E. C. CLAY.

Key Board for Fire Alarm Telegraphic Apparatus.

No. 18,626. Patented Nov. 17, 1857.

Fig. 4

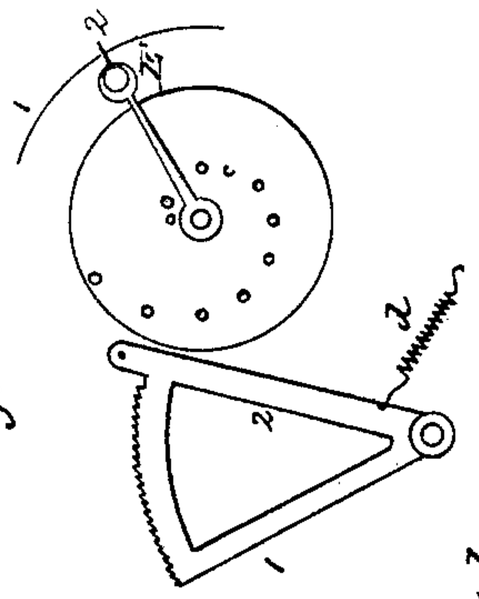


Fig. 1

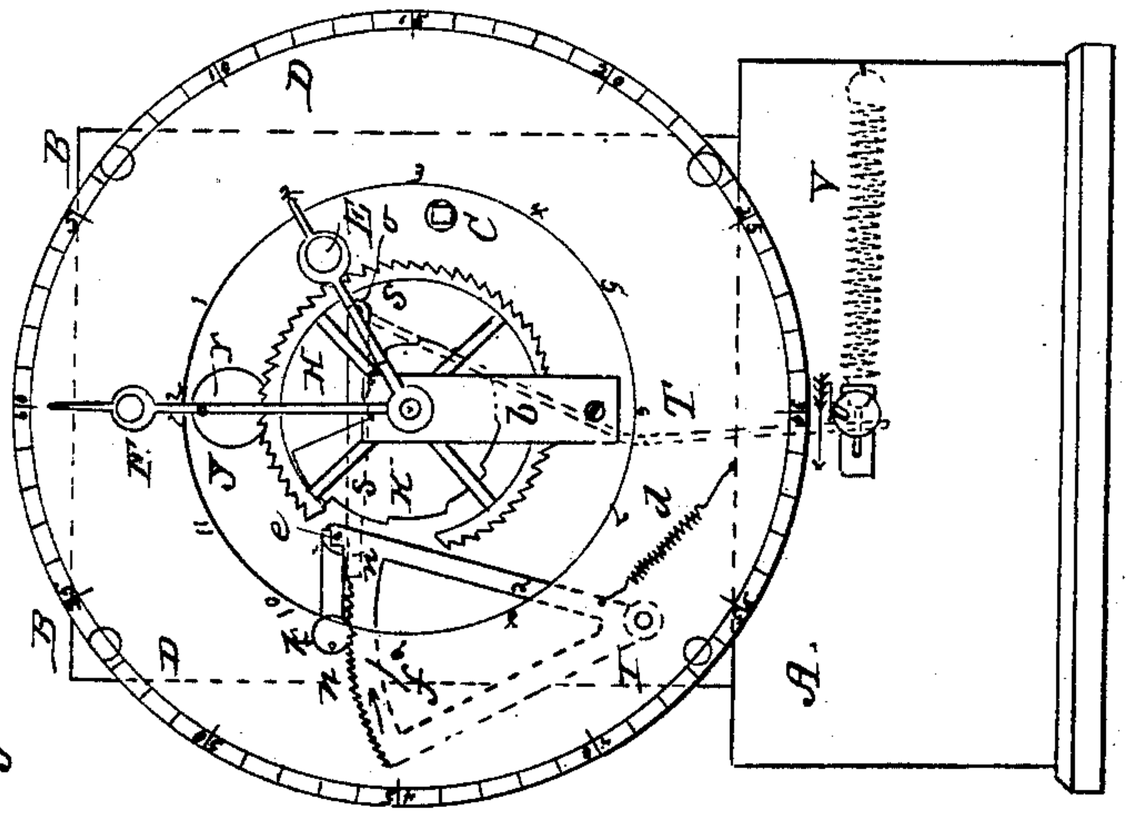


Fig. 6

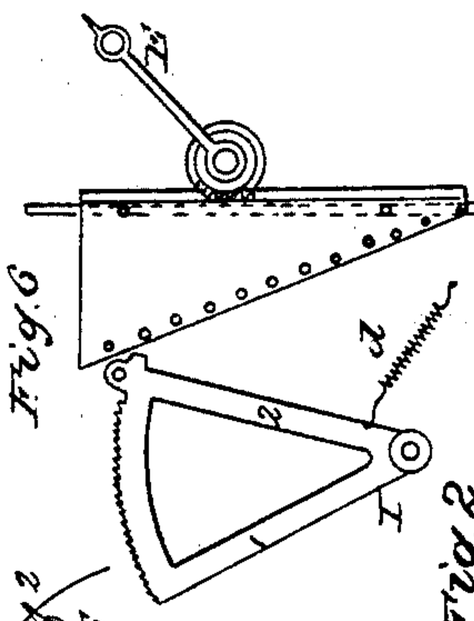


Fig. 2.

