Frese.

(No Model.) 3 Sheets—Sheet 2.

B. FRESE.

ELECTRIC FIRE ALARM BOX.

No. 277,020. Patented May 8, 1883.

Fig. 3

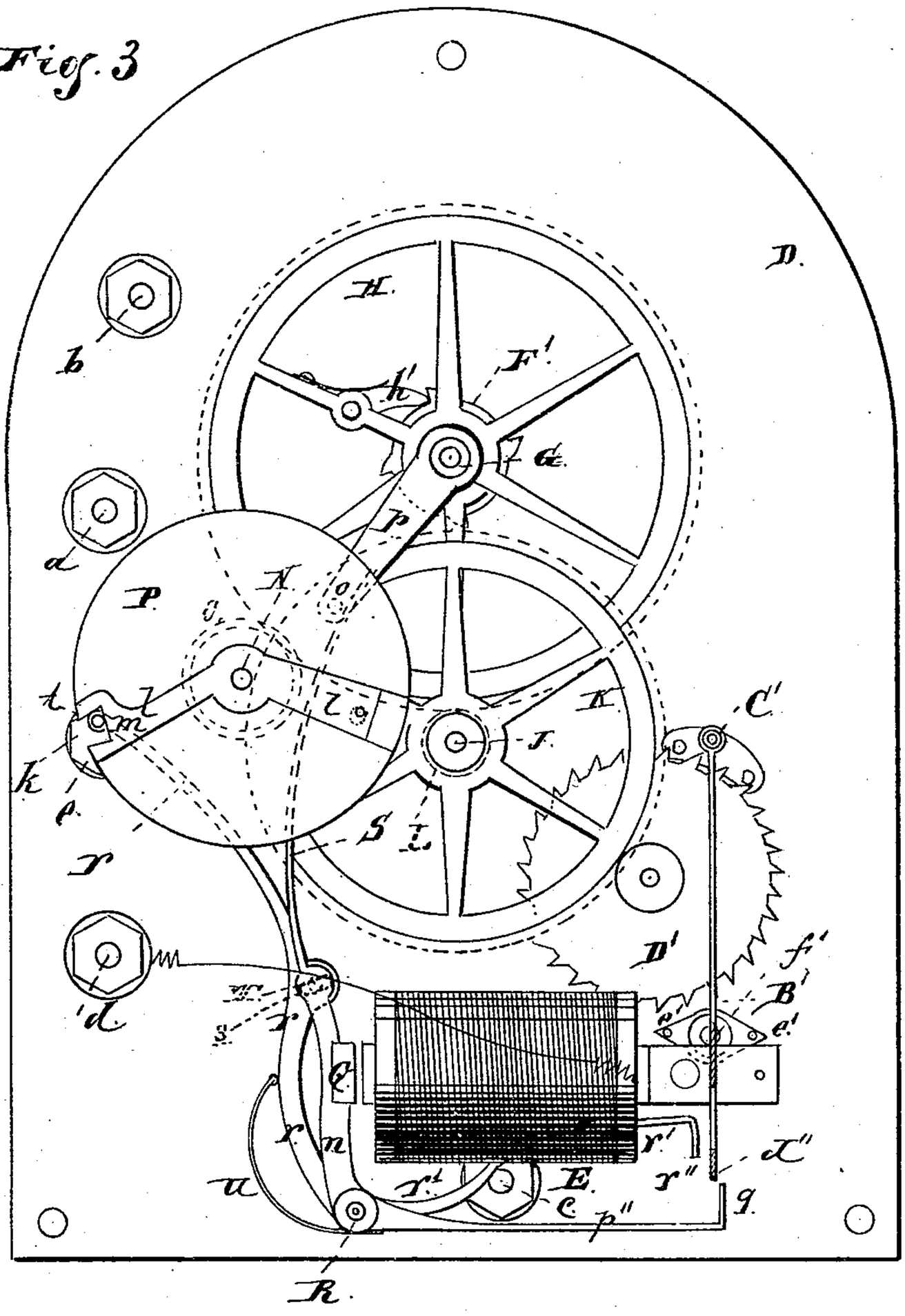

Fig. 5 Fig. 6

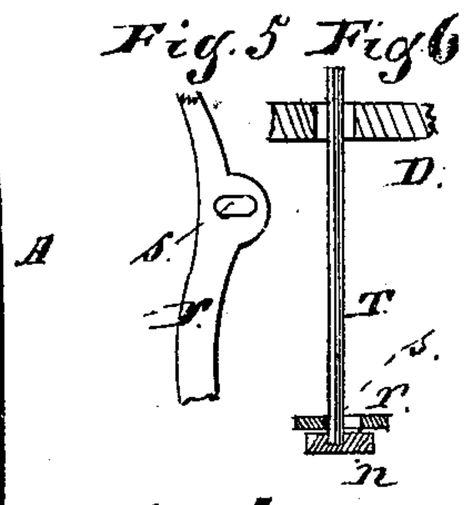

Fig. 4

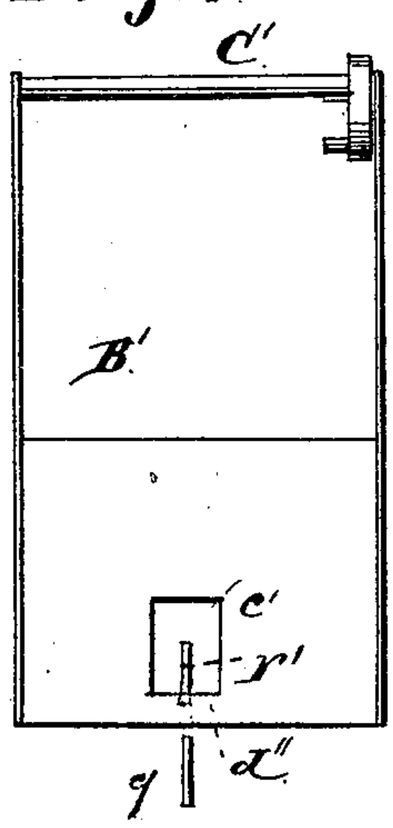

Fig. 7.

