J. H. HAYES.

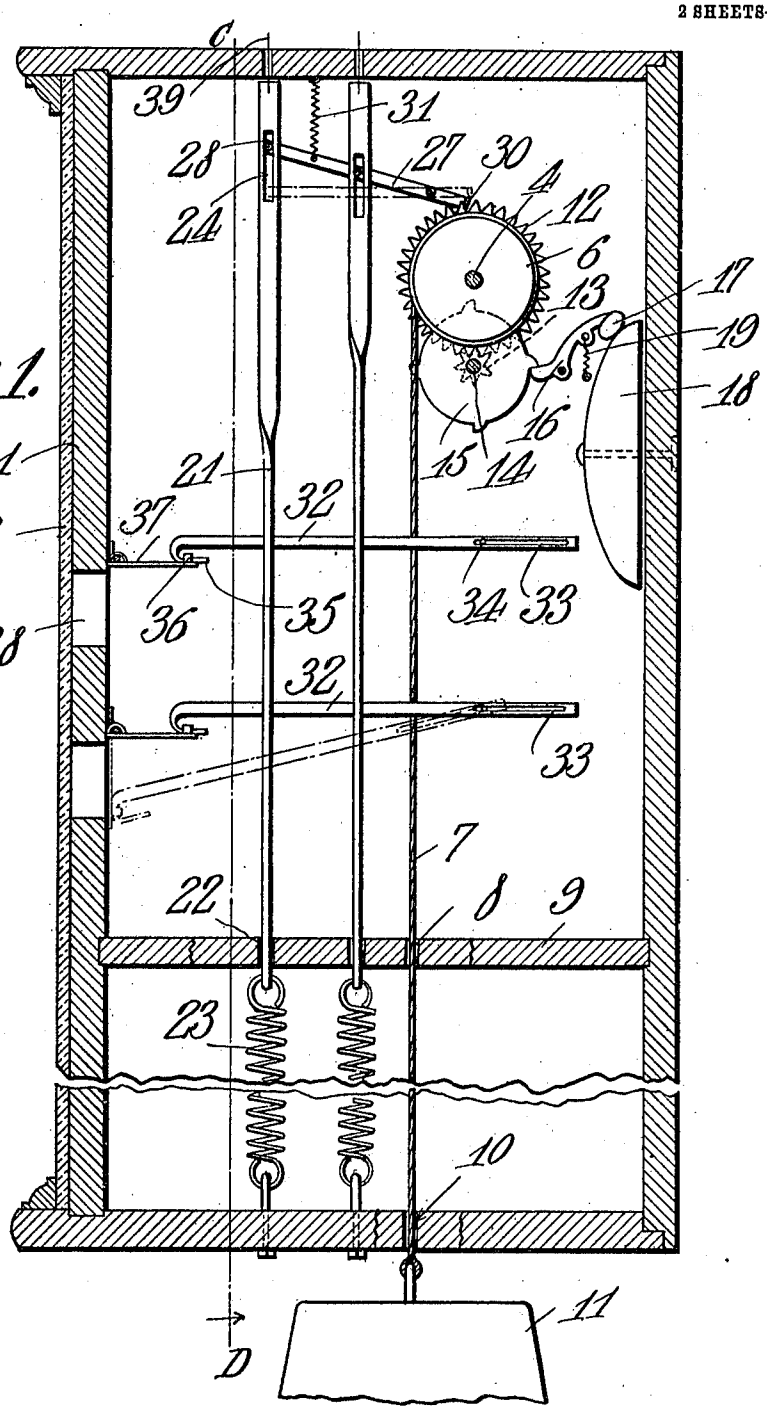
FIRE ALARM.

APPLICATION FILED JUNE 15, 1909.

