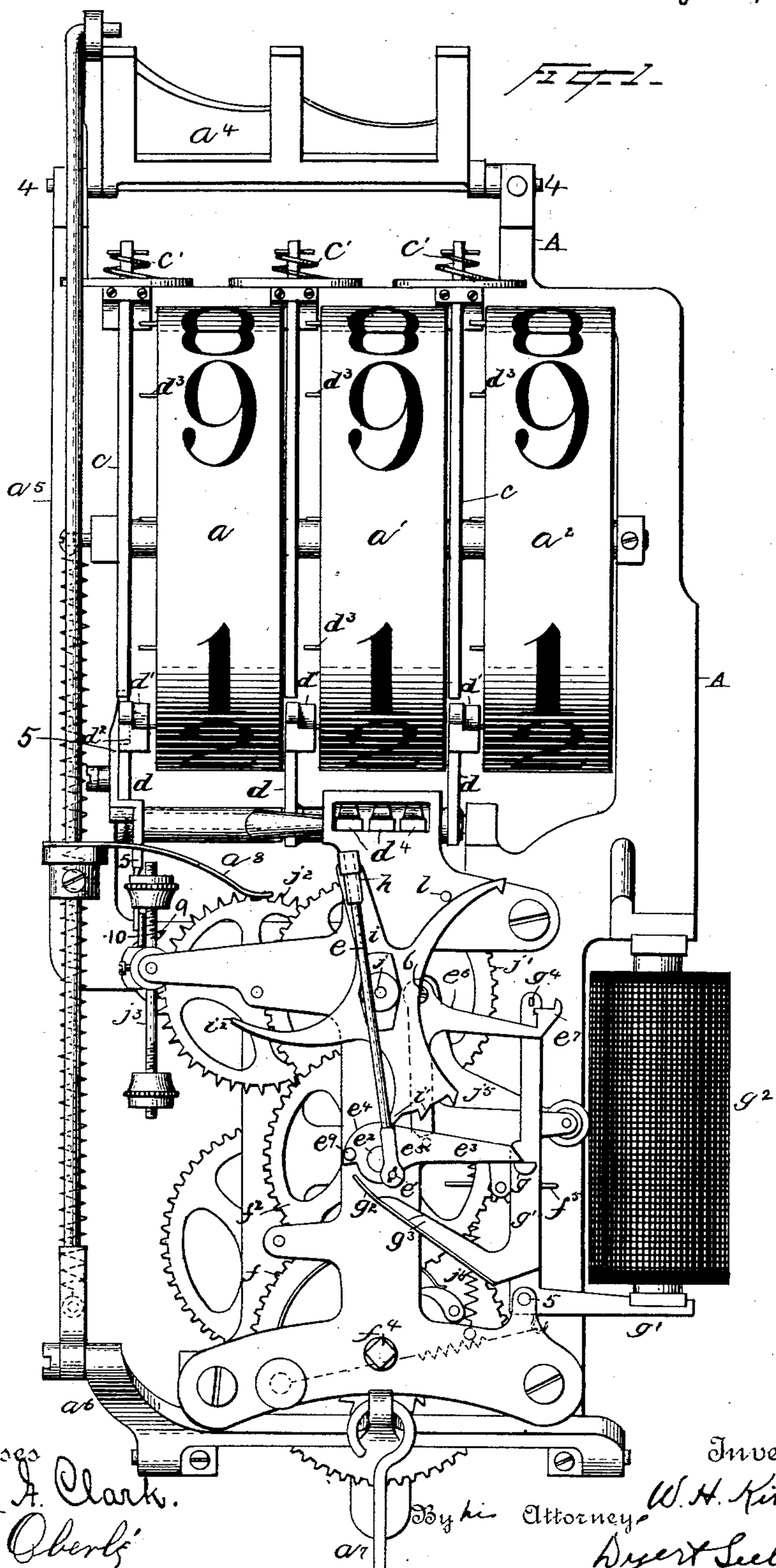
(No Model.) 2 Sheets—Sheet 1.

