

Aug. 11, 1942.

F. LUX

2,292,576

ALARM TIMING DEVICE

Filed Sept. 25, 1937

2 Sheets-Sheet 1

Fig.1.

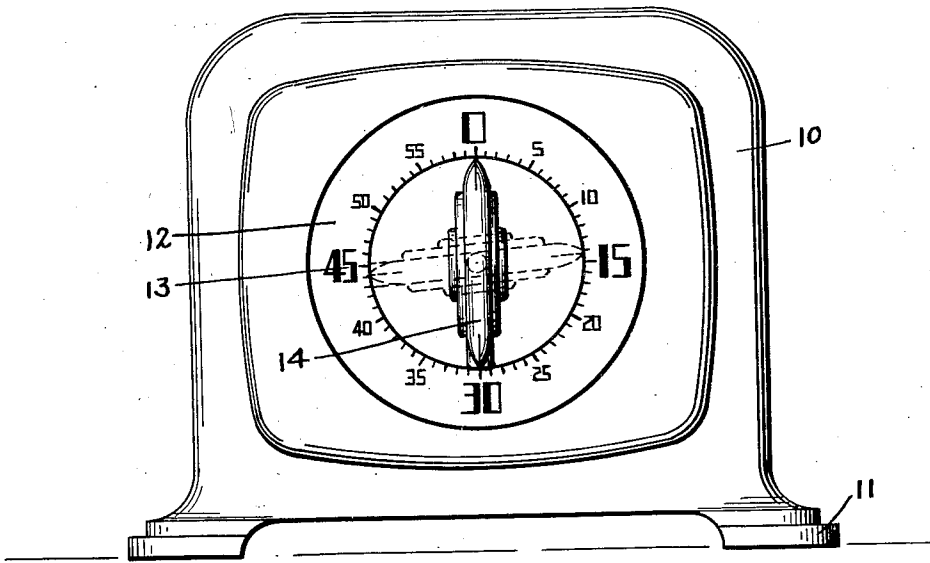


Fig.2.

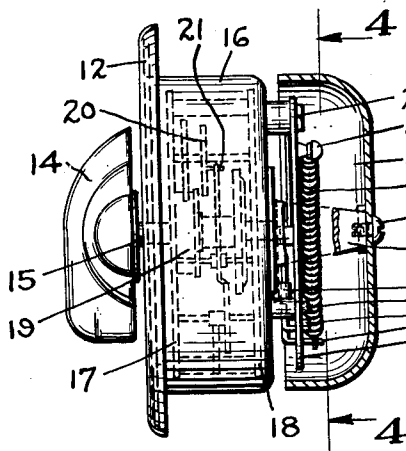
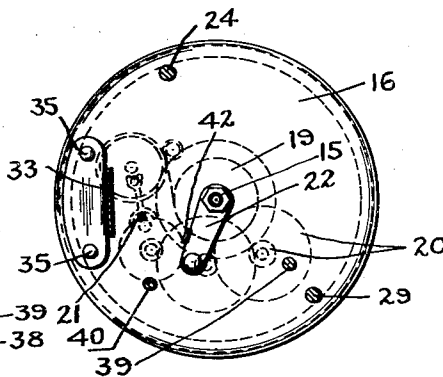


Fig.3.



INVENTOR
Frederick Lux.

BY
H. S. Manning
ATTORNEY

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2 Sheets-Sheet 2

Fig. 4.

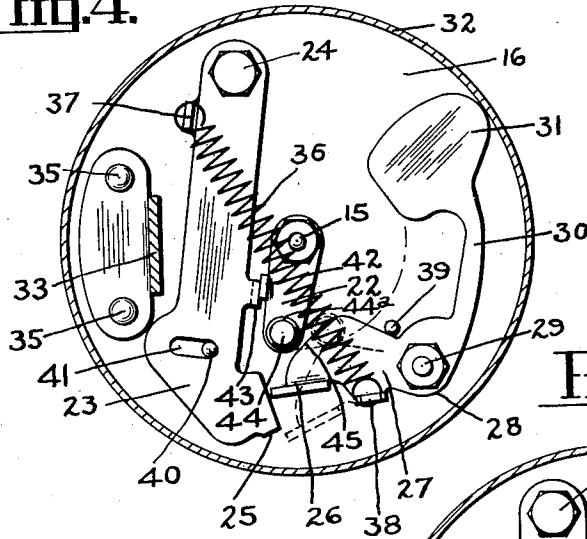


Fig. 5.