955,798. **Patented Apr. 19, 1910.**

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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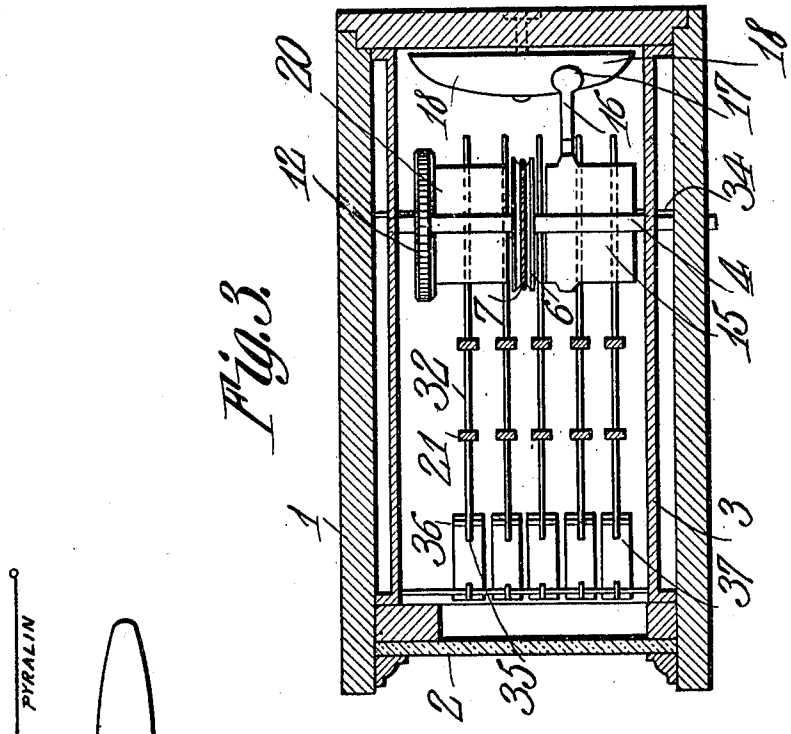
2 SHEETS—SHEET 2.

Fig. 3.



