(No Model.)

W. J. DUDLEY.

AUXILIARY FIRE ALARM APPARATUS.

No. 387,585. Patented Aug. 7, 1888.

Fig. 1,

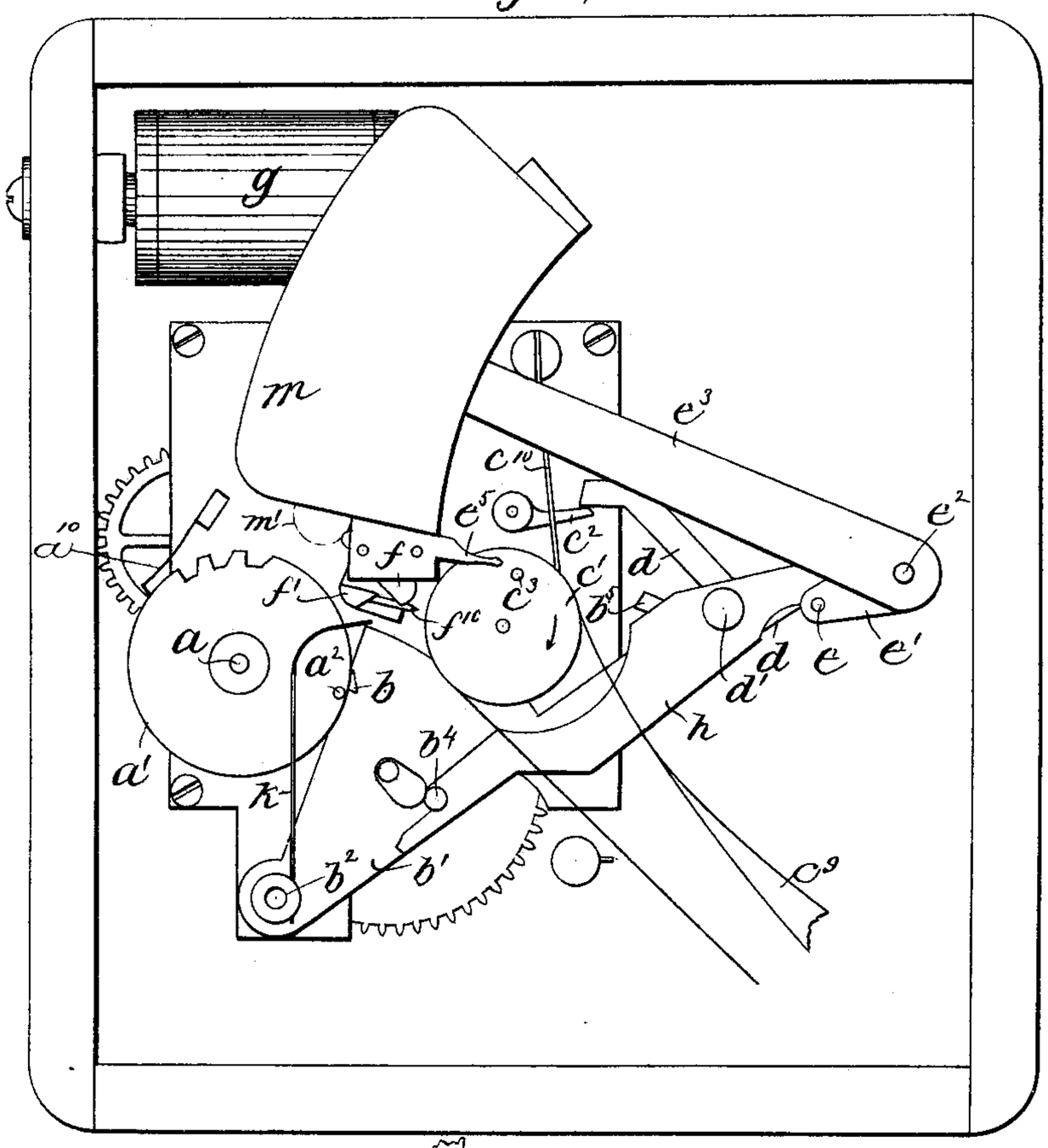


Fig. 2.