W. H. KIRNAN.

INDICATOR FOR FIRE ALARM OR OTHER PURPOSES.

No. 520,234. Patented May 22, 1894.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

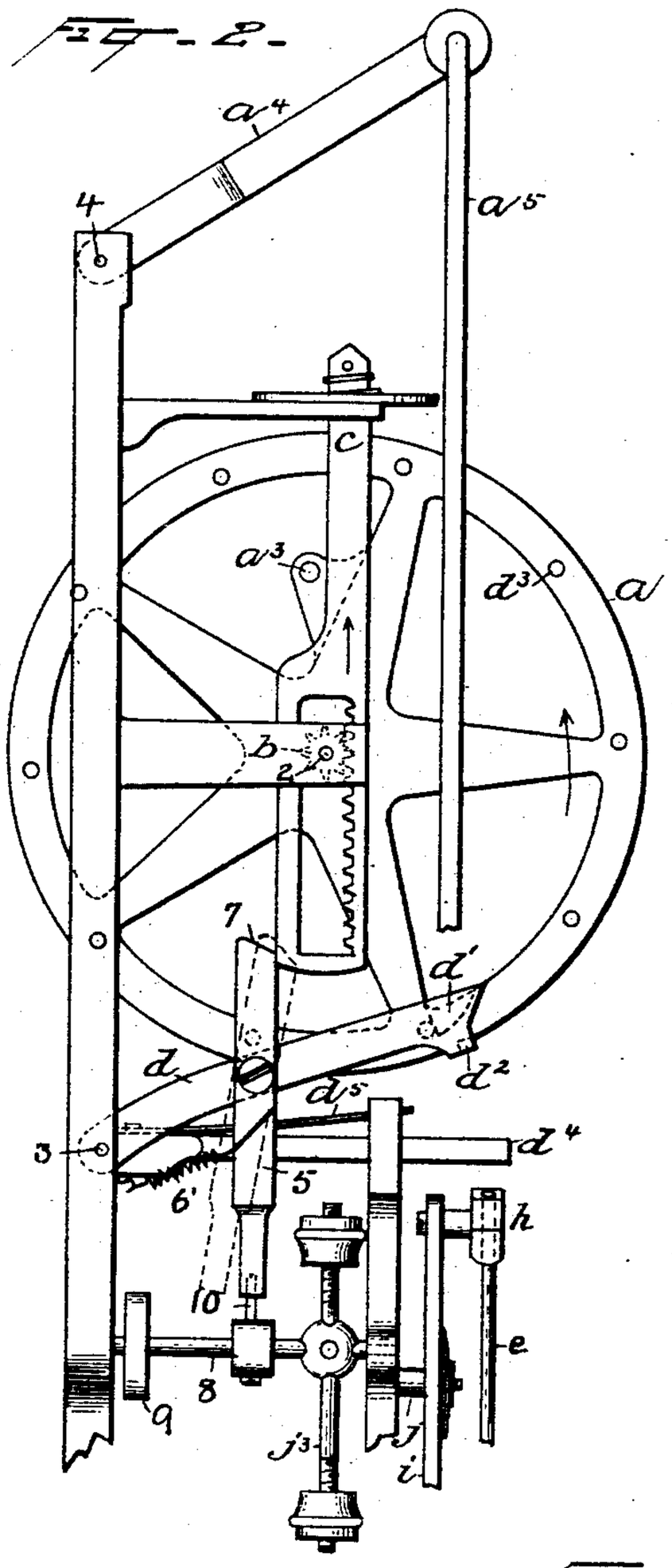


Fig. 1.