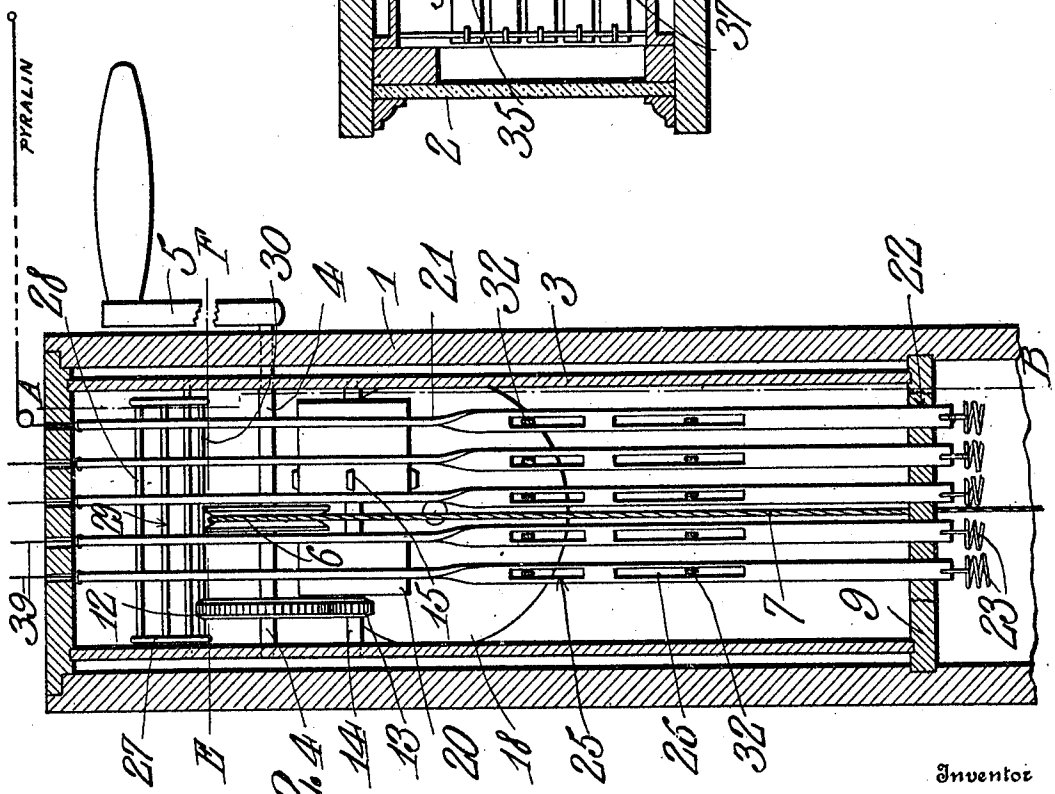


Fig. 2.

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UNITED STATES PATENT OFFICE.

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FIRE-ALARM.

955,798. Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed June 15, 1909. Serial No. 502,336.

To all whom it may concern:

Be it known that I, JOHN H. HAYES, a citizen of the United States, residing at Lesslie, in the county of York and State of South Carolina, have invented a new and useful Fire-Alarm, of which the following is a specification.

This invention has reference to improvements in fire alarm and its object is to provide an apparatus which may be located at any point and which will sound an alarm continuously for a considerable length of time should a fire occur at any one of a number of points close to or remote from the alarm apparatus.

In accordance with the present invention the alarm producing means may consist of a bell and this bell may be rung for a considerable period of time by mechanism actuated by a weight or spring and there is provided a locking mechanism holding the weight or spring against its normal action and this locking mechanism is under the control of any one of a number of means normally constrained to move in a certain direction but normally held against the action of the constraining means by strands readily destroyed or so weakened by the action of heat as to readily break so that in the event of a fire the constraining means will be caused to part and thus cause the action of the lock operating means to release the weight or spring which in turn causes the actuation of the alarm mechanism.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a section on the line A—B of Fig. 2. Fig. 2 is a section on the line C—D of Fig. 1. Fig. 3 is a section on the line E—F of Fig. 2, the handle shown in Fig. 2 being omitted.

Referring to the drawings, there is shown a casing 1 the front of which may be covered by a glass panel 2 and at any convenient point there may be provided a door for access to the interior of the casing, although the door is not shown in the drawings.

Within the casing there is mounted a suitable frame 3 designed to carry certain operating parts of the mechanism and journaled in this frame is a shaft 4 which may be carried through the side of the casing 1 to the exterior thereof and there be provided with a crank 5 for the manual operation of the shaft when necessary.

Mounted on the shaft 4 is a winding drum 6 carrying a cord or strand 7 extending through a perforation 8 in a partition 9 which latter is parallel with but supported a distance above the bottom of the casing, and the strand 7 is continued through a perforation 10 in the bottom of the casing and at the lower end is connected to and sustains a weight 11. The purpose of the weight is to cause the unwinding of the strand from a drum 6 and the consequent turning of the shaft 4 under circumstances which will hereinafter appear, but it will be understood that if so desired the weight 11 may be replaced by a suitable spring, although it is preferred to use a weight.

Mounted on the shaft 4 is a gear wheel 12 and this gear wheel is in mesh with a pinion 13 on another shaft 14 carrying a tappet wheel 15 in the path of which is a lever 16 terminating at the end remote from the tappet wheel in a head 17 adapted to make contact with a bell 18 suitably supported on the interior of the casing 1. The bell lever 16 is normally constrained toward the bell by a spring 19. If it be assumed that the weight 11 is elevated by the winding of the strand 7 on the drum 6 and that the weight be permitted to act then the strand 7 will be unwound from the drum 6 and rotative movement will be thereby imparted to the shaft 4 and in turn to the gear 12 which through the pinion 13 will impart a much more rapid rotation to the shaft 14 and the tappets on the wheel or drum 13 will be brought in rapid succession against the lever 16 moving the head 17 of the lever away from the bell against the action of the spring 19 and as soon as the lever escapes from the tappet the spring 19 will return the hammer 17 into contact with the bell thus setting the latter in vibration and causing it to emit a sound. The structure will cause a rapid succession of blows to be delivered to the bell 18 until the cord or strand 7 has unwound from the drum 6 or the descent of the weight has been arrested by any suitable means. The parts are proportioned in practice so that the sounding of the bell will continue for a considerable period of time. In order to steady the rotation of the tappet wheel 15 the latter may be made in the form of a heavy drum and the shaft 14 may carry

