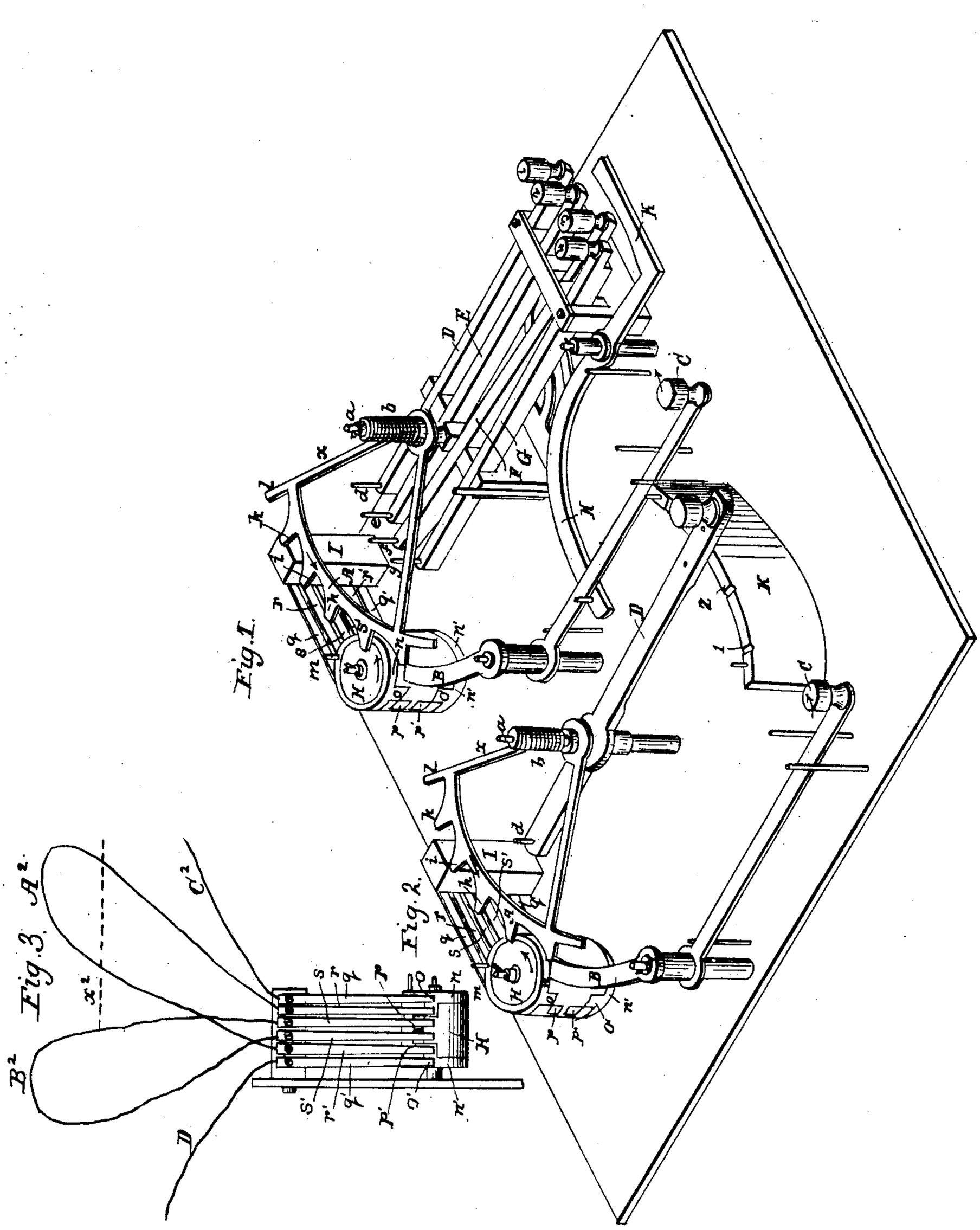
FARMER & CHANNING.

Fire-Alarm Telegraph.

No. 23,217. Patented March 8, 1859.



UNITED STATES PATENT OFFICE.

M. G. FARMER, OF SALEM, AND W. F. CHANNING, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO W. F. CHANNING.

IMPROVED ELECTRO-MAGNETIC FIRE-ALARM APPARATUS.

Specification forming part of Letters Patent No. **23,217**, dated March 8, 1859.