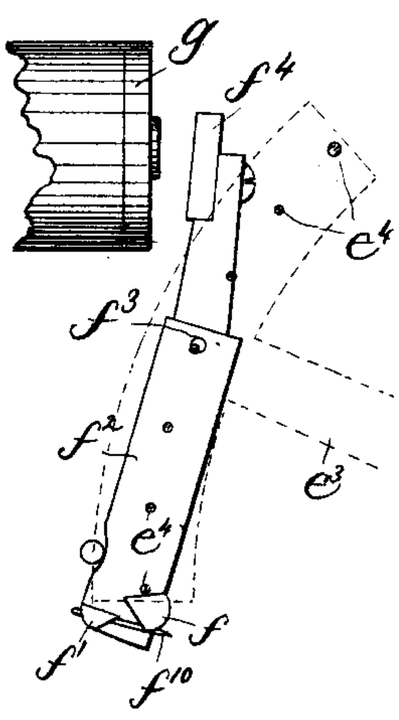


Fig. 3,

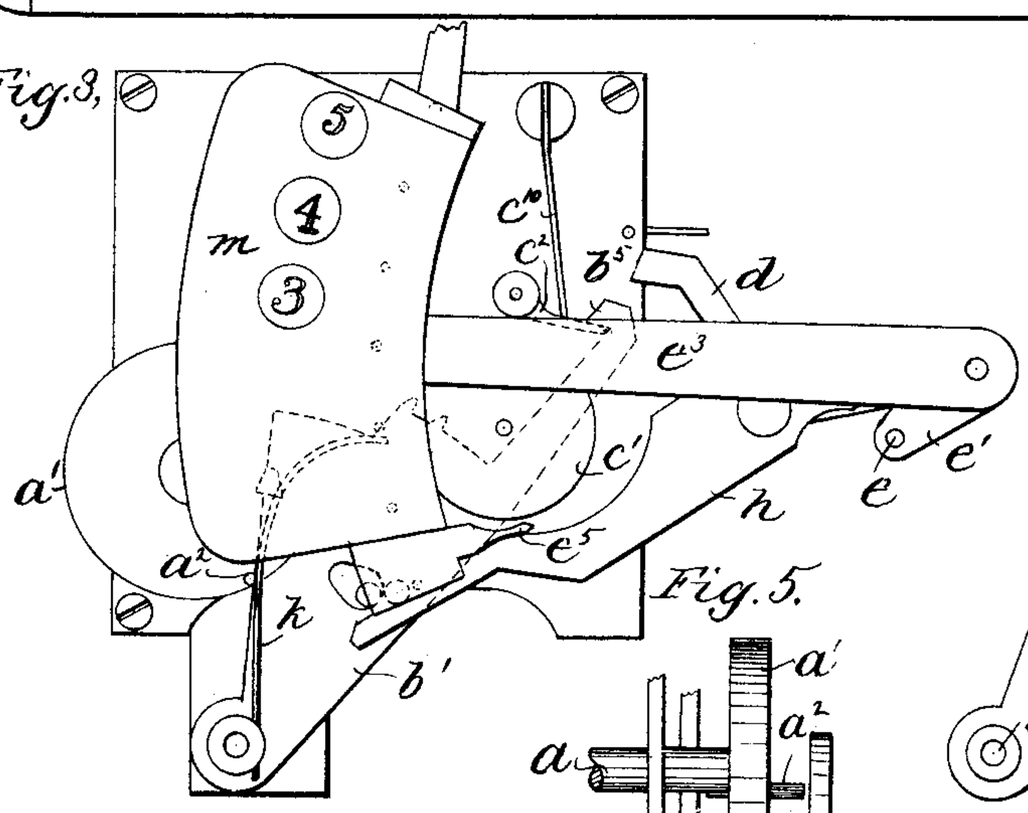


Fig. 4,

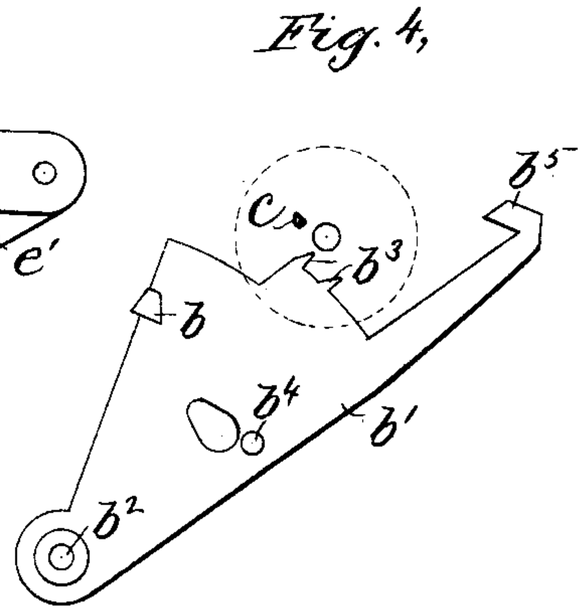
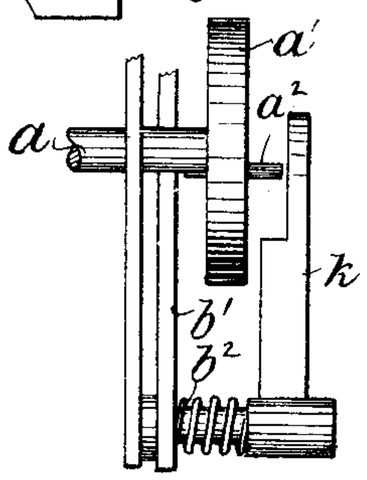


Fig. 5.



Witnesses,
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UNITED STATES PATENT OFFICE.

WALTER J. DUDLEY, OF EVERETT, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WALTER J. DUDLEY, TRUSTEE, OF SAME PLACE.

AUXILIARY FIRE-ALARM APPARATUS.

SPECIFICATION forming part of Letters Patent No. 387,585, dated August 7, 1888.

Application filed July 5, 1887. Serial No. 243,401. (No model.)

To all whom it may concern:

Be it known that I, WALTER J. DUDLEY, of Everett, county of Middlesex, State of Massachusetts, have invented an Improvement in Auxiliary Fire-Alarm Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to an auxiliary fire-alarm or other similar telegraph apparatus in which a signal-box or transmitter in a main transmitting-circuit is controlled as to its operation by a local circuit extending to and adapted to be operated from a number of different points.

In apparatus of this kind as heretofore generally made a single change in the local circuit—such, for example, as a closure—when said local circuit is normally open or break when said circuit is normally closed, has caused the main signal-box to be operated either by releasing its detent when it is a normally-wound box, or by winding its motor by means of an additional more powerful motor controlled by the local circuit. This plan is objectionable for the reason that a single change in the condition of the local circuit is likely to occur accidentally at any time, and thus effect the transmission of a false alarm on the main circuit.

