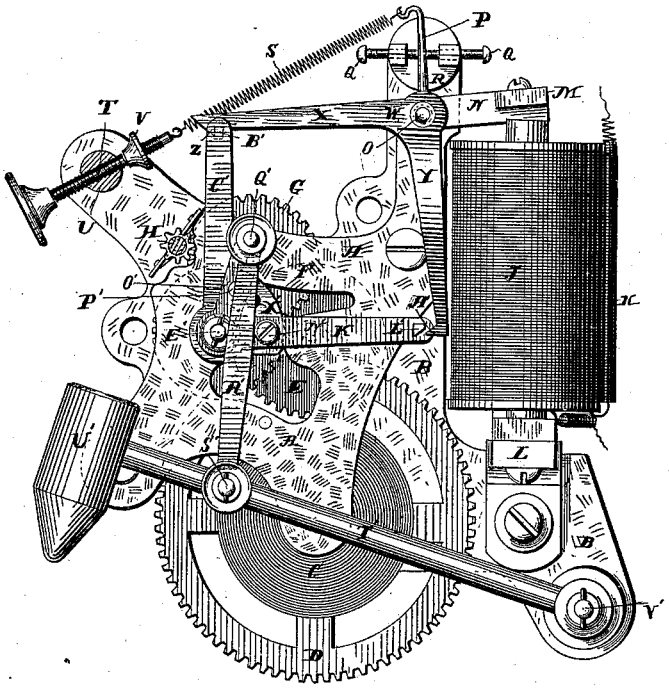
(No Model.) 4 Sheets—Sheet 1.

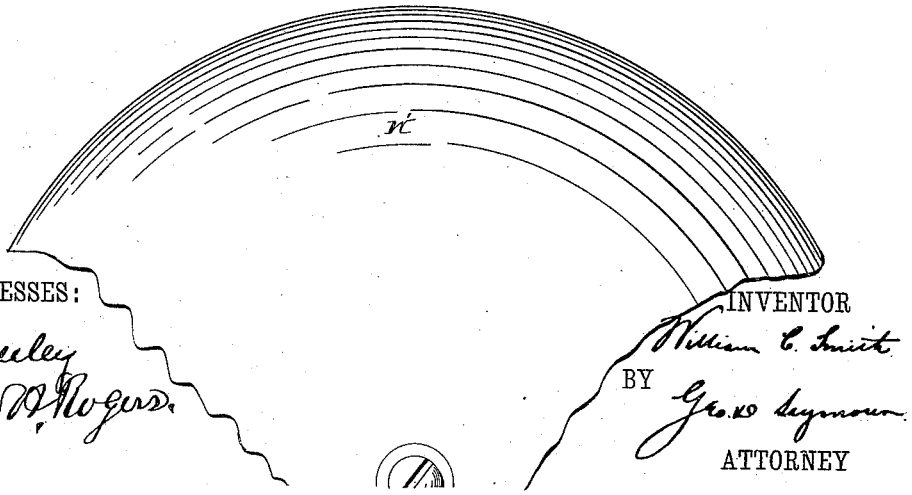
W. C. SMITH.

ELECTRIC ALARM APPARATUS.

No. 343,863. Patented June 15, 1886.

Fig. 1





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ELECTRIC ALARM APPARATUS.