To all whom it may concern:

Be it known that we, MOSES G. FARMER, of Salem, in the county of Essex and State of Massachusetts, and WILLIAM F. CHANNING, of Boston, in the county of Suffolk and State aforesaid, have invented an Improved Fire-Alarm Striker, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which are represented, in Figures 1 and 2, perspective views of our apparatus, and in Fig. 3 a front elevation of a part thereof.

The object of our invention is to complete and break one or more electric circuits of a fire-alarm telegraph a definite number of times at definite intervals, for the purpose of actuating thereby one or more electro-magnets contained in the said circuits, so as to give a public alarm by sound produced either by the direct action of the armatures of the electro-magnets, or indirectly by a mechanism liberated by the armatures of the electro-magnets. The object is to give, in the manner described, a definite public alarm with greater accuracy than can be done by completing and breaking the circuit by hand, and also to obtain the greatest economy of battery-power, and to avoid the danger of irregular cross-communication through the ground where more than one circuit is used.

Our invention consists in a novel mechanism or apparatus for the purpose of regulating and determining the number of blows struck upon the alarm-bells, which we denominate a "fire-alarm key-board" or "striker;" and our invention further consists in certain details in the construction of the same; and in carrying out our invention we employ a rack with a lifting-piece or liberating-key and a pin or pins for determining the distance to which the rack may fall, in combination with a circuit-wheel making and breaking the electric circuit at each revolution by contact with a series of springs, and carrying a gathering-pallet to move the rack as the striking proceeds, as will now be more fully described.

In Fig. 1 of the accompanying drawings, A is a rack pivoted at *a*, and falling in the direction of its arrow under the influence of the spring *b*.

B is a lifting piece or key with a knob, C. When this is moved in the direction of its arrow it allows the rack to fall until it meets with some resisting body.

D E F G are index-keys, numbered 1, 2, 3, and 4 on their respective knobs, and carrying pins *d e f g* on their other extremities. When the knob of one of these index-keys is depressed, as in the case of 3 in the drawings, it is obvious that if the lifting-piece were removed the rack would fall until its arm *x* came in contact with the pin *f*. In falling through this angular distance three of the teeth, *h i k*, on the rack would have passed the pallet *m* on the circuit-wheel H.

The circuit-wheel is usually made to revolve by clock-work, and its speed regulated by a fan, but the connection with the machinery is not shown here. It may be so arranged that the same movement of the lifting-piece which liberates the rack shall also liberate the clock-work which actuates the circuit-wheel. The circuit-wheel is a cylinder of ivory, carrying on its upper and lower edge an inlaid ring, *n n'*, of silver or other conducting metal, on which the two springs *q q'*, supported on the standard I and connected with the opposite poles of a galvanic battery, constantly bear. Connected with the rings *n n'* are the inlaid segments of silver *o o'*, on which the springs *r r'* bear for a small part of each revolution of the circuit-wheel H.

Adjoining the segments *o o'*, and in electric connection with them and the rings *n n'*, are the segments *p p'*, so placed that the springs *s s'* will bear upon them respectively for a small part of each revolution of the circuit-wheel H. The springs *s s'* coming in contact with their segments *p p'* at the same instant (or immediately thereafter) that the springs *r r'* leave their segments *o o'*.

The springs *r r'* are connected, respectively, with the two ends of a circuit of a fire-alarm telegraph, and the springs *s s'* are connected, respectively, with the two ends of another circuit of the telegraph.

It will be seen that at every revolution of the circuit-wheel H momentary connection is made between the battery and one of the circuits of the fire-alarm telegraph through the two springs *q q'*, the rings *n n'*, the segments

o o', and the springs *r r'*, and immediately afterward that momentary connection is made between the battery and a second circuit of the fire-alarm telegraph through the springs *q q'*, the rings *n n'*, the segments *p p'*, and the springs *s s'*. By increasing the number of similarly-arranged segments and corresponding springs a larger number of circuits may be successively connected with the battery in the same manner.

In Fig. 3 is represented an elevation of the circuit-wheel, with its rings, segments, and springs in connection with two distinct circuits, A^2 B^2.

It will be observed that each circuit is provided with two springs—one at each extremity—which are brought simultaneously into communication with the opposite ends of the battery. The operation of this double circuit-wheel is as follows: When in the position seen in Fig. 3, the fluid entering by the wire C^2 from the battery passes by the spring *q*, ring *n*, segment *o*, and spring *r* to the wire of the circuit A^2; thence over the spring *r'*, segment *o'*, ring *n'*, spring *q'*, and wire D^2 to the opposite pole of the battery. The bells within the circuit A^2 are thus simultaneously rung. As the circuit-wheel H continues to revolve the springs *r r'* pass off the segments *o o'*, and this circuit is thus broken at each end, neither extremity of its wire being left in communication with the battery. The same instant, or immediately thereafter, the springs *s s'* come in contact with the segments *p p'* and the circuit B^2 is closed, whereby the bells within this circuit are struck, and so on through as many circuits as may be in connection with the wheel H.