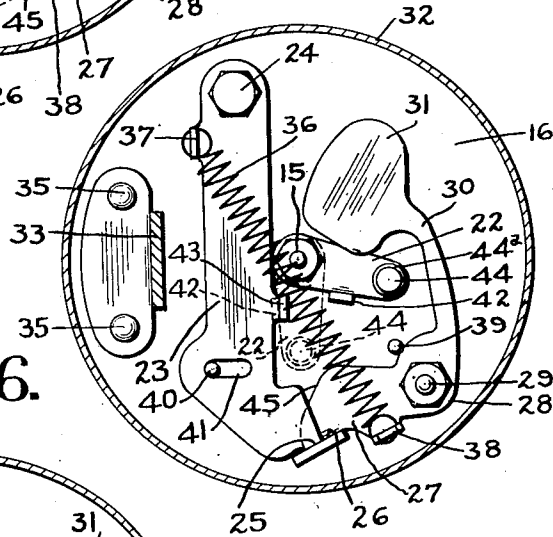
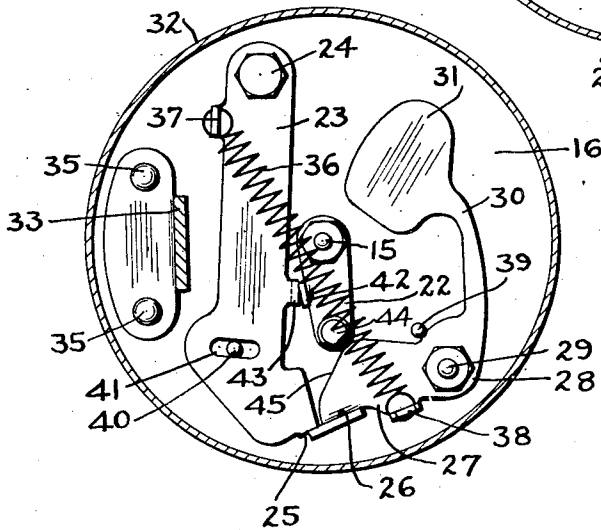


Fig. 6.



INVENTOR
Frederick Lux.
BY
H. G. Manning
ATTORNEY

UNITED STATES PATENT OFFICE

2,292,576

ALARM TIMING DEVICE

Frederick Lux, Waterbury, Conn., assignor to
The Lux Clock Manufacturing Company, Waterbury, Conn., a corporation of Connecticut

Application September 25, 1937, Serial No. 165,733

16 Claims. (Cl. 161—23)

This invention relates to timing devices, and more particularly to an interval timer adapted to sound an alarm at the expiration of any determined period of time.

One object of this invention is to provide a time-controlled one-stroke alarm for use in homes, hospitals, laboratories, photographic studios, etc., to time various operations that require a specific period of time for their completion.

Another object is to provide a timing device wherein the time-controlled spring will be wound and the alarm mechanism set in operative condition simultaneously by the manual turning of a visible indicating pointer, and in which the time-operating mechanism will start as soon as the pointer is released after being set at the desired time indicating point, but the alarm mechanism will be restrained until the determined time period has expired.

A further object is to provide in a timing device of the above nature, a time-controlling train of gears driven by a main controlling spring, a manually operable pointer to wind said spring and to set a catch-restrained, spring-actuated hammer, and means to release the hammer at the expiration of a determined time period to permit it to strike a bell.

A still further object is to provide an alarm timer of the above nature which will be simple in construction, inexpensive to manufacture, easy to manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawings one form in which the invention may be conveniently embodied in practice.

In the drawings:

Fig. 1 represents a front view of an interval alarm timer embodying the features and principles of this invention.

Fig. 2 is a side view of the alarm timer mechanism removed from its outer casing, the bell being shown in section.

Fig. 3 is an end view of the time-controlling mechanism with the alarm mechanism removed.

Figs. 4, 5 and 6 are enlarged sectional views, respectively, taken on the line 4—4 of Fig. 2 and illustrating various positions of the several parts of the alarm mechanism during the operation of the device.

Referring now to the drawings wherein like reference numerals indicate the same parts throughout the several views, the numeral 10 indicates an outer casing which in this instance

is supported by feet 11 upon a flat surface, such as a table or shelf. The timing device is provided with a face 12 upon which time-indicating numerals 13 are arranged in circular dial form. A manually-operable pointer 14 is provided in front of the face 12 to cooperate with the indicating numerals 13 to visually indicate the time intervals for which the device may be set to operate.