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FIG. 2

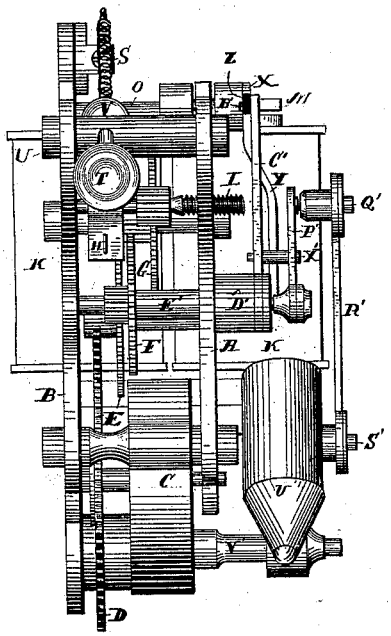
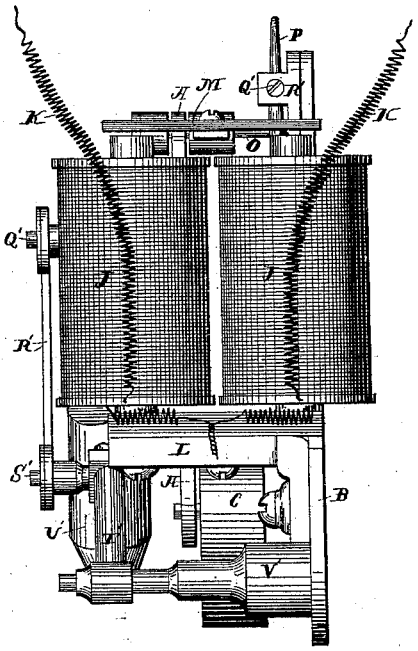
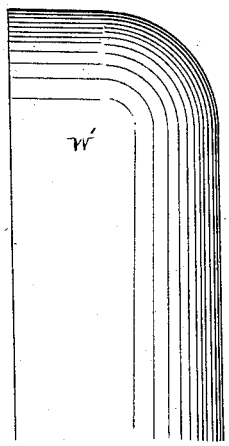


FIG. 3





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(No Model.) 4 Sheets—Sheet 3.

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ELECTRIC ALARM APPARATUS.

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Fig. 4

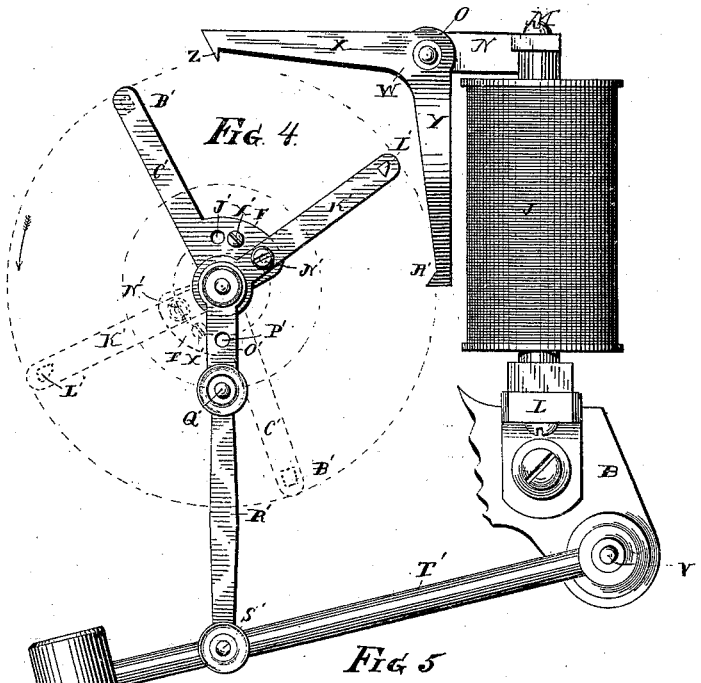
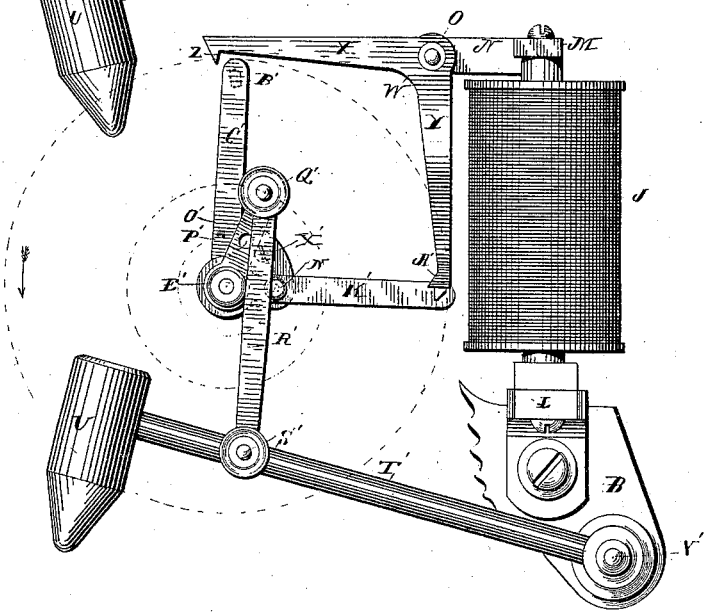