One object of the present invention is to prevent or diminish the liability of such false alarms, and also to prevent second alarms after one has been properly transmitted, and also to indicate at what point or station on the local circuit the signal-box was set in operation, so that if, for example, the local circuit passes through a number of different buildings, each provided with means for operating it, there will be an indication at the main signal-box, showing from which building it was set in operation, and thus greatly facilitating the discovery of the exact location of the fire. The apparatus employed for carrying out these objects in accordance with the invention comprises what may be called a "main motor," shown as a spring-actuated train of wheel-work, which, when set in operation, may itself release or wind the main signal-box of the fire-alarm-telegraph apparatus, such as commonly used, or may itself operate a break-wheel and thus practically constitute the signal-box, and effect directly the transmission of the signal in the main circuit. The said main motor is normally retained inoperative by a detent, which is itself operated by a secondary or auxiliary motor provided with a detent controlled by an electro-magnet in the local circuit which is to govern the operation of the box or transmitter in the main circuit. The detent in the main motor is so arranged as to require for its release two or more turns of the controlling-arbor of the secondary motor. The detent or stop mechanism for the secondary motor comprises a controlling-arm governed by the armature-lever of the controlling-magnet in the local circuit, which is arranged to operate like an escapement, each to-and-fro movement of the armature producing a short movement or single step of the said controlling-arm. The secondary motor is so arranged that if the controlling-arm moves only a certain number of steps—anything less than two, for instance—the said motor will at its first movement engage the said arm and restore it to its normal position, and will thus stop itself before it has made sufficient movement to release the main motor; but if the said controlling-arm makes a greater number of step movements it will not be engaged by the secondary motor, which will continue to operate until it has released the main motor, which operation will again stop the secondary motor, and also lock the controlling-arm in the position to which it was moved when it set the secondary motor in operation, and the entire apparatus will thereafter be unaffected by any further changes in the local circuit until it has been manually restored to its normal position.

Figure 1 is a front elevation of a signaling apparatus embodying this invention, the parts being shown in the normal position; Fig. 2, a detail showing the armature and escapement device for the controlling-arm of the secondary motor; Fig. 3, a front elevation showing the parts in the position assumed after a signal has been transmitted; Fig. 4, a detail showing the stop device of the main motor; and Fig. 5, a detail, to be referred to.

The main motor comprises a shaft, *a*, provided with a disk, *a'*, having a stop-pin, a^2, which projects from both sides of said disk,

as shown in Fig. 5, and which is operated by a spring-actuated train of wheel-work of any usual or suitable construction and not requiring to be illustrated in detail. The said main motor is normally stopped or retained inoperative by a detent or stop shoulder, b, (best shown in Fig. 4,) which engages the pin a^2 at the rear of the disk a', and is itself carried by a stop-plate, b', pivoted at b^2 on the framework, and arranged to turn with slight friction on its pivot, as shown in Fig. 5, so that it will remain in whatever position it happens to be placed until moved therefrom by a sufficient force. The said stop-plate b', that controls the main motor, is provided with two or more teeth or projections, b^3, (see Fig. 4,) arranged to be operated by a pin or projection, c, carried by a disk, c', which is operated by a secondary motor that also consists of a train of wheel-work actuated by a spring, and is capable of moving independently of the main motor. The said secondary motor has a stop-arm, c^2, normally engaged by a detent or stopping device, d, consisting of a bent lever pivoted at d' and acted upon by a projection, e, on an arm, e', pivoted at e^2, and connected with the controlling-arm e^3 of the entire apparatus. The said controlling-arm e^3 (shown in dotted lines, Fig. 2,) is provided with an arc carrying a number of escapement-pins, e^4, (see Fig. 2,) that co-operate with pallets or stopping projections $f\,f'$ on an armature-lever, f^2, pivoted at f^3, and provided with an armature, f^4, for the magnet g, that is in the local circuit, which may be either normally open or normally closed, as preferred, being shown in this instance as normally open, so that the armature stands unattracted and the governing-lever e^3 is retained supported by its lowest pin, e^4, resting on the pallet f.

It will be readily understood from Fig. 2 that each complete to-and-fro movement of the armature f^4, caused by a closure and break in the local circuit through the magnet g, will permit the controlling-arm e^3 to fall the distance between two of the projections e^4, and that two such changes in the local circuit will cause the said arm to fall another space, and so on.

As one or more changes may occur in the local circuit from accident, the said controlling-arm e^3 is likely to be dropped the space of one or two teeth when the apparatus is not intentionally operated; but more than two such changes are not likely to occur accidentally in a circuit without considerable interval of time.