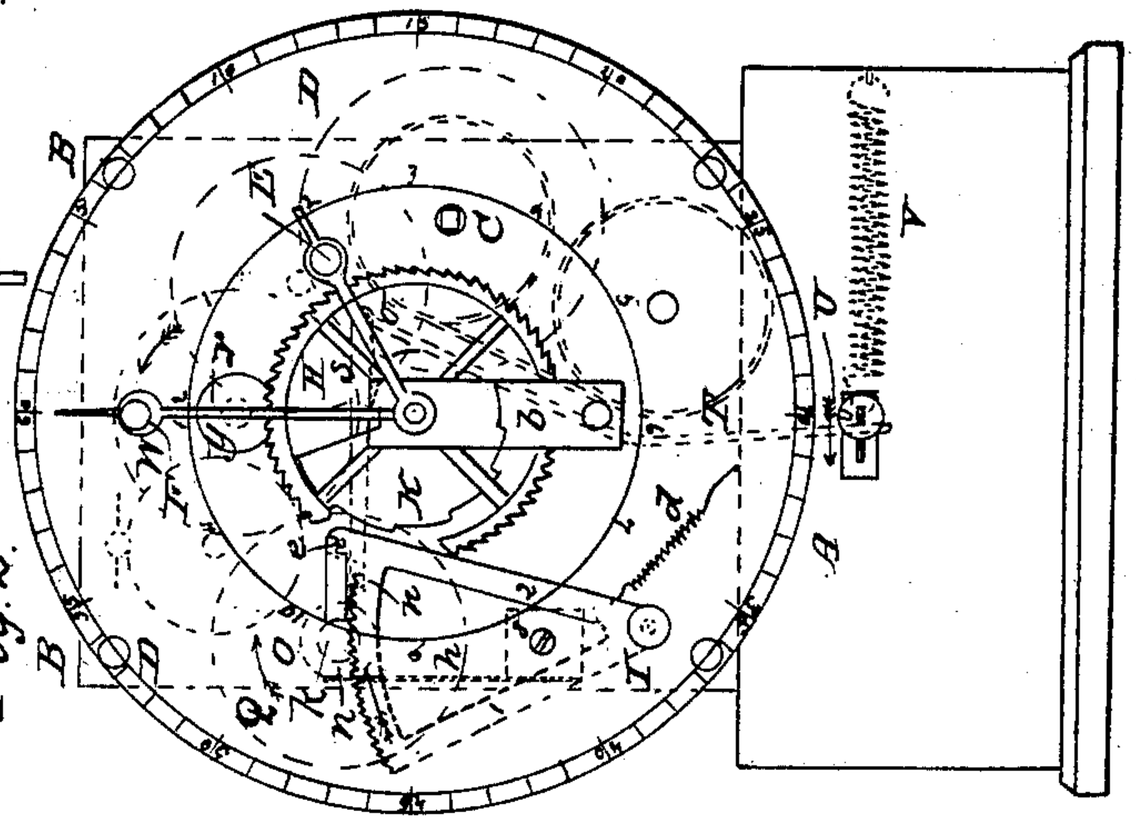


Fig. 5

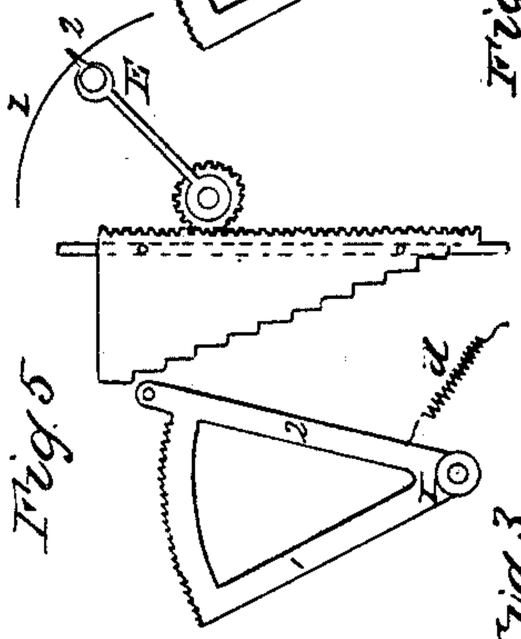
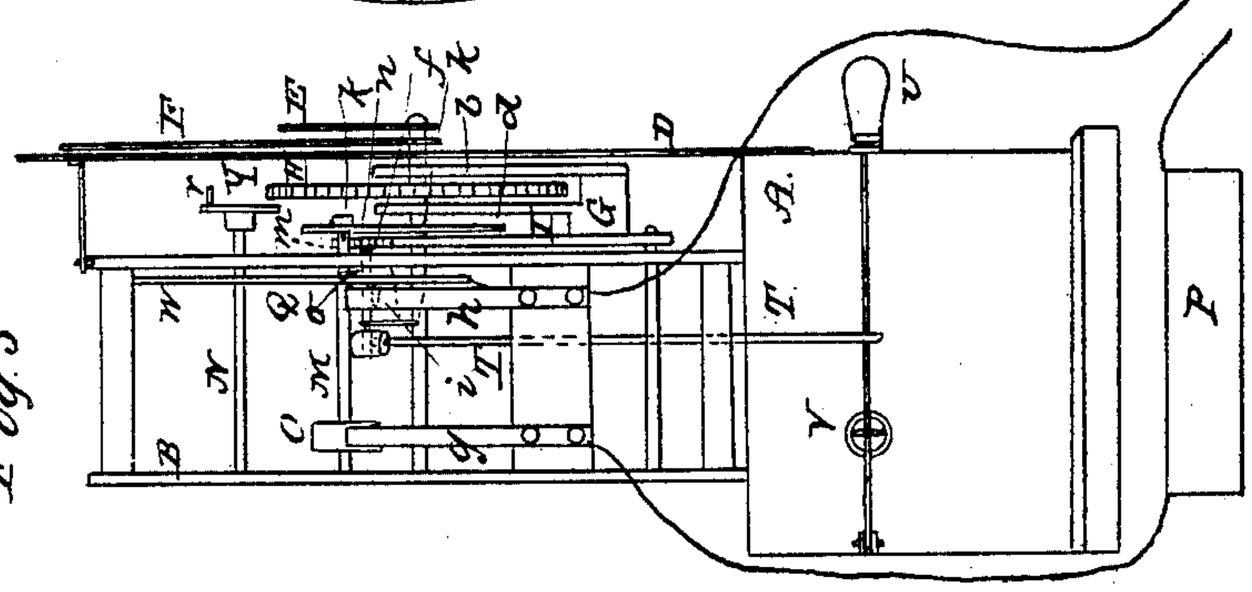


Fig. 3



UNITED STATES PATENT OFFICE.

EDWARD C. CLAY, OF BOSTON, MASSACHUSETTS.

IMPROVED DEVICE IN TELEGRAPHIC FIRE-ALARM APPARATUS.

Specification forming part of Letters Patent No. **18,626**, dated November 17, 1857.