Fig. 5



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ELECTRIC ALARM APPARATUS.

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FIG. 6

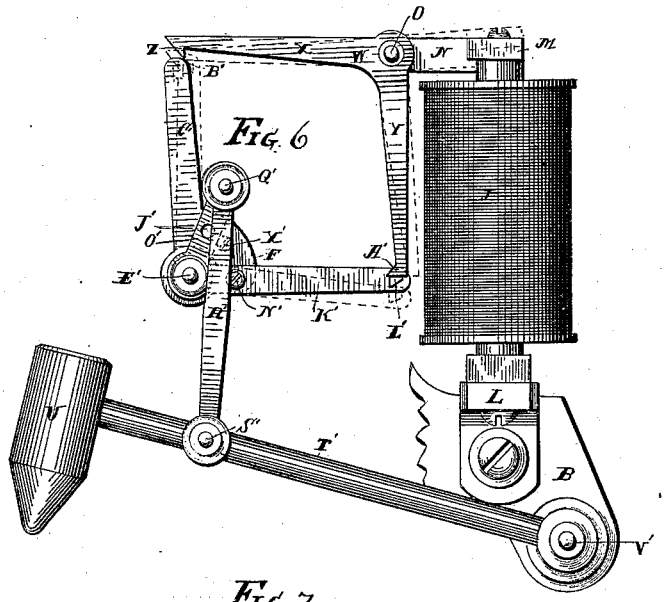

FIG. 7

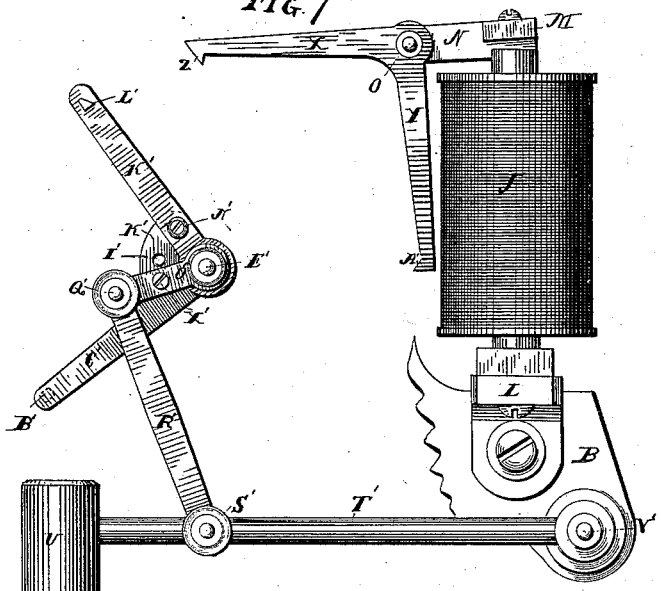

FIG. 8

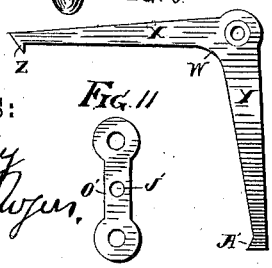

FIG. 9

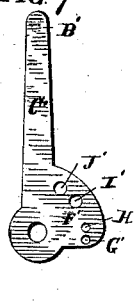

FIG. 12

FIG. 10

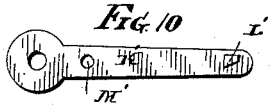

FIG. 11

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UNITED STATES PATENT OFFICE.