The pointer 14 is secured upon the front end of a shaft 15 which passes through a shell 16 enclosing a time-controlled mechanism which is shown supported between a pair of plates 17 and 18 which are mounted within the casing. The time-controlled mechanism may be of any desired standard form having a main spring 19 which, when wound, drives a train of gears and pinions 20 under control of any usual form of escapement 21. The main spring 19 is operably connected with the shaft 15 so as to be wound up whenever the pointer 14 is manually rotated clockwise to any one of the indicating numerals 13 and, upon release of the pointer 14, said spring 19 serves (as viewed in Fig. 1) to drive the gears and pinions 20 and produce a constant speed of timed rotation of the shaft 15. As herein disclosed, the construction is such that one complete revolution of the shaft 15 is equivalent to a period of one hour.

The shaft 15 extends through the casing 16 and has a setting arm 22 secured upon its rear end for rotation therewith. The arm 22, being connected to the shaft 15, is necessarily moved by the manual setting of the pointer 14 to the desired indicating numeral 13, and said arm then swings counter-clockwise (as viewed from the front) with said shaft 15 under the speed control of the escapement 21 and the driving influence of the main spring 19.

As is clearly shown in Figs. 4, 5 and 6, the alarm mechanism includes a swingable catch or trigger release arm 23 pivoted at 24 to the casing 16. The arm 23 has a catch shoulder 25 at its free end which is adapted to engage with a wedge action a flange 26 provided on the free end of an arm 27 of a bell-crank hammer lever 28 to releasably hold it in a "set" position. The lever 28 is pivoted to the casing 16 at 29, and the other arm 30 thereof is provided at its free end with a hammer lug 31 which, when said lever 28 is released from the restraining action of the catch arm 23, is adapted to strike the inside of a dome-shaped bell 32. The bell 32 is secured to a curved offset bracket 33 by a screw 34, the bracket in turn being secured to the casing 16 by rivets 35.

A coiled spring 36 is secured at one of its ends to a lug 37 provided on the catch arm 23, and at its other end to a lug 38 provided on the arm 27 of the hammer lever 28. The tension of the spring 36 constantly tends to pull the free end of the catch arm 23 and the arm 27 of the hammer lever 28 toward each other—thus urging the hammer lug 31 to swing outwardly against the bell 32. A stop pin 39 is secured to the casing 16 and extends upwardly into the path of the arm 27 to limit the movement of the hammer lug 31 toward the bell 32. A second stop pin 40 is also secured to the casing 16 and extends upwardly through an elongated slot 41 formed in the catch arm 23 to limit the swinging movement of said catch arm 23 in both directions.

The setting arm 22, secured on the shaft 15, is provided with a short upstanding lug 42 which, when the arm 22 is rotated in a clockwise direction (as viewed in Figs. 4-6) by the unwinding of the timer main spring 19, is adapted to engage a cooperating upstanding lug 43 provided on the catch arm 23 to force said catch arm 23 in a clockwise direction against the tension of the spring 36. This movement of the catch arm 23 will release the hammer lever 28 from the restraining action of the catch shoulder 25 (which engages the flange 26 by a "trigger action"), and will permit the spring 36 to abruptly swing the hammer lever 28 in a clockwise direction and cause the hammer lug 31 to strike the bell 32. The setting arm 22 is provided with a short cylindrical stud 44 upon its free end (see Fig. 6) and mounted to rotate on said stud 44 is a roller 44a which is adapted to engage a curved camming edge 45 provided on the arm 27 of the hammer lever 28 when the setting arm is moved in a counter-clockwise direction during the setting operation, as viewed in Figs. 4 to 6, whereby said lever will be cammed into its "set" position with the catch shoulder 25 disposed in engagement with the flange 26 on the free end of the arm 27 (see Fig. 5).

The flange 26 is preferably disposed at an inclination to the shoulder 25 on the end of the trigger catch arm 23, so as to cause a wedge engagement therebetween when the device is being set. When the hammer lever has reached the position shown in Fig. 6—the shoulder 25 on the trigger catch arm 23 by the automatic action of the spring 36 will start to engage the inclined flange 26 on the hammer lever 28, and said shoulder will gradually slide on said flange by a wedge action until the hammer lever 28 has moved further into the position shown in Fig. 5. Continued counter-clockwise motion (Figs. 4-6) of the setting arm 22 during the setting operation will carry the roller 44a out of engagement with the cam surface 45 on the hammer lever 28. This prevents any possibility of loading the time keeping mechanism during the running of the clock when the roller 44a on the arm 22 passes the high point of the cam as it moves in a clockwise direction. In other words, the hammer lever 30 will be positively held in this position clear of the roller 44a by the wedging engagement of the shoulder 25 and the flange 26, and said hammer lever will be prevented from moving backwards by the taking up of backlash so that the roller 44a will not bump the cam 45 on the return clockwise motion of the setting lever as the clock runs down.