A fall of the arm e^3 through two spaces or one space between the pins e^4 will cause the release of the stop-arm c^2 of the auxiliary motor by its detent d, which will be turned aside the moment it is no longer supported by the projection e, and the secondary motor will thus be permitted to run. The wheel or disk c' of the said secondary motor is provided with a pin, c^3, and the grooved end of the controlling-arm is provided with a projection, e^5, which, when the said arm drops over the space between two of the pins e^4 or double the said space, will lie in the path of the said projection c^3, which, as the disk c' turns in the direction of the arrow, Fig. 1, will engage the said projection e^5, and thus raise the arm e^3 back to its normal position, (shown in Fig. 1,) the pallets $f\,f'$ being inclined at their under sides to permit the upward movement of the pins e^4, and by the restoration of the arm e^3 the detent d will again be brought into position to engage the stop-arm c^2 of the secondary motor, which can thus only run far enough to make one complete rotation of the disk c', when the controlling-arm is dropped as far as permitted by two or less to and fro movements of the armature f^4. In such single rotation of the disk c' the pin c, Fig. 4, at the rear of said disk will engage one of the teeth b^3 of the stop-plate b for the main motor and move the said plate a short distance, but not sufficient to disengage the stop projection a^2 of the main motor, which consequently will not be started by two or less consecutive to and fro movements of the armature-lever f^4. The detent for the main motor thus has a graduated movement dependent on the amount of movement of the secondary motor and requires a definite amount of movement in order to release the main motor, which may correspond to a greater or less amount of movement in the secondary motor, as may be determined upon in the construction of the apparatus. The said stop-plate b' is provided with a projection, b^4, engaged by a forked lever, h, pivoted at d' and acted upon by the pin e of the controlling-lever e^3 for the auxiliary motor, so that as the said lever returns to its normal position by the action of the secondary motor, as just described, it engages the said lever h and restores it and the stop-plate b' for the main motor to their normal position shown in Fig. 1. Thus it will be seen that unless more than four changes occur in the local circuit in less time than occupied by a single rotation of the wheel c' for the secondary motor no effect will be produced on the main motor and main circuit controlled by it.

For the normal operation of the apparatus the local circuit will contain signal-transmitters, which may be like the well-known district-telegraph boxes, the different break-wheels of the same being arranged with three, four, and five or more notches, so as to produce each a corresponding number of double changes or breaks and closures of the circuit, causing the corresponding number of double movements of the armature f^4 and the corresponding movement of the controlling-arm e^3. For example, if a box in the local circuit having three notches were operated, the armature f^4 would make three to and fro movements in succession and the arm e^3 would fall until the fourth pin, e^4, from the lowermost was arrested by the pallets on the armature-lever. The secondary motor would begin to run when the arm e^3 began to drop; but the pin c^3 would not come around to the path of the projection

e^3 until the successive movements of the armature f^4 were completed, and if there were three complete double changes in the local circuits, so that the arm e^3 dropped to the fourth pin, e^4, the projection e^5 of said arm would be carried below the path of the pin e^3, as shown in Fig. 3, and consequently the secondary motor would not act to restore the said arm e^3 to its normal position, as before described, and would not itself be stopped at the end of one turn of the wheel e', but would continue running, and at its second rotation the projection c, Fig. 4, would engage the second tooth b^3 of the stop plate b' and move the said stop-plate far enough to disengage the stop or detent b from the pin a^2 of the main motor, which would then be permitted to run and make nearly one turn.

The stop-plate b' for the main motor is provided with a second stop, b^5, for the secondary motor, and after two revolutions of the secondary motor the said stop-plate b', besides releasing the main motor, as just stated, is brought into such position that its second stop, b^5, arrests the stop-arm e^2 of the secondary motor, as shown in Fig. 3, so that the said secondary motor is arrested after two turns of the disk e' and not permitted to run down.

