

J. S. HARTLEY.

ALARM CLOCK.

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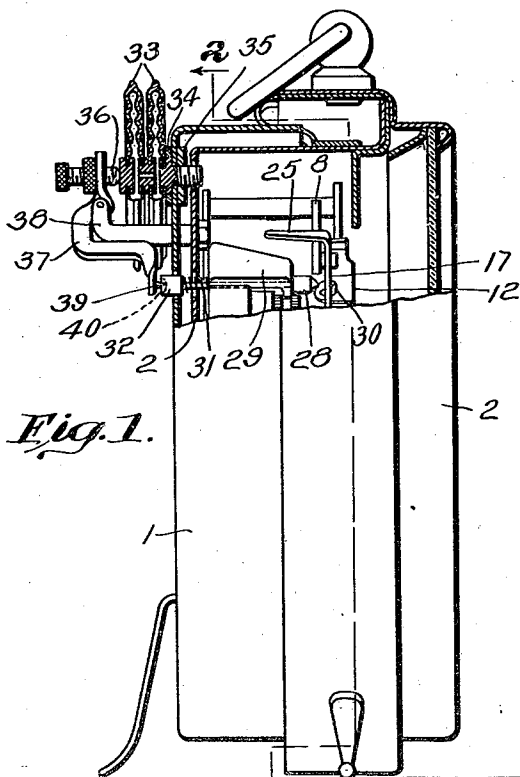


Fig. 1.

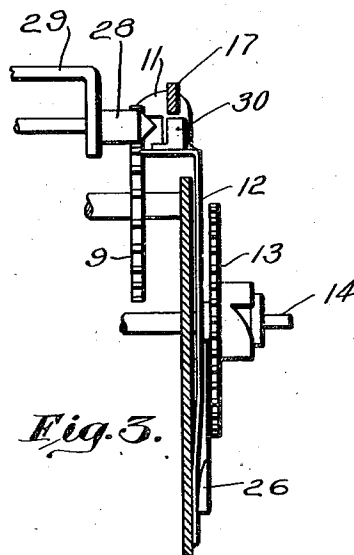


Fig. 3.

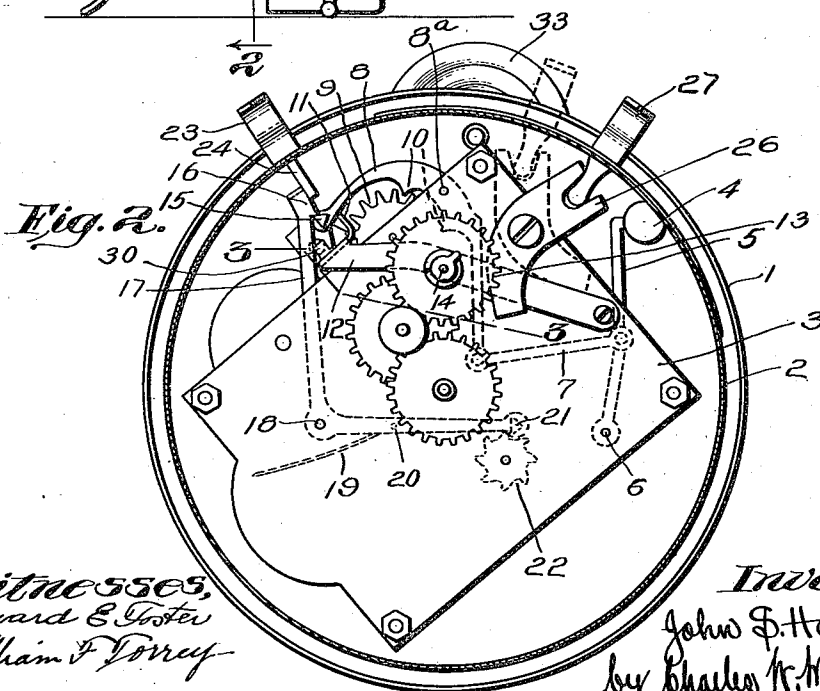


Fig. 2.

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UNITED STATES PATENT OFFICE.

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ALARM-CLOCK.

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To all whom it may concern:

Be it known that I, JOHN S. HARTLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Alarm-Clocks, of which the following is a specification.

The present invention relates to alarm clocks.

Experience has demonstrated that many people who have perished in a fire at night could have saved themselves if they had been awakened by some device for automatically indicating the presence of the fire. Usually these unfortunate people have continued to sleep even after the rooms occupied have become heated to a high degree.

The principal object of the present invention is to provide a novel alarm whereby the prompt warning of a fire to a sleeper is insured.

To the accomplishment of this object one feature of the invention contemplates the provision, in an alarm clock having mechanism for ringing the alarm at a predetermined time, of mechanism for ringing the alarm at a predetermined temperature. This arrangement enables the clock to be used to awaken the sleeper at the customary time in the morning and also to awaken the sleeper when the sleeping room becomes heated to an abnormal degree. This and other features of the invention, including certain details of construction and combinations of parts, will be further explained in the following description, and then particularly pointed out in the appended claims.