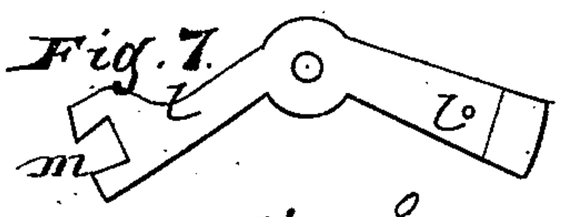

Fig. 8.

Witnesses:
Wm. Bond.
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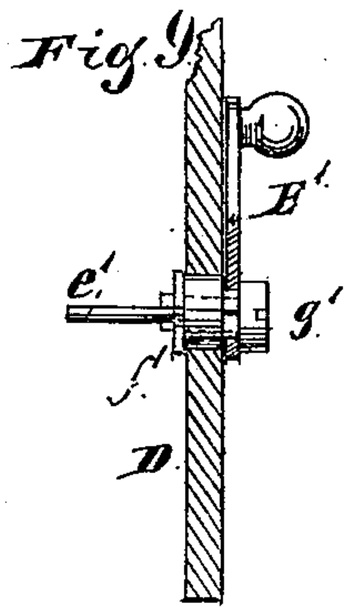
Fig. 9.



Inventor:
Bernard Frese.

(No Model.) 3 Sheets—Sheet 3.

B. FRESE.

ELECTRIC FIRE ALARM BOX.