WILLIAM C. SMITH, OF NEW HAVEN, CONNECTICUT.

ELECTRIC ALARM APPARATUS.

SPECIFICATION forming part of Letters Patent No. 343,863, dated June 15, 1886.

Application filed March 18, 1886. Serial No. 195,628. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. SMITH, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Electric Alarm Apparatus; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in electric alarm apparatus, the object being to produce an apparatus adapted to be convertible without structural change for either open or closed circuit operation, and for gravity or power striking, and constructed to be operated with a light battery, and to avoid false signals, and combining simplicity of construction, positiveness, and reliability of action, and durability and general efficiency in use.

With these ends in view my invention consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in front elevation of an electric alarm apparatus embodying my invention, and shown in its normal adjustment when converted for open-circuit operation and gravity-striking. Fig. 2 is view thereof in end elevation. Fig. 3 is a similar view of the opposite end of the device. Fig. 4 is a detail view in front elevation, showing the parts in the positions ascribed to them just after the hammer has dropped, the circuit through the magnet being closed. Fig. 5 is a similar view showing the hammer lifted and the adjustable arm engaged with the lower arm of the bell-crank lever, the circuit being closed. Fig. 6 is a detail view in front elevation, showing the apparatus converted for closed-circuit operation, and in its normal adjustment, the positions of the armature, the bell-crank lever, and the carrying and adjustable arms, when the train is stopped after a signal has been given, being shown by dotted lines. Fig. 7 is a view showing the apparatus converted for power-striking. Fig. 8 is a detached view, in elevation, of the bell-crank lever. Fig. 9 is a similar view of the carrying-arm. Fig. 10 is a similar view of the adjustable arm. Fig. 11 is a similar view of the crank, and Fig. 12 is a similar view of the link.

Between the plates A and B is a coiled spring, C, driving a train composed of wheels D, E, F, and G and their respective pinions, and controlled by the fan H, adapted to be disconnected from the train through its screw-center I, or cut out by suitable means. A magnet composed of coils J J, having circuit-connections K K, is supported upon a bracket, L, secured to the plate B, as shown. Above the poles of such magnet is located an armature, M, carried by an arm, N, mounted upon an arbor, O, journaled between the plates A and B and projecting outward through the former. A hook, P, secured to the said arbor and extending upward between two set-screws, Q Q, carried in a frame, R, has one end of a spring, S, connected with it, the other end of such spring being connected with an adjusting-screw, T, mounted in the pillar U of the frame of the apparatus, and provided with a jam-nut, V, for locking it when adjusted. That end of the arbor O which projects through the plate A, as described, carries a bell-crank lever, W, having arms X and Y, respectively, provided with stops Z and A′, the arm Y being bent outwardly. The said stop Z engages with a pin, B′, located upon the inner face and at the outer end of a carrying-arm, C′, attached to a sleeve, D′, secured to the projecting outer end of the arbor E′ of the wheel F of the train, and provided with an extension, F′, having two small screw-holes, G′ and H′, located one above the other, and two larger screw-holes, I′ and J′, located between the holes aforesaid and the arm, as shown in Fig. 9 of the drawings. The said arm carries an adjustable arm, K′, forming approximately a right angle with it, centered upon the said arbor E′, and provided upon its outer face and near its outer end with a pin, L′, adapted to engage with the stop A′ of the arm Y of the bell-crank lever, and near its inner end with a hole, M′, receiving a screw, N′, entering either of the holes G′ and H′ and securing the arm to the extension F′, and hence to the carrying-arm. By shifting the said adjustable arm and screw from the hole G′ to the hole H′, and vice versa, the relations between the stops X and Y and the pins B′ and L′ are so far altered as to change