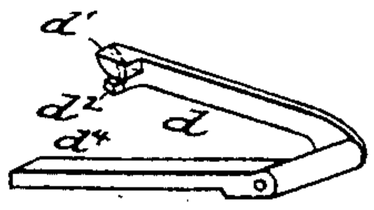
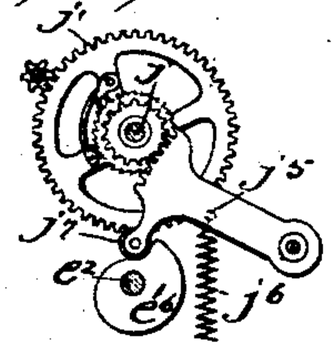


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM H. KIRNAN, OF BAYONNE, NEW JERSEY, ASSIGNOR TO THE GAMEWELL FIRE-ALARM TELEGRAPH COMPANY, OF NEW YORK, N. Y.

INDICATOR FOR FIRE-ALARM OR OTHER PURPOSES.

SPECIFICATION forming part of Letters Patent No. 520,234, dated May 22, 1894.

Application filed January 18, 1892. Serial No. 418,372. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. KIRNAN, a citizen of the United States, residing at Bayonne, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Indicators for Fire-Alarm and other Purposes, of which the following is a specification.

This invention relates to an indicator for fire-alarm purposes, and is intended as an improvement in indicators of the class in which a series of figure-indicating devices or drums are controlled by the impulses employed in giving a fire alarm to indicate the number of the said alarm, one drum being employed to indicate each figure of the whole number of the alarm and a single tripping device being employed to govern the movements of all the said drums, its position being controlled by a time-train, so that it will operate upon the different drums in turn when the proper interval occurs between the strokes of the alarm.

The present invention consists in improvements in the mechanical construction of the apparatus whereby it may be reset at once after a signal is received without danger of leaving any of the parts in an inoperative or wrong position.

Figure 1 shows in front elevation an indicator constructed in accordance with this invention; Fig. 2, a side elevation of the upper portion thereof, showing the means employed for operating the figure-indicating device; Fig. 3, a detail; and Fig. 4, a perspective view of one of the levers by which the movements of the figured drums are controlled.

The figure-indicating devices are shown as drums a a' a^2, each having the figures 1 to 9 in order at uniform distances on its periphery, and a corresponding blank space between the figures 1 and 9, the whole apparatus being, when in use, inclosed in a case having a series of apertures or windows, through which one of the said figures on each drum may be seen when in proper position, these parts being common in indicators of this class. These drums are pivoted on a shaft 2, supported in the frame-work A, the hub of each drum having a pinion b (see Fig. 2), meshing with an actuating device shown in Figs. 1 and 2 as a toothed bar c, slotted at its lower end to embrace and be guided by the said pinion, and guided at its upper end in a slot in the frame-work A, the said bars being acted upon by springs c', having a tendency to move them upward, and thus, through the pinions b, to turn the drums so as to bring the numbers from 1 to 9 successively behind the opening in the casing.

The movement of the drums is controlled by the escapement levers d, pivoted upon a shaft 3 in the frame-work, and having pallets d', d^2 arranged to engage pins d^3, projecting laterally from the drums, one pin corresponding to each figure upon the face thereof. The levers d are provided with feet d^4, actuated, as hereinafter described, to produce a vibration of one of the said levers d on its pivot at each stroke of the alarm. When the lever d is thus raised the pin d^3, held by it, escapes from the pallet d' and is arrested by the pallet d^2, as will be readily understood by referring to Fig. 2, and when the lever falls again under the action of gravity, assisted by the spring d^5, the said pin escapes from the pallet d^2, and the drum rotates until the next pin is arrested by the pallet d'. By this arrangement the drum is permitted to move for the space of one figure, and one only, each time the foot d^4 of the lever d is actuated.

A stop-pin a^3, connected with the side of each drum, serves by its engagement with the bar c to prevent the drum from moving forward farther than one complete rotation, and also serves as a stop to limit the backward movement thereof when the drums are restored to their normal position, indicating blank or zero, by the restoring plate a^4 pivoted at 4 upon the frame-work, and adapted, when moved downward by the rod a^5, as hereinafter described, to engage the toothed bars and move them downward, rotating the drums a, a', a^2 backward to their zero or normal position. The faces of pallets d', d^2, engaged by the pins d^3 in this backward movement, are inclined so as to permit the said pins to pass readily, they then vibrating the arms d up and down.