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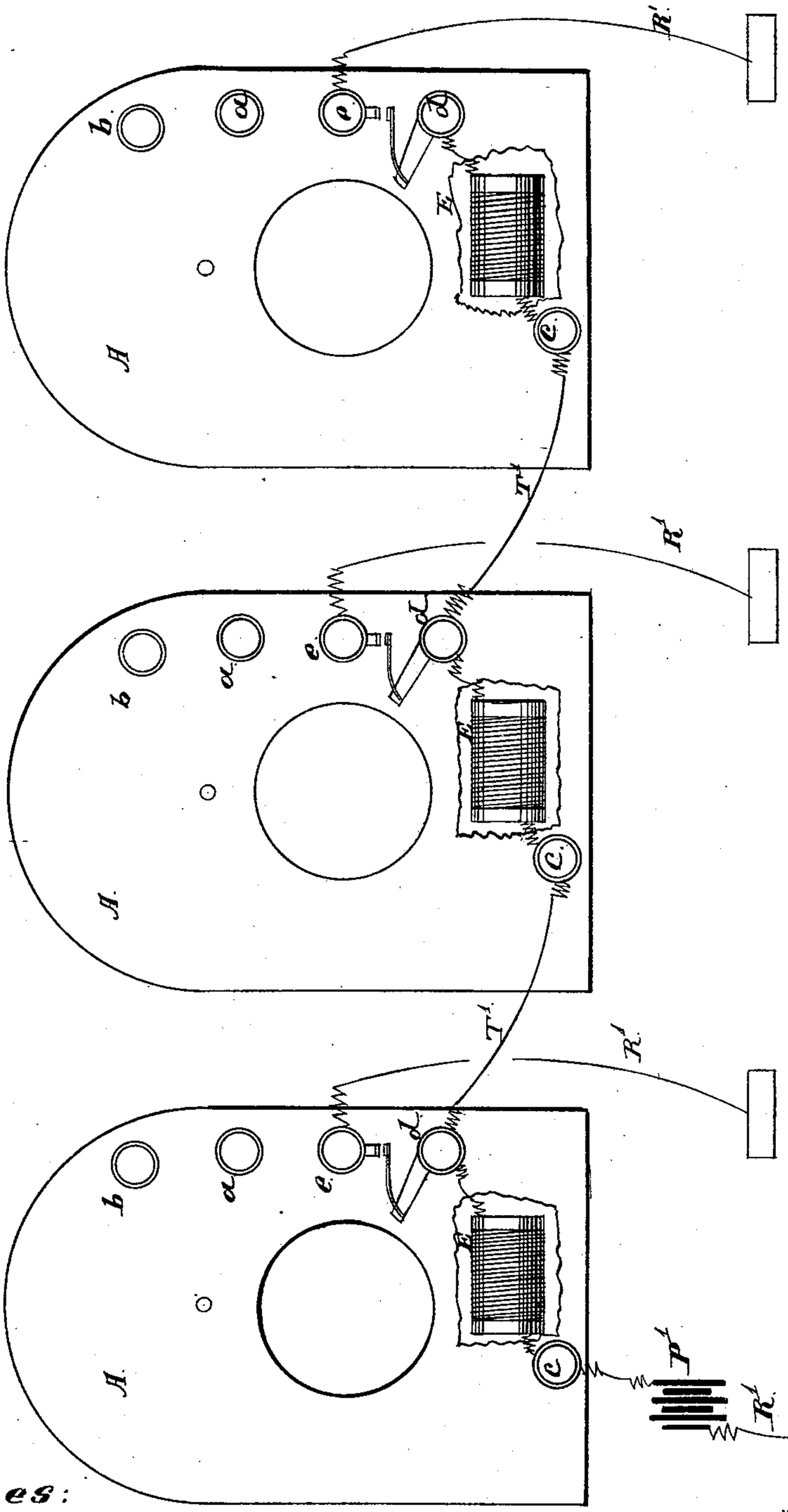

Fig. 10.

Witnesses:
H. J. Burns
Albert H. Adams.