The main motor is arrested after nearly a complete turn of the disk a' by the portion of the pin a^2 at the front of the plate coming in contact with a spring, k, as shown in Fig. 3, and it bends the said spring so that its free end comes in the path of the pins e^4, and thus prevents further movement of the arm e^3, which is consequently no longer affected by the movement of the armature f^4.

The controlling-arm e^3 is provided with an indicator-plate, m, provided with numbers corresponding with the different signal-boxes on the local circuit, the said numbers being brought by the fall of the arm opposite an opening indicated in dotted lines at m', Fig. 1, in the front of the inclosing-case for the apparatus. Thus, if the local-circuit box having three teeth were operated the figure 3 would be brought opposite the opening m'; if the box having four teeth were operated, the figure 4 would be brought opposite the said opening, and so on, and by having the location of the different boxes properly scheduled the fireman can tell at a glance which station on the local circuit the apparatus is operated from.

The disk a' of the main motor may operate to cause the transmission of a signal in the main circuit in any suitable or usual manner, the specific arrangement forming no part of the present invention. For example, as shown in Fig. 1, the disk a' is made as a break-wheel co-operating with a spring, a^{10}, to open and close the main circuit in the well-known manner. When the main motor has once been operated, as just described, the controlling-arm e^3 is locked by the spring k, as shown in Fig. 3, and there can be no subsequent interference with the main signaling apparatus from the local circuit until the fireman or other authorized person arrives at the main signal-box. The arm e^3 may then be manually restored to its normal position, in which movement it will restore the main stop-plate b' to its normal position, releasing the secondary motor at b^5, but also restoring the detent d to its normal position (shown in Fig. 1,) so that the secondary motor is again immediately arrested. The pin a^2 will then spring past the spring k, which is undercut, as shown in Fig. 5, and the main motor will come to its normal position when the pin a^2 is arrested by the stop b, and the parts will be again ready to operate, as before described.

The disk e' may carry a band of paper, as shown at e^9, held upon it by a spring, e^{10}, as in the well-known telegraphic registers, and the armature-lever f^2 may be provided with a stylus or point, f^{10}, to mark the strip of paper carried by the said disk e', and thus record the changes in the local circuit through the magnet g.

I claim—

1. The combination of the main motor and its detent with the secondary motor and detent therefor, said secondary motor when operated causing the detent for the main motor to release said main motor, and said detent for the main motor being provided with a stopping device for the secondary motor, substantially as described.

2. The combination of a motor and controlling-arm therefor, and an electro-magnet and its armature co-operating with said arm which has a progressive step-by-step movement when said armature vibrates, the said motor being provided with a restoring device which engages said controlling-arm and restores it to its normal position when said controlling-arm makes less than a predetermined number of step movements, the said arm passing beyond the reach of said restoring device when it makes a greater number of step movements, substantially as described.

3. The combination of the main motor and its stopping device with the secondary motor co-operating with said stopping device, as described, the detent and controlling-arm for said secondary motor and the restoring device for the stopping device of the main motor operated by the said controlling-arm of the secondary motor, substantially as and for the purpose set forth.

4. The combination of the main motor and its detent with the secondary motor co-operating with said detent, as described, and the controlling arm for said secondary motor, and electro-magnet and its armature co-operating with said arm which has a step-by-step movement when said armature vibrates, and a locking device for said controlling-arm operated by the main motor, substantially as described.

5. The combination of a motor and detent therefor, and a pivoted controlling-arm for said detent provided with an indicating device, and an electro-magnet and its armature co-operating with said arm which has a step-by-step

movement as the said armature vibrates, the said arm operating said detent to release the motor with different numbers of step movements, and indicating by its position the number of vibrations of said armature that occurred when the motor was released, substantially as and for the purpose set forth.

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

WALTER J. DUDLEY.

Witnesses:
JOS. P. LIVERMORE,
JAS. J. MALONEY.