To all whom it may concern:

Be it known that I, EDWARD C. CLAY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in the Key-Board for Telegraph Fire-Alarm Apparatus, 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—

Figure 1 is a front view of my improved apparatus; Fig. 2, a similar view with the clock-work, or parts which give motion to the hands or counters, shown in red; Fig. 3, a side elevation of the same; Figs. 4, 5, and 6, details to be referred to.

In the telegraph fire-alarm system as at present operated the alarm is telegraphed from the several minor stations to a central station, from which the alarm is sounded on the various bells in the city. The works which operate these bells, being in telegraphic communication with the central station, are set in motion by completing the electric circuit. This is done by the person in charge of the central station, who presses down one of the keys of a key-board, which is so arranged with a key for each district that when a key is depressed it shall complete the circuit long enough for the bells to strike the number of that district. In large cities it is sometimes so arranged that if a second alarm occurs during the continuance of the first one the bells of one section of the city strike the number of one district and those of another section the number of the other district. The number of the district is repeated on the bells at short intervals of time; or, after the number has been struck a few times a general alarm is sounded, and then the number is again struck. As the numerous bells of a city are operated by clock-work which is arranged to strike a definite number of times, and which must be wound up before that number has been struck, it becomes necessary for the operator at the central station to keep a record of the number of blows struck on each bell. This he is only enabled to do by knowing what bells he has in communication with his key-board at the time of an alarm and noting the number of times which he causes them to strike. This requires his constant fixed attention, which is liable to be interrupted by another alarm or in any other manner. Besides this, he may sometimes press the wrong key of his key-board and cause confusion by striking the wrong district.

The object of my present invention is to simplify the operation of the key-board, and to relieve the operator of a portion of his labors.

That others skilled in the art may understand my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A is a box or stand on which is secured the case B, containing an ordinary clock-movement (shown in red, Fig. 2) the spring of which is wound up by a key placed on the shaft C′.

A dial, D, is secured to the front of the stand A and to the case B, leaving a space between it and the case, as shown in Fig. 3. This dial has an inner and an outer circle of figures, the inner one corresponding with the number of districts into which the city is divided—in this case into twelve—and is pointed to by the short index-hand E, like the hour-hand of an ordinary clock. The outer circle is divided into any number convenient for counting—in this case into sixty—and is pointed to by the index F, corresponding with the minute-hand of a clock.

Secured to the front of the case B is a block, G, from which rise two standards, *a* and *b*, which support the hollow arbor, to which is attached the hand F. To this arbor, between the two standards, is secured a ratchet-wheel, H, having a tooth for each division of the outer circle on the dial. Passing through this hollow arbor and through the case B is another arbor, which carries the hand E. To this arbor, between the standards *a* and the front of the case B, is secured a snail or notched cam, K, with the same number of divisions as the inner circle of the dial. This cam is so formed that the notches or steps in its periphery each approach nearer to its center as the corresponding number on the dial increases.

On the face of the case B is an escapement, I, which is pivoted at *c*. It is drawn toward the snail K by a spring, *d*. This escapement is formed, as shown in the drawings, with two straight arms, 1 and 2, connected at their outer ends by the notched segment *f*. From the outer end of the arm 2 projects a pin, *e*, which is borne against the snail K by the spring *d*. Consequently the position of the snail K determines how far the piece I shall be drawn over in the direction of its arrow.

Two metallic shafts, M and N, Fig. 3, pass

through the front plate and have bearings in the back plate of the case B. The shaft M carries, near its back end, a metal drum, O, which runs in contact with an insulated spring, *g*, in communication by its wire with one pole of a suitable battery, P, the other pole of which is in communication with another insulated spring, *h*, the current passing over the ordinary telegraph-wires through the striking apparatus of the several bells. These are so arranged that the bells shall be struck whenever the circuit of the battery P is closed. This circuit is closed in the following manner:

The shaft M carries a gear-wheel, Q, from the inner face of which projects a pin, *i*, which at each revolution of the wheel Q is brought into contact with the spring *h*, and the circuit of the battery is closed.