Inventor:
Bernard Frese

UNITED STATES PATENT OFFICE.

BERNARD FRESE, OF CHICAGO, ILLINOIS.

ELECTRIC FIRE-ALARM BOX.

SPECIFICATION forming part of Letters Patent No. 277,020, dated May 8, 1883.

Application filed August 31, 1882. (No model.)

To all whom it may concern:

Be it known that I, BERNARD FRESE, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Electric Fire-Alarm Boxes, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation, the front plate being removed, and also the handle for giving the signal. Fig. 2 is a side elevation. Fig. 3 is a rear elevation with the rear main plate removed for the purpose of showing the interior, the operating-spring being also removed. Fig. 4 is a detail of the vibrating fly; Fig. 5, a detail showing the slot in the loose armature-lever; Fig. 6, a detail showing the connection between the cut-off and the armature-lever. Fig. 7 is a detail view of the bar for permitting the loose armature-lever to drop out of the slot in the disk without catching; Fig. 8, details of the devices for regulating the speed of the fly. Fig. 9 is a detail sectional view on the line *x x* of Fig. 1, looking toward the left. Fig. 10 is an elevation showing the controlling-circuits for three boxes.

Electric fire-alarms are in common use. It is customary to use a number of alarm-boxes in a single circuit of considerable extent, and it frequently happens that two or more alarms from different boxes are turned in at or about the same time, and, as the devices for giving the alarm are now constructed, when two or more alarms are thus turned in they interfere with each other, and it is impossible to determine from which box the alarm is being given. The leading object of my invention is to overcome this difficulty, and to so construct electric fire-alarm boxes and the devices used therein that when more than one alarm is turned in from different boxes at or about the same time they will not interfere with each other, but the alarm from each box will be distinctly reported, the several alarms being reported one after the other, according to the distance of the several boxes from the battery, which I accomplish by means of devices hereinafter fully described.

In the drawings, A represents an alarm-box, a number of which are supposed to be located in the same circuit.

B is a front plate, C a rear plate, and D an intermediate plate, between which plates B, C, and D the several parts are placed and supported.

I use a wire leading from the main battery to the several boxes and to the stations where the signal is to be given, in the usual manner, which wire runs from the battery to the post *a* of the first box in the circuit, and from such post to the other boxes and to the stations, in the usual manner. At each box and station there is a ground-wire which completes the circuit with the wire already mentioned, which ground-wire is connected with a suitable binding-post, *b*. I use a second wire, in connection with a magnet and other devices, for the purpose of preventing two or more alarms, when turned in at the same time, from interfering with each other. This second wire runs from the battery to a binding-post, *c*.

E is a magnet, one end of the wire of which communicates with the post *c*, while the other end of this magnet-wire communicates with the post *d*. From this post *d* a wire passes to the next box, and is there connected with a binding-post corresponding with the binding-post *c*, each box being provided with a magnet E, connected as before described. There is a connection between the binding-post *d* and the binding-post *e* through the arm *f* and spring *g*, one end of which is free and can come in contact with a point, *h*, which is connected with the post *e*, or can be disengaged therefrom. The circuit of the wire connected with the binding-post *c* is completed by means of a wire passing from the binding-post *e* to the ground, or to the battery.

F is a mainspring, one end of which is attached to some suitable fixed point of the frame, while the other end is secured to the shaft G, on which is a main cog-wheel, H. This shaft G, as shown, is supported in bearings in the plates C and D, and it passes through the plates D and B, and upon its front end is an arm or lever, I. The mainspring F and shaft G are so arranged and connected that when a partial rotation is given to the shaft G by the arm or lever I the spring is partially wound, ready for action, the spring being at all times under some tension.

F′ is a ratchet-wheel permanently secured to the shaft G, and *h′* is a pawl pivoted upon the

wheel H, which pawl engages with the ratchet-wheel F′, which wheel has four teeth, so that one-fourth of a revolution can be given to the shaft G by each movement of the arm I.