another heavy drum 20. The two drums may for convenience be made of iron or other heavy metal and act as fly wheels to cause an even movement of rotation of the shaft 14.

Any suitable means for permitting the shaft 4 to be rotated in the direction to wind up the weight without actuating the alarm mechanism may be provided.

Extending longitudinally through the casing 1 are bars 21 each preferably made of a flat strip of metal given a quarter turn so that the ends are disposed at right angles one to the other. The upper ends of the bars 21 are within but normally close to the top of the casing while the lower ends of the bars extend through appropriate passages 22 in the partition 9 and below this partition each bar is connected to a spring 23 having the end remote from its connection with its bar secured to the bottom of the casing, all the springs 23 being lodged in the space between the partition 9 and the bottom of the casing.

Each bar near its upper end is provided with a longitudinal slot 24 and at points at or below the middle of the bars each bar is provided with two longitudinal slots 25—26 in line one with the other, these slots being of such length and disposition as to cause each bar to act in a manner to be hereinafter described.

Within the casing near the upper end thereof there is pivoted a frame 27 having cross bars 28—29 on one side of its pivot and on the other side of its pivot having a rod 30 adapted to normally engage between two of the teeth of the gear wheel 12, being held in this position by a spring 31.

In the particular structure shown in the drawings the bars 21 are arranged in two rows one in front of the other, and the rod 28 extends through slots 24 in the front row of bars 21 while the rod 29 extends through the slots 24 in the rear row of bars 21.

The spring 31 is a light spring being designed to simply maintain the frame 27 with the rod 30 between a pair of teeth of the gear wheel 12 thus holding the gear wheel against rotation and thereby maintaining the weight 11 in the elevated position and preventing the actuation of the alarm mechanism. In this position of the frame 27 the rods 28 and 29 are close to the upper ends of the slots 24 in the two sets of bars 21. Should any one of the bars 21 which are held in the elevated position against the action of the springs 23 by means which will be hereinafter described, be released from the restraining action of said means, then the particular released bar 21 will be drawn downward by the retractive action of the spring 23 and the upper wall of the slot 24 of the particular bar 21 will engage a rod 28 or 29 of the frame 27, and this will cause a movement of the frame 27 about its pivot against the action of the spring 23 and the consequent lifting of the rod 30 from between the teeth of the gear wheel 12. Under these conditions the weight 11 is now free to act and will cause the rotation of the shaft 4 and of the gear wheel 12 and the consequent rotation of the pinion 13 and shaft 14 and the ringing of the bell 18 in a manner already described. The downward movement of any one of the bars 21 does not in any manner interfere with the other bars 21 since the frame 27 is free to move with relation to the other bars because of the slots 24 which have a sufficient downward extension to permit the full movement of the frame 27 about its pivot without engaging the lower wall of the slots 24. By this means a downward movement of any one of the bars 21 under the action of its spring 23 will cause the release of the alarm mechanism and the consequent sounding of the alarm.

Extending through the slots 25 and 26 of the bars 21 are rods 32 each rod extending through two bars 21 one behind the other, but by the arrangement of the slots 25 and 26 a rod 32 is controlled by but one of the bars 21, the slot in the other bar through which a rod 32 extends being long enough to permit full movement of the rod without interference.