To the outer end of the shaft M, in front of the case B, is secured a hub, *k*, from the inner face of which projects a pin, *m*, in red, Fig. 3, which engages with the notched segment *f* of the escapement I, and moves it one notch against the resistance of the spring *d* at each revolution of the shaft M.

To the hub *k*, opposite the pin *m*, is attached an arm, *l*, the outer end of which comes in contact with the pin *e* on the arm 2 of the piece I whenever it is brought into the path in which the arm *l* revolves, as in the drawings, which is done by the pin *m* feeding forward the segment *f* in the direction opposite to that indicated by its arrow.

A pin, *n*, on the end of a long lever, S, acts as a retaining-pawl to the ratchet-segment *f*. The lever S is attached at its other end to a short shaft, *o*, having suitable bearings in the case B, to which shaft is connected a long bent rod or lever, T, which descends down into the stand A, and is vibrated in the direction of its arrow by the key U. This is drawn back when relieved from the hand of the operator by the spring V, contained in the stand A, and the weight of the long lever S causes the pin *n* to drop into a notch of the segment *f*.

The ratchet-wheel H, which moves the index-hand F, is fed forward one notch at each revolution of the shaft M, in the following manner:

The gear-wheel Q on the shaft M engages with a similar gear-wheel, W, on the shaft N. To the outer end of this shaft, where it projects through the front of the case B, is attached a disk, Y, from the front face of which projects a pin, *r*, which engages with the teeth on the periphery of the wheel H. Thus at each revolution of the shaft M the index-hand F is moved forward one division of the outer circle on the dial, counting one, and as each revolution of the shaft M, as before explained, completes the circuit of the battery P and causes the bells to strike, the hand F will be moved forward one mark for each stroke of all the bells which may be in communication with this key-board.

A friction-spring (not shown in the drawings) prevents the index-hands from turning too freely.

Operation: The operator at the central station having received the alarm from one of the minor stations sets the hand F at 60, and the hand E at the number of the district in which the fire may be—say at 2. This places the snail K in the position shown in the drawings, when the pin *e* will strike against the second step on the periphery of the snail K, and allow the escapement I to be drawn over by its spring *d* in the direction of its arrow just so far that it will require to be fed up two notches by the revolution of the shaft M before the pin *e* is again brought into the path of the arm *l*. When this occurs the revolutions of the shaft M are arrested. Having thus arranged the hands, the operator moves the key U against the resistance of its spring V. This moves the long bent rod T, and vibrates the lever S, and lifts the pin *n* clear of the segment *f*, when the spring *d* immediately draws over the escapement I until the pin *e* rests against the snail K. As soon as the pin *n* has been lifted, and the escapement I has vibritated, the key U is released by the operator and the pin *n* falls again into the segment *f* and acts as a retaining-pawl. When the pin *e* is drawn out of the way of the arm *l* the shaft M revolves. Each revolution of this shaft, as before stated, causes the bells to strike once, moves forward the index-hand one mark, and feeds up the segment *f* one notch. Now, as the position of the segment *f* is regulated by the index-hand F, the number of the district will be struck and counted, when the pin *e* will again be brought into the path of the arm *l* and the operation be stopped. The operator may thus strike the number of the district at short intervals of time, or he may cause the bells to strike a continuous alarm by holding the pin *n* suspended above the segment *f*, when the shaft M will revolve without feeding forward the segment *f*, and the bells will strike continuously while it is so held.

In Figs. 4, 5, and 6 are shown modifications of the arrangement by which the position of the index governs the number of times the bells are struck. In Fig. 4 pins placed in suitable positions on a disk serve as stops for the arm 2 of the escapement I. In Figs. 5 and 6 a plate with suitable steps in one side, or with pins on its face, is moved up and down by a rack on its edge and a pinion on the arbor of the index-hand; or a pointer may be attached directly to one side of this sliding plate to point to a vertical column of figures placed alongside of it; but the snail K with the index-hand and dial-plate is the method which I prefer.

What I claim as my invention, and desire to secure by Letters Patent, is—

The snail K, or its equivalent, and dial-plate, in combination with the single key U.

Witnesses: EDWARD C. CLAY,
THOS. R. ROACH,
P. E. TESCHEMACHER.