J is a shaft supported in bearings in plates C and D, and carrying a cog-wheel, K, and a pinion, L, which latter engages with the main wheel H. (See Fig. 3.) This shaft J passes through the plate D, and upon its forward and front end is permanently secured a disk or circuit-wheel, M, which, as shown, is provided with a series of holes, *i*, adapted to receive any suitable number of pins, *j*, which pins can be changed from one hole to another, and can be arranged so that the revolution of the wheel M will cause any desired number to be reported.

N is a shaft pivoted in the plates C and D, carrying a small cog-wheel, O, which engages with the main wheel H.

P is a disk rigidly secured to the shaft N, which disk has a notch, *k*, in its periphery.

l is an unbalanced bar, pivoted upon the shaft N by the side of the disk P. One end of this bar *l* is provided with a notch, *m*, which notch is somewhat narrower at the point than at the inner portion, as shown in the drawings. The other end of the bar *l* is provided with a pin which passes through a slot in the disk P, the pin and slot being so arranged that the bar *l* has a limited movement upon the shaft N. The bar *l* is to be so arranged that the notch *m* is opposite to the notch *k* in the disk P, the notch *k* being somewhat wider than the notch *m*, which is of sufficient size to receive a pin, hereinafter mentioned.

Q is an armature for the magnet E.

n is a lever permanently secured to the armature, the lower end of the lever being secured to a shaft, R, which has its bearings in the plates C and D. Permanently connected with the upper end of this lever is a spring, S, the upper end of which is carried up so far that it can engage with a pin, *o*, standing out from an arm, *p*, which is secured to the shaft G.

p″ is an arm, one end of which is permanently connected with the lower end of the armature-lever, so that such arm *p″* rocks with the lever. The outer end of this arm *p″* is turned up, so as to form a hook, *q*.

Upon the shaft R, and by the side of the armature-lever, is pivoted another lever, the two arms of which are marked *r r′*, the arm *r* having a slot, *s*, Figs. 3, 5, and 6, through which passes the pin T, the end of the latter which passes through said slot being permanently secured to the armature-lever, while the other end passes through the plate D.

Upon the upper end of the part *r* of the elbow-lever is a projecting pin, *t*, arranged to enter at the proper time the notches *m* and *k*.

The end of the arm *r′* of the side lever mentioned is turned downward, forming a hook, *r″*.

u is a spring, the lower end of which is permanently secured, as shown, to the lower end of the armature-lever. This spring might be connected with the shaft R. The upper end of the spring engages with the edge of the arm *r* of the elbow-lever *r r′*.

U is a bent lever, pivoted at *v*. One arm of this lever is provided with a notch, *w*, which engages with that part of the pin T which projects through the plate D. Upon the other end of this lever U is a pin, *a′*. The movement of this lever U and the pin *a′* thereon, in connection with the spring *g*, opens and closes the circuit between the binding-posts *d* and *e*. *s′* is a spring acting upon the short arm of the lever U.

The circuit between the binding-posts *a* and *b* is opened and closed by the action of the spring *b′* and the rear end of the lever V, one end of which comes in contact with the pins *j* as the wheel M rotates.

A′ is a spring, the action of which holds down the end of the lever V which comes in contact with the pins *j*.

B′ is a vibrating fly, the upper end of which is rigidly secured to the shaft C′, which latter is rocked through the medium of an ordinary pallet and the escape-wheel D′, the latter being actuated through the medium of the wheels K and H, in a manner similar to an ordinary time-movement. As shown, there is an opening, *c′*, in the solid part of the fly, leaving a narrow bar, *d″*, and this part of the fly and the hooks *q* and *r″* are so arranged that when the hooks are open the fly can pass between them, and when not open the fly will strike against the hooks.