The various features of the present invention will be best understood from an inspection of the accompanying drawings illustrating the preferred embodiment of the invention, in which,

Figure 1 is a left side elevation, partly in section, of the alarm clock; Fig. 2 is a sectional elevation on the line 2—2, Fig. 1, and Fig. 3 is a sectional detail on the line 3—3, Fig. 2.

In the illustrated embodiment of the invention the clock is provided with a gong 1 consisting of a hollow cylindrical shell secured to a casing 2 for the clock works 3. The gong is struck to sound the alarm by a hammer 4, (Fig. 2) formed upon the upper end of an arm 5 which is secured to a rock shaft 6 mounted to rock in the supporting

plates of the clock works. The arm 5 is connected by a link 7 to one end of a lever 8 secured to a rock shaft 8^a mounted to rock in the supporting plates of the clock works. The lever 8 is rapidly oscillated to impart the gong striking movements to the hammer 4 by a driving gear 9, actuated in the well known manner through a train of gears from a coiled spring (not shown), cooperating with a pair of pallets 10 formed upon the lever 8.

In order to normally prevent the operation of the alarm mechanism the teeth of the gear 9 are engaged by a pawl 11 formed upon the free end of a spring arm 12, called the trip lever, secured at one end to the front plate of the clock works. To hold the pawl 11 in engagement with the teeth 9 the trip lever 12 is pressed upon by the hub of a pinion 13 which is driven by the time train from the main spring. The pinion 13 is loosely mounted on the usual setting rod 14 which controls the time at which it is desired to ring the alarm. When the time arrives for the ringing of the alarm the pinion 13 is released so that it slides along the rod 14 under the pressure of the spring arm 12 thus permitting the pawl 11 to be withdrawn from the teeth of the gear 9 thereby releasing the alarm mechanism to the operation of its driving mechanism.

In order to ring the alarm intermittently the clock is also provided with a second time controlled mechanism arranged to alternately lock and unlock the alarm mechanism every thirty seconds. To this end the free arm of the lever 8 is provided with a dog 15 arranged to be engaged by a latch 16 formed upon the vertical arm of a bell crank lever 17, known as the "intermittent lever," pivotally mounted on a cross pin 18 connecting the supporting plates of the clock works. The latch 16 is normally held in engagement with the dog 15 by a leaf spring 19 secured at one end to the front plate of the clock works and engaged at its other end with a pin 20 carried by the horizontal arm of the bell crank lever 17. To disengage the latch and dog to release the driving mechanism for the operation of the alarm mechanism the horizontal arm of the bell crank lever 17 carries a prismatic block 21 which is engaged by a toothed wheel 22 constructed to alternately elevate the block and allow it to fall under the influence of the spring 19 at

intervals of thirty seconds. If it is desired to have the alarm ring steadily during the ringing period the intermittent lever 17 may be held out of latching position by a manually operated slide 23 having a rod 24 arranged to engage a lateral projection 25 (Fig. 1) on the lever 17.

In order to stop the alarm when the driving mechanism is released by the timing mechanism the front plate of the clock works carries a pivoted plate 26 which is actuated by a manually operated finger piece 27 mounted to slide on the casing 2. When the plate 26 is moved into the dotted line position, (Fig. 2) the spring arm 12 is free to follow the movements of the pinion 13. When the plate 26 is moved into the full line position, (Fig. 2) the spring arm 12 is prevented from following the pinion 13 and the alarm is either stopped or prevented from being sounded at the predetermined time.

In order to provide the clock with an additional mechanism which will sound the alarm when the clock becomes heated to a predetermined degree the clock carries a plunger 28 mounted to slide longitudinally in a yoked bracket 29 secured to the back plate of the clock works. The plunger 28 is provided with a conical end the point of which is arranged to engage a pin 30, (Figs. 2 and 3), formed on the free end of the trip lever 12. When the plunger is moved forwardly it strikes the pin 30 and removes the pawl 11 from engagement with the teeth of the gear 9 thus starting the driving mechanism to sound the alarm. The pawl 11 is actuated to release the driving mechanism under the influence of the plunger 28 even when the plate 26 has been actuated to stop the time controlled movement of the alarm mechanism as the trip lever is sufficiently flexible between its free end and the point of engagement of the plate 26 to permit the movement of the pawl 11 away from the gear 9. The plunger also releases the dog 15 from the latch 16 as the sloping side of its conical end is arranged to strike the side of the intermittent lever 17, (Fig. 2), when the lever is in latching position and moves it into an inoperative position.

The plunger 28 is normally held in an inoperative position by a coiled spring 31 coiled around the shank of the plunger and interposed between the bracket 29 and a block 32 on the rear end of the plunger. The plunger is actuated forwardly to withdraw the latch 11, or, both the latches 11 and 16, by a thermostat and suitable connections which operate the plunger when a predetermined temperature is reached. The thermostat in the illustrated embodiment of the invention comprises a pair of hollow connected disks 33, filled with ether, which

are secured, with a fiber washer 34 interposed between the disks and the back wall of the gong 1, by a bolt and nut connection 35 inside the gong. The outside disk 33 presses against a screw 36 which is adjustably held in the vertical arm of a bell crank lever 37 pivotally mounted on a bracket 38 carried by the casing 2. The horizontal arm of the bell crank lever carries a point 39 which engages a cup 40 formed in the block 32. With this construction an expansion of the ether-filled disks to a predetermined degree actuates, through the connections described, the plunger 28 to sound an alarm.