The rear end of each bar 32 is provided with a longitudinal slot 33 and is mounted on a pivot rod 34 which may be common to all the rods 32 in a horizontal plane and extend from one side of the casing to the other. The other end of each rod 32 is formed into a hook 35 returned on the rod and extending through an eye 36 on the free end of an indicator drop 37 pivoted at the other end to the inner wall of the front partition of the casing 1. Immediately below the pivot point of the drop 37 is a slot or opening 38 through the front wall of the casing 1 so that when a drop 37 is moved from a normal horizontal position to a pendent position it will be visible through the slot or opening 38 but is protected from handling or harm by the glass panel 2.

In the normal position of the parts, the ends 35 of the rods 32, which ends beyond the curved portions are straight for a distance, will maintain the drops 37 in the horizontal position but a superior force such as the retractile action of a spring 23 will cause the downward movement of the effected rod 32 and the eye 36 will then follow around the hook 35 while the rod 32 will move downwardly and forwardly on the pivot rod 34 because of the slot 33. The active position of an annunciator drop 37 and its rod 32 is shown in dotted lines in Fig. 1. Only a short part of the straight

portion of the end 35 of a rod 32 immediately adjacent to the curved portion, is necessary to cause the end 35 to cramp in the eye 36 of the respective annunciator drop, and the elongation of the free end of the hooked portion 35 beyond the eye in the showing of the drawings is only that projection which is usually allowed to remain in the practical embodiment of the invention.

The slots 25 and 26 in each bar 21 are so related that only one bar will operate any particular annunciator drop and by having a suitable legend displayed upon the visible face of the drop when in the active position the location of a fire causing the movement of the particular bar 21 is at once evident.

The bars 21 are each held in a position wherein the spring 23 controlling the particular bar is placed under tension, by means of a strand 39 and such strand is led to the point to be protected and the end remote from the bar 21 is fastened in any appropriate manner to prevent the active movement of the bar under the pull of the spring 23.

The strand 39 may be made of wire for a portion of its length and usually for the greater portion of its length. The remainder of the strand is formed of a suitably strong but readily inflammable material and for this purpose there may be used a pyroxylin product such, for instance, as the compound known as pyralin. Strands of this material may be carried wherever it is desired to cause an alarm to be given in case of fire and these strands may be carried between studs or under floors or along rafters of a frame building or anywhere where there may be a liability of fire and because of the quick action of fire or heat even without the presence of flame upon this material an alarm will be sounded before the fire has made any material headway.

Let it be assumed that a dwelling or other structure is equipped with the system set forth herein and that in some part of the building a fire should start then either the direct action of the flame or the heat of the flame will cause the rupture of some one of the strands 39 in the pyralin section thereof thus releasing a respective one of the bars 21 to the action of its spring 23 thus causing a downward movement of such bar as shown in Fig. 1. The movement of the bar 21 under the action of its spring 23 will simultaneously cause the actuation of the audible alarm and the display of the annunciator drop.

To reset the apparatus it is necessary to rewind the strand 7 upon the drum 6 thus elevating the weight 11 and to again move the actuated bar 21 to the inactive position and to renew the destroyed inflammable portion of the strand.

What is claimed is:—

1. In a fire alarm, a series of bars each having a longitudinal slot near one end and also slotted near the other end, a spring connected to each bar and tending to move the same in one direction, inflammable means for each bar for holding it against the action of its spring, an alarm mechanism, a lock for the alarm mechanism comprising a frame provided with rods extending through the slots at the ends of the bars and movable along said slots, rods extending through the other slots in the bars and capable of moving along said slots, and annunciator drops controlled by the last named rods.

2. In a fire alarm, a series of longitudinally slotted bars, a spring for each bar for moving the same actively, and an inflammable strand for holding each bar against the action of its spring, an alarm mechanism, a lock for the alarm mechanism having rods extending through slots in the bars and movable by any one of the bars without affecting the other bars, annunciator drops, and rods extending through other slots in the bars, and each individual to one only of the bars, each of the last named rods controlling an annunciator drop and movable by a bar when released from the inflammable controlling means to move its annunciator drop to visible position.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN HEMPHILL HAYES.

Witnesses:

C. B. Betts,

D. P. Lesslie.