e′ are two arms projecting inward from the plate D, and extending out so far that one side of the fly will be between them. I regulate the speed of the fly by regulating the distance which it moves, and this I do by changing the position of the arms *e′*. As shown, these arms are upon a short shaft, *f′*, (see Figs. 3, 8, and 9,) which passes through the plate D, upon the outer end of which is permanently secured a lever, E′, which lever, as shown, is held in place by a screw, *g′*. The arms *e′*, with the shaft *f′*, upon which they are placed, and the actuating-lever E′, are to be so connected with the plate D that the arms will remain in any position in which they may be placed, which can conveniently be done by means of a spring-plate connected with the shaft *f′* and bearing upon the inside of the supporting-plate D.

The operation is as follows: When the parts are in the position shown in Figs. 1, 2, and 3 the alarm-box is ready for use, the armature Q at this time being held in close proximity to but not in contact with the magnet E by the action of the pin *o* and the spring S, the pin *o* being in a position to draw the spring back with a little force. At the same time the pin *t* is in the notches *k* and *m* in the disk P and arm *l*, this pin being forced into the notches by the action of the spring *u*, acting upon the arm *r* which carries the pin *t*. When these parts are in this position the hook *r″* is held

down in such a position that the fly will come in contact with it and cannot pass it, and hence the escape-wheel cannot rotate. Therefore the movement of the parts which actually give the alarm is prevented. This hook r'' is held down in the position stated by the position of the arm r, the pin t upon its end being in the notches k and m. At the same time the spring b' is held away from the connection with the binding-post a, so that this circuit will be open, and at the same time the spring g will be held away from the point h, so that the other circuit will be open. Now, if the arm I be moved so as to partially wind the spring F, a quarter-revolution will be given to the shaft G, and as the arm p is permanently secured to this shaft G the pin o upon the arm p, which pin engages with the spring S, will be lifted, carrying the pin away from the spring and releasing it, which will cause the armature to drop away from the magnet. At the same time the pin T, which is secured at one end to the armature-lever, will be moved with the movement of the armature and allow the long arm of the lever U to be lifted up a little by the action of the spring s' upon its lower end, which will lift the pin a' away from the spring g, allowing it to come in contact with the point h, and thus closing this circuit. At the same time a slight movement will be given to the side lever, $r\ r'$, the arm r of this lever moving with the armature, the pin t will be carried out from the notches k and m, and at the same time the point r'' upon the arm r' of this side lever will be lifted up sufficiently to allow the fly to pass the point r''; but at the same time the point q will be raised by the movement of the armature away from the magnet, carrying with it the armature-lever and lifting the point q. When the point q is in this position the fly cannot operate, because its lower end will come in contact with such point q. The closing of the circuit at the points g and h brings the magnet E into action, and when this magnet is in action the armature will be drawn toward the magnet, but cannot come in contact with it, because the pin t will be in contact with the periphery of the disk P, and when in this position the armature will be held a little distance away from the magnet. The drawing of the magnet into the position last stated carries down the point q, because it is upon the arm p'', which is connected with the armature-lever and moves with it. When the point r'' is raised and the point q is down, as stated, they will be at such distance from each other that the fly can pass between them and the escape-wheel can operate it. If more than one alarm be turned in at or about the same time from different boxes, the position last described cannot be given to the points r'' and q, except in the box which is nearest to the battery, because the current passes through the magnet in that box, and not to the magnets for the circuit beyond it. Hence the magnet and other parts cannot be brought into the proper position for throwing down the point q in any of the boxes except the one nearest to the battery. Then, when the alarm has been given from the box nearest to the battery, the arm p, with its pin o, will be brought back to the position shown in Figs. 2 and 3, the pin o again coming in contact with and acting upon the spring S, drawing it back and drawing the armature toward the magnet, and causing the pin t to drop again into the notches k and m, the disk P having made one complete revolution. This opens the circuits at the points g and h and allows the current to pass to the nearest box where an alarm had been turned in, when the operation will be that before described. When an alarm is being given from one box all the magnets in the boxes between that box and the battery are active. Hence if while an alarm is being given from one box an alarm be turned in from a box nearer to the battery, that box, being active, will hold the armature in such a position that the pin t cannot drop out from the notches k and m, and therefore the circuits at the points g and h of that box cannot be closed, so that the turning in of such alarm from the nearer box will not interfere with the one which is being given; but when the alarm has been given from the box from which it was first turned in, then the magnet at said box ceases to act, and the magnets at the boxes nearer to the battery also cease to act, and then the pin t at the box nearer to the battery will drop out from its notches k and m and the alarm will be given. The distance which the fly moves forward and back can be regulated by means of the lever E′ and the devices connected therewith, the movement of such lever changing the position of the arms e', and thus the speed of the alarm apparatus can be regulated. The wheel M has three revolutions to one revolution of the disk P when the parts are arranged as shown.