It will be apparent to those skilled in the art that almost any abnormal temperature can be selected as the predetermined temperature to ring the fire alarm as many well known substances, liquids or compositions other than ether may be selected as the thermostatic material, and that through adjustments of the screw 36 the fire alarm may be rung either early or late in the expansive movements of the disks 33.

While the invention has been illustrated as being embodied in the alarm clock sold under the trade mark "Big Ben" it must be understood that the invention is not limited for application thereto as it will be clear to those skilled in this class of clocks, having the general objects of the present invention in view, that changes may be made in the details of structure, the described and illustrated embodiment thereof being intended as an exploitation of its underlying essentials, the features thereof being definitely stated in their true scope in the claims herewith.

What is claimed as new, is:

1. An alarm clock, having, in combination, mechanism for ringing the alarm at a predetermined time, mechanism for ringing the alarm at a predetermined temperature, and means for rendering one of said mechanisms inoperative without affecting the operation of the other mechanism, substantially as described.

2. An alarm clock, having, in combination, mechanism for ringing the alarm at a predetermined time, mechanism for ringing the alarm at a predetermined temperature, and means for rendering the time controlled mechanism inoperative without affecting the operation of the heat controlled mechanism, substantially as described.

3. A clock, having, in combination, an alarm mechanism, a driving mechanism therefor, a starting and stopping mechanism for the driving mechanism, a primary timing mechanism for controlling the operation of the starting and stopping mechanism, a secondary timing mechanism for interrupting the operation of the driving mechanism at intervals after the driving mechanism has been released by the primary timing mechanism, substantially as described.

nism, and automatic means for preventing the timing mechanisms from controlling the operation of the starting and stopping mechanism when the clock becomes heated to a predetermined degree, substantially as described.

4. A clock, having, in combination, an alarm mechanism, a driving mechanism therefor, a primary latch for stopping the driving mechanism, a primary time controlled mechanism for operating the primary latch to release the driving mechanism, a secondary latch for stopping the driving mechanism, a secondary timing mechanism for operating the secondary latch at intervals during the disengagement of the primary latch with the driving mechanism, and a single means actuated independently of the time controlled mechanisms for operating the latches to release the driving mechanism, substantially as described.

5. A clock, having, in combination, an alarm mechanism, a driving mechanism therefor, a pair of latches for stopping the driving mechanism, a pair of independent time controlled mechanisms for operating the latches to release the driving mechanism, and a heat controlled mechanism operating independently from the time controlled mechanisms for operating the latches to release the driving mechanism, substantially as described.

6. A clock, having, in combination, an alarm mechanism, a driving mechanism therefor, a trip lever, mechanism for holding the trip lever in position to stop the driving mechanism, a timing mechanism operating to release the trip lever and start the driving mechanism, a manually operated device acting directly upon the trip lever for locking the trip lever to prevent its release by the timing mechanism, and additional mechanism operating automatically to release the trip lever and start the driving mechanism when the manually operated device is either in or out of trip lever locking position, substantially as described.

7. An alarm clock, having, in combination, a trip lever and an intermittent lever, a plunger, a spring for normally holding the plunger in an inoperative position, and means for operating the plunger to release

the levers when the clock becomes heated to a predetermined degree comprising a thermostat and an operative connection between the thermostat and the plunger, substantially as described.

8. An alarm clock, having, in combination, a trip lever and an intermittent lever, a plunger, a spring for normally holding the plunger in an inoperative position, and means for operating the plunger to release the levers when the clock becomes heated to a predetermined degree comprising a thermostat, a lever actuated thereby, and a pin and cup connection between the lever and the plunger, substantially as described.

9. A clock, having, in combination, an alarm mechanism, a driving mechanism therefor, means for preventing the operation of the driving mechanism comprising a trip lever and an intermittent lever, timing mechanism for operating the levers to release the driving mechanisms, and a single means other than timing mechanism for operating the levers to release the driving mechanism, substantially as described.

10. A clock, having, in combination, an alarm mechanism, a driving mechanism therefor, mechanism for preventing the operation of the driving mechanism comprising a trip lever and an intermittent lever, timing mechanism for operating the levers to release the driving mechanism, means other than timing mechanism for operating the levers to release the driving mechanism, and a thermostat for controlling said means, substantially as described.

11. An alarm clock, having, in combination, a trip lever and an intermittent lever, means for releasing the levers to ring the alarm when the clock becomes heated to a predetermined degree comprising a pin carried by the trip lever and a plunger having a conical end the point of which is arranged to engage the pin on the trip lever and the sloping side of which is arranged to engage the intermittent lever, substantially as described.

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