In case it should be necessary to set the timer for sixty minutes (a full 360 degree arc), the

lug 42 on the setting lever 22 will engage the opposite side of the lug 43 on the catch lever 23, and will force the shoulder 25 still farther up the inclined flange 26 on the hammer lever 30. This motion is limited, however, by the engagement of the end of the slot 41 with the stud 40, thus insuring an accurate sixty minute setting of the alarm.

One advantage of the present invention is that the frictional resistance between the catch or trigger lever and the hammer lever is quite small, so that only a very slight load is imposed upon the time-keeping mechanism at the alarm tripping or "zero" position—thus making it possible to employ a small and relatively weak clock movement.

Operation

In operation, assuming that it is desired to set the device to sound the alarm after an elapsed period of fourteen minutes, the pointer 14 will be manually turned clockwise (as viewed in Fig. 1) to the indicating mark 13, representing "fourteen" on the dial face 12, as shown in dotted lines in Fig. 1. This action will cause the shaft 15 to rotate in a clockwise direction and wind up the mainspring 19. At the same time the setting arm 22 will be swung (counter-clockwise as viewed in Figs. 4-6) from the position of Fig. 4 into the position shown in full lines in Fig. 5, carrying the roller 44a over the camming edge 45 on the arm 27 of the hammer lever 28, and by engagement therewith, causing said lever 28 to be swung until the lever 28 assumes the position shown in dotted lines in Fig. 4. The catch arm 23 will then be free to swing automatically into the position shown in Fig. 4 by the action of the spring 36 thereon—the catch lever then causing the hammer lever to swing a short distance farther until it is clear of the roller 44a, as already described (see Fig. 5).

As the main spring 19 unwinds under the control of the train of gears 20 and the escapement 21, the shaft 15 will be rotated clockwise (as viewed in Figs. 4-6), swinging the setting arm 22 in the same direction toward the catch arm 23 from the position shown in Fig. 5 to that of Fig. 6. At the expiration of the predetermined period of fourteen minutes in the present instance, the lug 42 on the setting arm 22 will engage with the lug 43 on the catch arm 23, as shown in Fig. 6, and continued rotation of the shaft 15 will cause the catch arm 23 to overcome the slight friction between the catch shoulder 25 and the flange 26 of the hammer lever 28 and release said hammer lever 28, permitting the spring 36 to abruptly swing it from the position shown in Fig. 6 to that shown in Fig. 4, whereupon the hammer lug 31 will sharply strike the bell 32 with a single stroke to audibly indicate the expiration of the elapsed time of fourteen minutes. After such action, the above described parts will be again disposed in their respective normal positions as shown in Fig. 4, and the main spring 19 is prevented from rotating the pointer 14 beyond its "zero" position in respect to the dial by the engagement of the stop pin 40 with the right-hand end of the slot 41, as shown in Fig. 4.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified

and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new and for which it is desired to secure Letters Patent is:

1. In an alarm timer, a frame, a setting arm pivoted in said frame, manual means to swing said setting arm in one direction to set the alarm timer, a time-keeping mechanism drivingly connected to said setting arm to automatically move it in the return direction, a spring-actuated alarm-sounding lever initially lying in the path of said setting arm and swingable out of said path, said alarm-sounding lever having a cam section engageable by said setting arm to swing said lever to "set" position against the action of its spring, said lever having a flange, a spring-actuated catch arm pivoted on said frame for restraining said lever from sounding the alarm, and having a cam section for engaging said flange with a wedge action during the manual alarm setting operation for causing said lever to swing farther than it was moved by said setting arm and until it is moved entirely clear of the path of said setting arm, whereby the latter on its automatic return motion will be permitted to move past said lever without engagement therewith, thus avoiding the loading of said setting arm, said catch arm being in the path of said setting arm on its automatic return and movable by said setting arm to release said lever and permit it to sound said alarm.

