

Oct. 1, 1940.

M. SCHLENKER

2,216,523

ALARM CLOCK

Filed June 17, 1938

3 Sheets-Sheet 1

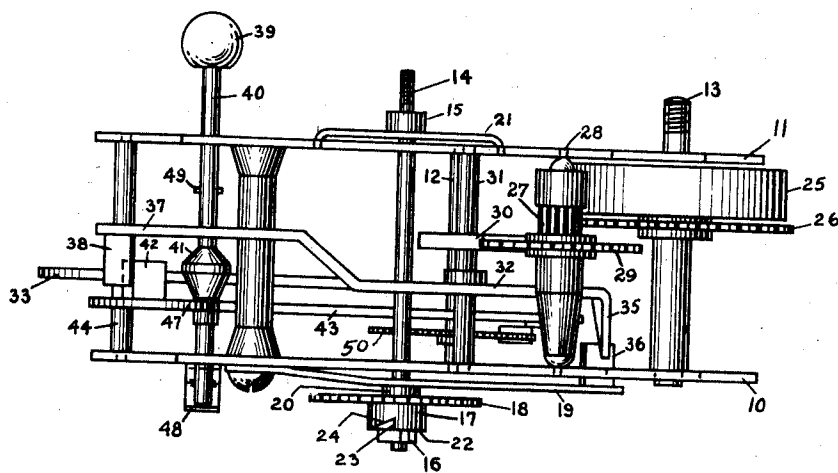


FIG. 1

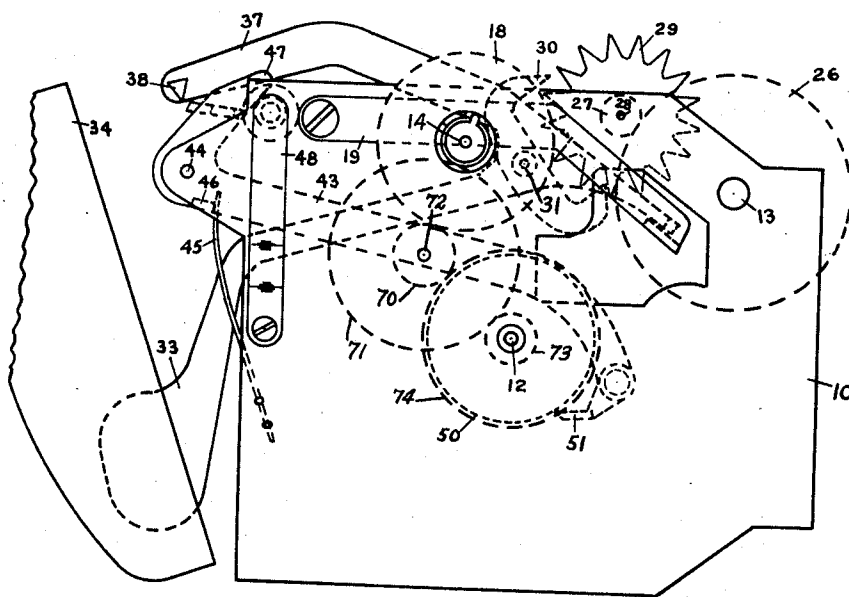


FIG. 2

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3 Sheets-Sheet 2

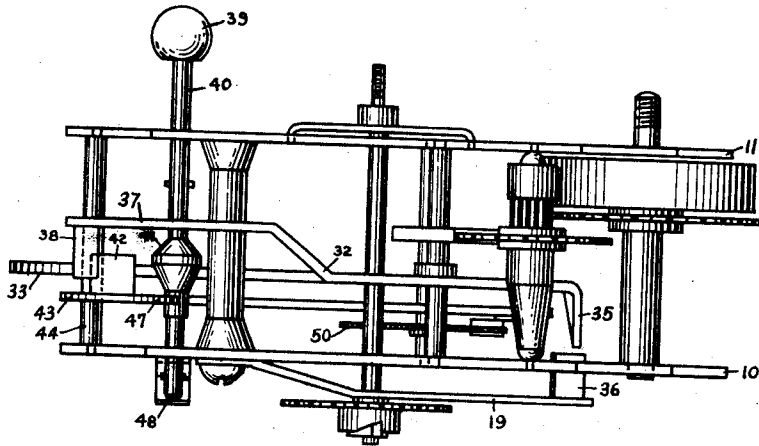


FIG. 3

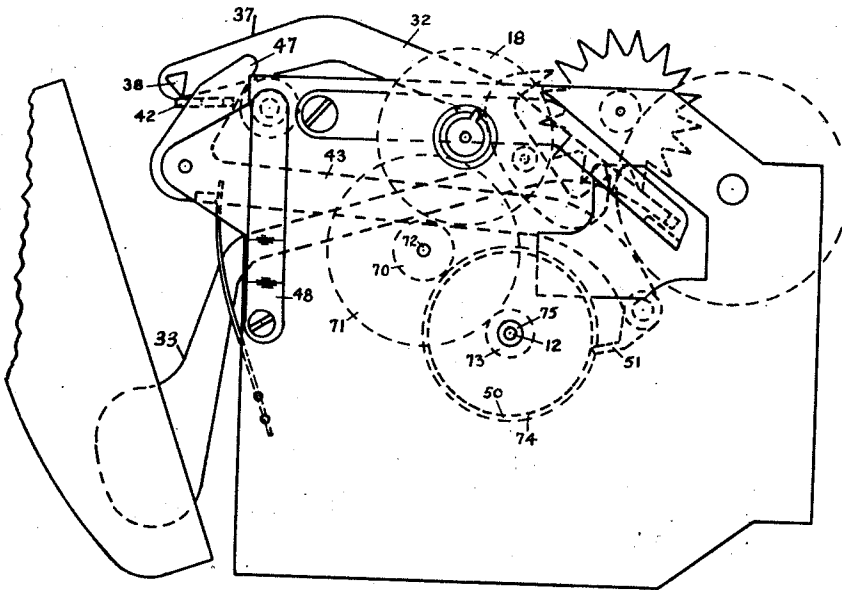


FIG. 4

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3 Sheets-Sheet 3

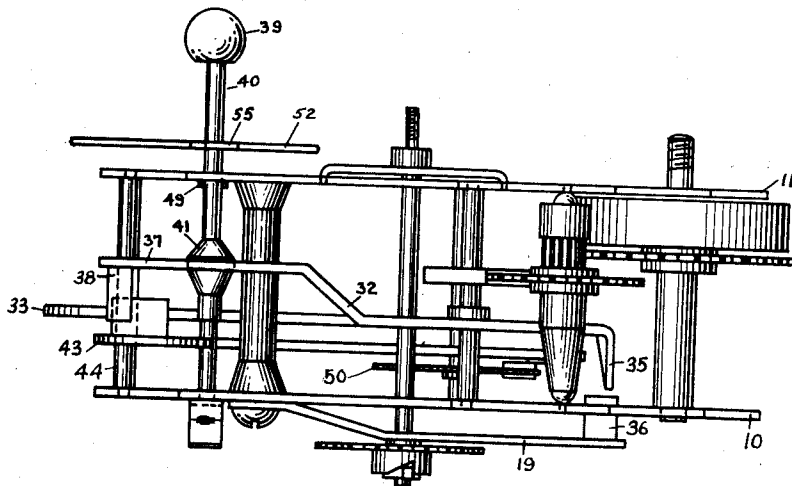


FIG. 5

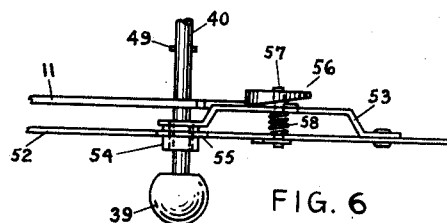


FIG. 6

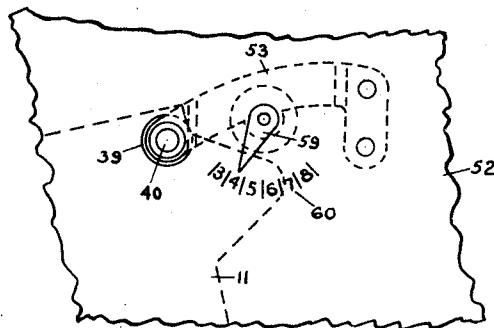


FIG. 7

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2,216,523

ALARM CLOCK

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Application June 17, 1938, Serial No. 214,204

14 Claims. (Cl. 58—16)

This invention relates to alarm clocks, and in particular to such clocks incorporating alarm mechanism arranged to give a plurality of successive periodic alarms.

5 It has been considered desirable to provide a second alarm which will ring at a predetermined definite interval after the first alarm has been released and been turned off, as the sleeper often goes to sleep again after turning off the alarm. 10 In the usual construction of such alarms it is comparatively simple to provide two releasing means instead of one, the operation of which will be separated by a definite time interval. However, it becomes increasingly more difficult 15 to add a third, fourth and successive releasing means to the usual alarm releasing means for the reason that the parts are small, and in particular when a sleeve cam is used to release the alarm the size of the cam will determine the number of 20 successive releases that can be obtained.

I have provided an auxiliary releasing means to the main releasing means which can be operated to release the alarm as many times as may be desired after the main release has been automatically operated, the number of times which 25 the auxiliary releasing means may be operated being subject only to the power in the alarm spring to operate the alarm. Furthermore, with the mechanism herein disclosed the interval between the successive releases may be varied.