The feet d^4 of the controlling or escapement levers d are operated by an actuating device or trip-rod or operating device e, connected with a wrist-pin e', carried by the main cam-

shaft e^2 of a train of wheel-work f, f', f^2, actuated in the usual manner by a spring or weight connected with the squared winding-shaft f^4 and governed by a fan or fly f^5. The said main or cam shaft e^2 is provided with a detent-arm e^3, controlled by a projection g in the armature-lever g', pivoted at 5 in such position that when the armature is retracted from its controlling-magnet g^2 the said projection g is disengaged from the arm e^3, permitting the shaft e^2 to revolve, and in such revolution to throw the trip e upward, so that it will engage one of the feet d^4 of the escapement-levers d. In the said rotation a cam e^4 on the hub of the arm e^5 engages a spring g^2 on an arm g^3 of the armature-lever, mechanically moving the armature up to the poles of its magnet, and a pin e^5 engages an armature-prop e^6 pivoted at 6 upon the frame-work A, raising the said prop so that its end e^7 engages a pin g^4 on the end of the armature-lever g, and retains the said armature quite close to the poles of its magnet, so that but comparatively small magnetic force will be required to attract the said armature. The action of the cam e^4 and pin e^5 is properly timed, so that the former first moves up the armature-lever, and the latter then moves up the prop and retains it until the said cam e^4 has released the armature-lever, permitting it to engage and be held by the said prop, which is itself held by the armature lever as long as it is under the influence of its retractor alone, having a tendency to move the armature away from the magnet. As soon as the armature is attracted the pin g^4 is thereby moved out of engagement with the end e^7 of the prop e^6, which drops by its own weight to the position shown in full lines, Fig. 1, leaving the armature free to move back as soon as the magnet g^2 is again demagnetized. It will thus be seen that each time that the circuit, over which a signal is being sent, is closed and then broken, the shaft e^2 will be permitted to make one revolution, and in so doing will restore the armature nearly to the poles of its magnet and raise the prop e^6 to retain it there until the circuit is again closed, and that in the said rotation of the shaft e^2 the trip-rod e will be thrown upward to strike one of the feet d^4 of the escapement levers of the figured drums. The upper end of the said trip e passes through a guide h, carried upon an arm of a trip-controlling plate i, which is frictionally held upon a shaft j of a gear j', meshing with the pinion upon the shaft of an escapement-wheel j^2, governed by a pendulum j^3, so as to have a uniform movement, the said wheels constituting a train denominated the "controlling time train." The said shaft j has loose upon it a pinion j^4 (see Fig. 3), meshing with a segmental gear j^5, provided with an actuating-spring j^6 and a cam-roller j^7 resting upon a cam e^{16} upon the shaft e^2 of the main train, so that at each rotation of the said shaft e^2, as before described, the segmental gear j^5 is raised, stretching the spring j^6. The pinion j^4 is provided with a ratchet engaging a pawl on the gear j', so that in the return movement of the segment j^5 under action of the spring j^6, as soon as the high part of the cam e^{16} has passed the roller j^7, which occurs when the detent-arm e^3 is held, the time-train is set in motion by the force of the spring j^6, carrying trip-controlling plate i with a uniform movement from left to right, Fig. 1. The speed of movement of the time-train is such that the rod e will be carried from one to the next of the feet d^4 in an interval of time, such as employed between the different series of strokes representing the figures of the whole number of an alarm—as, for instance, that occurring between the three strokes and the four strokes of the alarm 3 4 5.