2. In a timing device, a frame, a main shaft mounted in said frame, a manually settable pointer on said shaft to rotate said shaft in one direction, a spring-driven time-keeping mechanism carried by said frame to rotate said shaft in the opposite direction back to its initial position, a spring-actuated swingable bell-striking lever pivoted to said frame, a releasable spring-actuated catch lever pivoted to said frame and having a sliding wedge engagement with said bell-striking lever to hold it in one position against its spring action, and a common setting arm having cam engagement with said alarm-striking lever to move into catch-held position when said shaft is rotated manually and to release said catch to permit swinging of said lever by spring action when said shaft is automatically rotated to its initial position, the engagement of said bell-striking lever by said catch lever causing said bell-striking lever to swing clear of the setting arm so that on the return motion of said setting arm said time-keeping mechanism will not be loaded.

3. In a timing device, a frame having a bell mounted thereon, a single-stroke alarm mechanism including a swingable lever pivoted to said frame adapted to strike said bell, a spring to actuate said lever, a releasable catch lever mounted on said frame to restrain said striking lever against actuation by said spring, a rotary member carried by said frame to set said striking lever in catch-restrained position when manually rotated in one direction, time-controlled means to automatically rotate said member in the reverse direction to release said catch, and means to swing said bell-striking lever a short distance farther when said catch lever engages it to avoid loading of said time-controlled means when the setting lever moves back to original position.

4. In a timing mechanism, a casing having a bell mounted thereon, a single-stroke alarm mechanism including a swingable lever in said casing adapted to strike said bell, a releasable catch in said casing to restrain said lever against bell-striking actuation, a common spring connecting said lever and said catch to swing said lever into bell-striking position and to hold said catch in lever-restraining position, and time-controlled means in said casing manually movable in one direction to engage and set said lever in catch-restrained position, said catch having wedge engagement with said lever to move the latter out of the path of said setting means, the movement of said means in the opposite direction serving to release said catch at the expiration of a determined time period.

5. In a timing mechanism, a casing having a bell mounted thereon, a single-stroke alarm mechanism in said casing including a swingable lever adapted to strike said bell, a releasable catch secured to said casing to restrain said lever against said bell-striking actuation, a common spring to swing said lever into bell-striking position and to hold said catch in lever-restraining position, a windable spring-driven time-controlled mechanism, means in said casing responsive to the manual winding of said mechanism to engage and set said lever in catch-restrained position, and means automatically operated by the operation of said mechanism to release said catch at the expiration of a determined time period, said catch having a sliding wedge engagement with said lever serving to swing said lever through a slight additional angle out of the path of said manual setting means to avoid loading of said time-controlled mechanism on the return motion of said windable mechanism.

6. In an interval timer, a casing, a shaft mounted therein, means in said casing to drive said shaft at constant speed, manually operated means to set said shaft to operate for any desired time period, an alarm actuating lever pivoted in said casing adapted to operate at the expiration of the pre-set time period, cam engaging means on said setting means to engage and move said actuating lever to cocked position, a latch member connected to said casing and having a sliding wedge engagement with said actuating lever to positively hold it at the extreme position reached during the cocking operation, and means responsive to the driving of said shaft to release said latch member at the conclusion of the set period.

7. In a timing device, a frame, a shaft mounted in said frame, a windable spring-driven time-keeping mechanism connected to said shaft, a spring-pressed alarm striking lever, a manually-operated cocking member connected to said shaft, said member having cam engagement with said lever to swing it in one direction, a releasable catch arm having a sliding wedge engagement with said lever continuing to the end of the cocking operation after it has been initially swung by said cocking member, to swing said lever an additional amount whereby it will be held out of the path of said cocking member during the return movement thereof to avoid loading the time-keeping mechanism connected therewith, and stop means on said frame and loosely projecting through said catch arm to limit the swing thereof and yet permit 360° rotation of said shaft.

8. In an alarm timer, a spring-driven time-keeping mechanism, a swingable alarm sounding member, a restraining catch for said member, a

common spring connecting said member and said catch to cause said member to swing when it is released and to previously hold said catch in restraining position, a rotatable pointer connected to said time-keeping mechanism to indicate the time for which the alarm has been set, said pointer having a setting arm connected thereto to engage and swing said member into catch-restrained position, and means operated by said time-keeping mechanism to move said catch and release said member at the alarm time, said catch having a sliding wedge engagement with said member to move it beyond the point to which it was swung by said setting arm whereby it will be out of the path of said arm on the return motion thereof.