Referring to Fig. 10, P′ indicates an auxiliary battery employed in connection with the magnets E and the circuits in which they are placed. R′ indicates the ground-wires, and T′ the connecting-wires between the boxes. The main battery and the connections with the several boxes and the stations where the signals are to be given are not represented, as there is nothing novel in such parts.

Instead of the wheel M, any other suitable wheel or signaling device may be used.

I use the bar l, with its notch at one end and pin in the other, entering a slot in the wheel P, for the purpose of rendering it certain that the pin t will not be caught and held while passing out from the notches. If only the notch k were used, the point of the notch might catch upon the point of the pin t and hold it. The pin t rests upon the periphery of the disk P until the notched end of the bar l arrives opposite it, and it then changes its rest from the disk to the bar, which, being loosely pivoted, will remain stationary until it is carried

along with the disk by the pin on its opposite end, and when the pin *t* has been forced in the notch *m* the bar *l* will drop away from it, its opposite end being slightly heavier.

I have described my improvements as designed to be used in electric fire-alarm boxes; but of course they are adapted to be used in giving other alarms or signals when similar boxes are used.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. As an improvement in electric alarms where a number of alarm-boxes are located in the same circuit, a magnet in each alarm-box, all the magnets being connected with each other and a battery, and in a separate circuit from that which operates the signal, and an armature for each magnet, each armature being connected with and operating devices which control the action of a fly connected with the clock-work of the box, substantially as and for the purpose specified.

2. In an electric alarm, a magnet and armature, a lever connected with the armature and carrying a hook, a lever independent of the armature and pivoted upon or at the side of the armature-lever, and having a limited movement therewith, and carrying another hook, both of which hooks are arranged to interfere with or to permit the movement of the clock-work of the box, substantially as and for the purpose specified.

3. In an electric alarm, a magnet and its armature, a lever connected with the armature and carrying a hook, a spring to act upon the armature-lever, a second lever pivoted upon or at the side of the armature-lever, and having a limited movement therewith, and carrying another hook, the hooks arranged to act upon the fly of the clock-work, a wheel or disk provided with a notch in its periphery, a notched bar pivoted by the side of such notched wheel, and a pin arranged to engage with the notch in such disk and bar, all combined substantially as and for the purpose specified.

4. In an electric alarm, a magnet and its armature, a lever connected with the armature and carrying a hook, a second lever pivoted upon or by the side of the armature-lever, and carrying a second hook, the hooks being arranged to act in connection with the fly of the clock-work, a pin, T, and a lever, U, for closing the magnet-circuit, all combined substantially as and for the purpose specified.

5. In an electric alarm, an arm or lever, *p*, connected to the shaft G, which operates the mainspring F, and carrying a pin, *o*, arranged to act upon the spring S, and to be released therefrom by revolving the shaft G, substantially as and for the purpose specified.

6. The arms *e'*, operated by a lever, E', in combination with the fly of the clock-work, substantially as and for the purpose specified.

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A. H. ADAMS.