The trip-guiding plate i is provided with teeth i' in proper position to be engaged by a pin e^9 on the hub of the arm e^3 in the rotation of the shaft e^2, the said pin carrying the plate i back in the opposite direction to that in which it is moved by the time-train to such a point that when the left-hand one of the said teeth is engaged by the said pin the trip-rod e in the same rotation of the shaft e^2 will strike the left-hand one of the feet d^4, permitting the left-hand drum a to move for one space, as before described, and when the next tooth i' is engaged the next foot and drum will be acted upon by the trip-rod, and so on. The plate i slips backward independently of the shaft j when thus actuated by the pin e^9 and immediately after the arm e^3 has been arrested begins to travel, under the action of the time-train, from the left-hand toward the right-hand one of the feet d^4. If a short interval only elapses between the successive relations of the shaft e^2, such as employed between the different strokes representing one figure of a whole number, the tooth i' of the plate i that was last engaged will not be carried by the time-train beyond the range of the pin e^9, so that as long as the strokes occur at these definite short intervals, the trip-rod e will always be carried back to the same spot and actuate the same one of the feet d^4 and figured drums, thus giving a series of movements of the same drum, and causing it to show a figure the same as the number of the said movements. When, however, the long interval occurs, the tooth i' last actuated will be carried beyond the range of the pin e^9, and the end of the trip-rod e will be carried to the next one of the feet d^4, and in the next rotation of the shaft e^2, after the said interval, the next tooth i' will be engaged by the pin e^9, and the trip-rod e will be brought back to a position under the said next foot d^4, so that the left-hand one of the drums will now remain stationary, indicating the number of the first series of blows for the first figure of the whole number of the alarm, while the second drum will begin to be actuated to show the number of the next series of strokes, and after the next equally long interval the third

tooth i' will be engaged by the pin e^9 and the third drum will be actuated. If the number of the alarm should contain but one or two figures, the interval between the successive repetitions of the wheel-number is so much greater than that between the different figures of the same number that the succeeding tooth i' will be carried wholly beyond the range of the pin e^9, and only the first drum or first two drums will be actuated, as should be the case. After an alarm has been completed the apparatus is restored to its normal condition (shown in Fig. 1) as follows: The drum-restoring plate or lever a^4 is connected by a rod a^5 with a similar lever or arm a^6 pivoted at the bottom of the frame-work, and provided with a suitable cord or handle a^7 extended out through the case, so that by pulling down on the said handle the plate a^4 is depressed, thereby turning the drums back to their normal position, as before described. The rod a^5 is provided with a tappet a^8, which, when thus depressed, engages an arm i^2 of the trip-guide plate i, moving the end of the trip-rod e back to the proper position to engage the left-hand one of the feet d^4, as is desired for giving the first figure of the next alarm or signal that may be sent. The range of movement of the plate i is limited by a stop-pin l upon the frame-work and the pin g^4 upon the armature lever. The winding-up cam e^{16} of the time-train is of such height that the said train will run down in about the interval which occurs between the two rounds or repetitions of the same signal, so that the said train will usually be run down before the restoring devices a^8, a^5, a^6 are set back by the operator. It sometimes happens, however, that the person receiving a signal will reset the signal wheels instantly when he sees the complete signal number, and before the spring of the time movement has entirely run down, and in this case the plate i will not remain in its normal or retracted position, but will be again moved forward, carrying the trip-rod e toward the right, unless special means are employed to overcome the difficulty, and such means are provided by the present invention. The objection to having plate i move forward after the signal wheels are reset is obvious, since unless the rod e stands under the first foot d^4, at the left, when a succeeding signal is sent to the indicator the first integer of the signal number will not be shown by the first wheel. If the plate i and rod e have moved entirely over to the position occupied after a signal and before the apparatus is reset, a succeeding signal would not operate any of the signal wheels; moreover, while resetting the apparatus prematurely, as described, one of the signal wheels is sometimes advanced, and if this is not noticed, and the wheel again reset, the number displayed for the next signal will be erroneous.