In lieu of constructing the circuit-wheel with segments, as above described, which come successively in contact with the springs, they may be arranged in straight lines lengthwise of the wheel, and the springs be brought successively in contact with them either by being of different lengths or by being inclined at different angles to the wheel. These, however, are but modifications of the plan proposed, and need not be further described. When the knob marked 3 was depressed and the rack had fallen against the pin *f*, it would be necessary for the circuit-wheel to revolve three times to gather up the three teeth of the rack which had fallen past it. This would connect the battery three times at definite intervals with the telegraphic circuits connected with the springs *r r'* and *s s'*.

The circuit-wheel may be prevented from revolving after the rack has been restored to the position in the drawings by a stop, which is thrown into a position to arrest the motion of the pin *m* by the rack A.

When either of the index-keys D E F G are depressed to their full extent they displace the lever K K, so as to liberate the lifting-piece B by the same motion which raises the pins *d e f g* to define the distance through which the rack shall fall; or the index-keys may be partially depressed, so as to raise the pins sufficiently to catch the rack without letting off the lifting-piece.

By liberating the lifting-piece or liberating-key by hand the signal prescribed can, by setting the index-key, then be repeated any number of times.

It will be observed that the pins *d e f g* perform the office usually performed by the snail in the common striking movement of the clock.

In the modification represented in Fig. 2 the rack A, teeth *h i k l*, arm *x*, pivot *a*, spring *b*, lifting-piece B, knob G, circuit-wheel H, standard I, rings *n n'*, segments *o o' p p'*, springs *q q' r r' s s'*, correspond with the similar parts in Fig. 1; but in place of the index-keys D E F G, with the pins *d e f g* moving vertically, a single index-key, D, is substituted, carrying a pin, *d*, and moving horizontally. The index-key D rests on an arc, K, having the equidistant notches 1 2 3 4 on its upper surface, into any one of which the index-key D may be set. In the drawings the key is represented as set in the third notch. The pin *d* will now allow the rack to fall the distance of three teeth, or just as far as the rack in Fig. 1 would fall against the pin *f* if the key marked 3 were depressed. The key D, Fig. 2, being set, the signal may be given as before by liberating the lifting-piece B as many times as may be desired with suitable pauses between. A definite signal may thus be struck with great accuracy on the alarm-bells of a city provided with the mechanism of the American Fire-Alarm Telegraph for which Letters Patent of the United States were granted to us on the 19th of May, 1837.

For economy of battery-power, and also for superior safety, it is desirable to divide a city furnished with the fire-alarm telegraph into several circuits.

By the arrangement of the circuit-wheel, rings, segments, and springs, the same signal is distributed successively with great rapidity to two or more circuits. A front elevation of the circuit-wheel H, rings *n n'*, segments *o o' p p'*, springs *q q' r r' s s'*, and standard I is represented in Fig. 3.

It sometimes happens that the circuits A^2 B^2, Fig. 3, of the fire-alarm telegraph connected with the springs *r r'* and with the springs *s s'* are imperfectly insulated from the ground. If one extremity of both of these circuits were left in constant connection with the battery a part of the current, after being diverted from the first circuit and being directed to the second circuit, might cross over the ground between the two (as by the dotted line x^2, Fig. 3) and discharge partly through the first, thereby producing irregularity of action and causing the bells of a portion of the first circuit to strike an additional blow. To obviate this difficulty the circuit-wheel H, Figs. 1, 2, and 3, is made double, having double springs and bearings, and in its action completing and

breaking the circuit at both extremities simultaneously.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The independent keys D E F, with their pins *d e f*, in combination with the rack A and a means of liberating the rack, for the purpose set forth.

2. The arrangement of the segments on the circuit-wheel, in combination with the springs, or their equivalents, for throwing the electric current successively onto different circuits.

3. The double circuit-wheel, or its equivalent, for the purpose of completing and interrupting an electric circuit at both ends, essentially as set forth.

MOSES G. FARMER.
WM. F. CHANNING.

Witnesses:
THOS. R. ROACH,
P. E. TESCHEMACHER.