9. In a timing device, a frame, a shaft mounted in said frame, a windable spring-driven time-keeping mechanism connected to said shaft, a spring-pressed alarm striking lever, a manually-operated cocking member connected to said shaft, said member having cam engagement with said lever to swing it in one direction, a releasable catch arm having a sliding wedge engagement with said lever continuing to the end of the cocking operation after it has been initially swung by said cocking member, to swing said lever an additional amount whereby it will be held out of the path of said cocking member during the return movement thereof to avoid loading the time-keeping mechanism connected therewith.

10. An interval alarm timer comprising a windable spring-driven time-movement, a spring-pressed alarm striking lever, a manually-operated cocking-member connected to said time-movement for winding it and cocking the alarm striking lever when said cocking-member is moved in one direction, said cocking-member having cam-engagement with said alarm striking lever during the winding and cocking-movement of said cocking-member to swing said alarm striking lever in one direction, a spring-pressed catch arm having releasable holding engagement with said alarm striking lever and having a sliding wedge engagement with said alarm striking lever continuing to the end of the cocking operation after said alarm striking lever has been initially swung by said cocking-member into cocking position for causing said alarm striking lever to be swung through a small additional angle whereby said alarm striking lever will be held out of the path of said cocking-member during the return unlatching movement of the latter under the driving action of said time-movement to avoid loading said time-movement when said cocking-member is driven in the reverse direction from that in which it was manually moved to wind the time-movement and cock the alarm striking lever.

11. An interval alarm timer comprising a windable spring-driven time-movement, a spring-pressed alarm striking lever having a cam nose and a latching flange, a manually-operated cocking-member mounted to move in the path of said cam nose and connected to said time-movement for winding it and cocking the alarm striking lever when said cocking-member is manually moved in one direction, a latching trigger arm having releasable holding engagement with said flange and also having sliding wedge engagement with said flange continuing to the end of the cocking operation after said alarm striking lever has been initially swung by said cocking member for causing said alarm striking lever to be swung a short distance farther and out of the path of

said cocking member on its return unlatching movement to free said cocking-member from obstruction by said alarm striking lever when said cocking-member is driven in the reverse unlatching direction by the operation of said time-movement.

12. The invention as set forth in claim 10 in which said alarm striking lever and said catch arm are connected together by a coiled tension spring, the opposite ends of which are joined to said alarm striking lever and catch arm, respectively.

13. The invention as set forth in claim 11, characterized by having a slip-friction clutch in the connection between said time-movement and said cocking member for permitting manually-controlled partial return movement of said cocking-member independently of said time-movement.

14. The invention as set forth in claim 10, characterized by having a slip-friction clutch in the connection between said time-movement and said cocking-member for permitting manually-controlled partial return movement of said cocking-member independently of said time-movement.

15. In an interval alarm timer, a frame having a signal bell mounted thereon, a single-stroke alarm mechanism including a spring-pressed bell-striking lever pivoted to said frame in position to strike said bell a single-stroke, a windable spring-driven time-movement, a manually-operated cocking-member pivoted to said frame and connected with said time-movement for winding it and cocking said bell-striking lever when said cocking-member is turned in one direction, a spring-pressed trigger lever mounted on said frame and having releasable holding engagement with said bell-striking lever and also having a sliding wedge engagement with said bell-striking lever continuing to the end of the cocking operation after said bell-striking lever has been initially swung by said cocking-member into cocking position for causing said bell-striking lever to swing through a small additional angle whereby said bell-striking lever will be held out of the path of said cocking-member during the return unlatching movement of the latter under the operation of said time-movement, to avoid loading of said time-movement.

16. An interval alarm timer comprising a windable spring-pressed time-movement, an alarm bell, a spring-pressed bell-striking lever in alignment with said bell, a manually-operated rotary cocking-member in alignment with said bell-striking lever and connected with said time-movement for winding it and moving said bell-striking lever into cocked position when said cocking member is manually rotated in one direction, a handle connected to said cocking-member, said bell-striking lever having a catch flange, a spring-pressed trigger lever having releasable holding engagement with said flange and also having a slidable wedge engagement with said flange continuing to the end of the cocking operation for causing said bell-striking lever to swing through a small additional angle whereby said trigger lever will hold said bell-striking lever out of the path of said cocking-member during the return unlatching movement of the latter when driven by said time-movement to avoid loading of said time-movement prior to the unlatching of said trigger lever from said bell-striking lever by said cocking-member.

FREDERICK LUX.