According to my improvement I pivot a detent or stop lever or arm 5 on the first escapement lever d, as shown in Fig. 2. Said stop is provided with a retracting spring 6′ which tends to move it to its dotted line position, but which is normally, that is, when the signal wheels are reset and the apparatus is in condition to receive a signal, held in its full line position by the bar c. The upper end of lever 5 is beveled as at 7, so that the lever will be moved by the bar c when the same is moved down as hereinafter described. On the shaft 8 that supports the pendulum j^3 and escapement 9, I mount a pin 10 which forms a part of the detent or stop device, and which is adapted to strike the lower end of lever 5 when said lever is in its full line position. Suppose, now, that a signal is sent from a distant transmitter, in the manner already described, and that the attendant at the indicator after seeing the signal but before the time train has entirely run down pulls down the handle and resets the signal wheels; in doing this the rod c strikes lever 5 and carries it from its dotted to its full line position, thereby bringing the detent or stop lever into line with the co-operating pin, and at once arresting the time-movement, the duty of which is to move the plate i. Said plate will therefore remain in the position in which it is shown in Fig. 1, until another signal is received. This entirely overcomes the trouble mentioned, by an attachment which is exceedingly simple and not liable to get out of order. The invention may be embodied in other forms, but it is essential that the time or regulated motor which controls the position of the signaling device (e in this application) should be stopped or operatively disconnected from the signaling device by the act of resetting the apparatus, and that the resetting apparatus can be operated without waiting for the time mechanism to run down.

What I claim is—

1. The combination, in an indicator, of signal-wheels, means for moving the same individually the desired distance, a time movement or regulated motor connected to the operating device and controlling its position, means for re-setting the indicator, comprising a bar having a reciprocating movement coincident with the rotation of the signal-wheels and co-acting with a detent to move the same into the path of a stop connected with said time mechanism or regulated motor, substantially as set forth.

2. The combination, in an indicator, of signal-wheels and means for moving the same, escapements therefor, a trip device for operating the escapements, means for operating the trip device, a time mechanism or regulated motor connected to the trip and moving it into position to operate on the escapements successively, a signal-wheel re-setting mechanism, comprising a bar having a reciprocating movement coincident with the rotation of the signal-wheels, and a pivoted detent having a spring by means of which it is withdrawn from the path of a stop connected with

the time mechanism or motor, said bar being adapted to move the detent against the tension of said spring so as to arrest said time movement or motor, substantially as set forth.

3. The combination, in an indicator, of signal drums or wheels with figures thereon and having projections corresponding to the figures, escapements co-operating with the projections, reciprocating bars operatively connected to the signal drums or wheels for moving them, a trip device for the escapements with motor driving mechanism, a time mechanism connected to the trip and adapted to move it into position to operate on the escapements successively, re-setting mechanism for the signal drums or wheels, and a detent or stop for the time mechanism, one part of which is in position to be struck by one of said reciprocating bars, substantially as described.

4. The combination, in an indicator, of signal-wheels, a rod by means of which the signal-wheels are successively advanced, mechanism for reciprocating said rod, a motor connected to the rod and moving it into position to operate the wheels successively, means for re-setting the wheels, a bar having a reciprocating movement coincident with the rotation of the signal-wheels, and a pivoted detent mechanically unconnected with said bar but capable of being struck by the same and moved into the path of a stop controlling the movement of said motor, substantially as set forth.

5. The combination, in an indicator, of signal-wheels, a rod by means of which the signal-wheels are successively advanced, mechanism for reciprocating said rod, a motor connected to the rod and moving it into position to operate the wheels successively, re-setting mechanism, comprising reciprocating bars having racks co-acting with pinions rotating with said signal-wheels, and a pivoted spring-pressed detent thrown into engagement with a stop controlling said motor by means of one of said reciprocating bars, substantially as set forth.

This specification signed and witnessed this 14th day of January, 1892.

WILLIAM H. KIRNAN.

Witnesses:
J. D. CLARKE,
CHAS. W. CORNELL.