the order of their engagement, and hence convert and adapt the apparatus for open or closed circuit operation, as the case may be. Thus when the adjustable arm is secured to the extension by the entrance of the screw into the hole G′ therein the relations secured between the stops and pins adapt the apparatus for open-circuit operation, while when the arm is secured to the extension by the entrance of the screw into the hole H′ therein the relations obtained between the pins and stops adapt the apparatus for closed-circuit operation. A crank, O′, loosely centered upon the projecting outer end of the arbor E′, is provided midway of its length with a hole, P′, and at its outer end with a pin, Q′, over which fits the upper end of a link, R′, the lower end of the same fitting over a pin, S′, carried by the arm T′ of the hammer U′, the rear end of the arm T′ being swiveled upon a stud or post, V′, attached to the plate B of the frame, and the said crank and link being long enough when extended in a straight line to permit the said hammer to strike the bell W′, located below it. A screw, X′, extending outwardly from the extension F′, is entered into the holes I′ and J′ therein for gravity and power striking respectively. When entered into the hole I′, the crank rests upon and is supported by it when the parts are in their normal positions, as shown in Figs. 1, 2, and 5 of the drawings. Then when the circuit is made or broken, as the case may be, and the screw is carried forward with the carrying-arm, it carries the said crank beyond the center of gravity, and, being loose on the arbor E′, the crank falls by gravity with the hammer, as shown in Fig. 4 of the drawings. The screw following in the path of the crank, being rotated with the carrying-arm, then engages with it, as shown by dotted lines in the said figure of the drawings, and through the train lifts it to and supports it in its normal position until the circuit is again made or broken and the train released. On the other hand, when the screw is entered into the hole J′ of the extension, it is passed through the hole P′ in the crank, which is thus coupled with the carrying-arm, as shown in Fig. 7 of the drawings. Then when the carrying-arm is released by the making or breaking of a circuit the stroke of the hammer is given under the power actuating the train, which is accelerated by the weight of the hammer, and which restores the same to its normal position immediately after it strikes the bell. It will thus be seen that by simply shifting the screw between the holes I′ and J′ the apparatus may be converted for gravity or power striking. When it is desired to give a large number of signals in a given time, it may be done by coupling the apparatus for the power action of the hammer and removing or cutting out the face, so as to leave the train entirely unrestrained. Otherwise the crank is left free to turn upon the arbor and the face retained for the gravity action of the hammer.

The several phases of the apparatus when converted for open-circuit operation in striking a single signal are shown by Figs. 1, 2, 3, 4, and 5 of the drawings. The normal positions of the parts are shown in Figs. 1, 2, and 3 thereof, representing the circuit open, the train held by the engagement of the stop Z of the arm X, with the pin B′ of the carrying-arm C′ and the hammer lifted. Fig. 4 of the drawings represents the circuit closed, the train released by the disengagement of the said stop from the said pin and the hammer at the limit of its downstroke, the paths of the carrying and adjustable arms, and also their positions when the crank is engaged by the screw for lifting the hammer, being represented by broken lines. Fig. 5 of the drawings represents the circuit closed, the train stopped and held by the engagement of the stop A′ of the arm Y with the pin L′ of the adjustable arm K′, and the crank and hammer lifted to nearly their normal positions. The opening of the circuit now permits the said pin L′ to pass the stop A′ and effects the engagement of the stop Z with the pin B′, the same being the normal positions of the parts, as shown in Figs. 1 and 2 of the drawings.

The phases assumed by the parts when the apparatus is converted for closed-circuit operation in striking a single signal are shown in part by the full and broken lines of Fig. 6 of the drawings. In such figure the full lines represent the parts in their normal positions with the circuit closed, the train held by the engagement of the stop A′ of the arm Y with the pin L′ of the arm K′ and the hammer lifted. Then when the circuit is broken the ensuing movement of the bell-crank lever withdraws the stop A′ from the pin L′, and the pin B′ being at this time just beyond the range of the stop Z, the train is released, the signal given, the hammer lifted, and the train arrested, with the bell-crank lever and the carrying and adjusting arms in the positions indicated by the dotted lines, by the engagement of the stop Z with the pin B′. The circuit being closed again, the parts are brought back to the positions in which they are shown by full lines, with the train held by the engagement of the stop A′ with the pin L′, as represented.

The described adaptation of the apparatus for converting it for open or closed circuit operations enables it to be adapted without structural alteration to systems arranged to be operated in either way; also, the construction of the apparatus for converting it without structural change for gravity or power striking is attended with obvious advantage, as it permits the apparatus to be readily conformed and adapted in signaling capacity to the demands of any ordinary system or code. Furthermore, the leverage obtained through the carrying and adjustable arms, releasing the train at a distance from the power, permits the apparatus to be operated with a very light battery; again, the construction of the said arms and bell-crank lever secures a positive

and reliable operation of the apparatus and avoids false or double signals, against which there is another safeguard in the herein-described manner of restoring the hammer, which cannot be brought into position for striking a second or double blow until an appreciable interval has intervened between it and the preceding blow. This, however, does not interfere with the capacity of the apparatus for giving a large number of reliable signals in a given time.

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

1. An electric alarm apparatus having a power-actuated train, a magnet, an armature, and releasing and stopping connections between the armature and train, including a movable detent located in a revolving carrier, substantially as set forth.

2. An electric alarm apparatus having a power-actuated train, a magnet, an armature, and releasing and stopping connections between the armature and train, including an adjustable arm for converting the apparatus for open or closed circuit operation, substantially as set forth.

3. An electric alarm apparatus having a power-actuated train, a magnet, an armature, two stops carried by the armature, two arms carried by the train and adapted to be engaged by the said stops, a hammer, a crank and a link therefor, and means for coupling the said hammer, crank, and link with the train, substantially as set forth.

4. An electric alarm apparatus having a power-actuated train, a magnet, an armature, a bell-crank lever carried by the armature and provided at the end of each arm with a stop, and two arms carried by the train and adapted to be engaged by the stops of the bell-crank lever, substantially as set forth.

5. An electric alarm apparatus having a power-actuated train, a magnet, and an armature, a bell-crank lever carried by the armature and provided at the end of each arm with a stop, a carrying-arm carried by the train, and an arm adjustably secured to the carrying-arm, so as to be shifted for converting the apparatus for open or closed circuit operation, the said carrying and adjustable arms being engaged by the arms of the bell-crank lever, substantially as set forth.

6. An electric alarm apparatus having a power-actuated train, a magnet, and an armature, two stops carried by the latter, an arm carried by the train and provided with an extension, an arm adjustably secured to the extension of the said arm, so as to be shifted in its relations to the said arm and to the stops, the carrying and adjustable arms being engaged by the stops, substantially as set forth.

7. An electric alarm apparatus having a power-actuated train, a magnet, and an armature, releasing and stopping connections between the armature and train, a hammer, and connections between the same and the train, such connections being convertible for securing a gravity or power stroke from the hammer, substantially as set forth.

8. An electric alarm apparatus having a power-actuated train, a magnet, and an armature, releasing and stopping connections between the armature and train, a hammer, a loose crank therefor, and convertible coupling-connections, substantially as shown, between the crank and train, substantially as set forth.

9. An electric alarm apparatus having a power-actuated train, a magnet, and an armature, a bell-crank lever carried by the latter and provided with a stop at the end of each arm, a carrying-arm carried by the train and provided with an extension, an adjustable arm adjustably secured to the extension of the carrying-arm, the said carrying and adjustable arms being adapted to be engaged by the stops of the bell-crank lever, a hammer, a loose crank therefor, and means, substantially as shown, for convertibly coupling it with the extension of the carrying-arm, substantially as set forth.

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

WILLIAM C. SMITH.

Witnesses:
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C. L. SWAN, Jr.