30 An object of this invention is to provide an improved alarm clock which will sound successive alarms, the alarm mechanism being released automatically a predetermined time after each manual shut-off.

A further object is to provide an alarm clock in which the number of times the alarm may be released is not limited.

40 A further object is to provide a multiple alarm clock in which the interval between successive releases of the alarm can be varied.

Another object is to provide an improved multiple alarm clock in which the successive alarm feature is obtained by auxiliary releasing means 45 providing greater accuracy in the timing of intervals between the successive releases effected thereby.

50 A still further object is to provide an improved multiple alarm clock of economical construction and of more positive and accurate operation.

55 Other objects, features and advantages will become apparent as the description proceeds. Reference is hereby made to the accompanying drawings illustrating a preferred embodiment of my

invention and in which like reference numerals refer to like parts.

Figure 1 is a top plan view of an alarm releasing and striking mechanism for an alarm clock just before the alarm is about to strike, the clock work and other portions of the alarm clock which are old in the art not being shown herein.

Figure 2 is a front elevation of Figure 1.

Figure 3 is a top plan view showing the mechanism illustrated in Figure 1 just after the alarm 10 has been released and shut off.

Figure 4 is a front elevation of Figure 3.

Figure 5 is a top plan view of the mechanism illustrated in Figure 1 showing the same when the alarm has been permanently shut off, that is, 15 when both alarm releasing means have been rendered inoperative.

Figure 6 is a detailed plan view of the interval regulating means.

Figure 7 is an elevation of the interval regulating means shown in Figure 6.

Referring now to Figures 1 and 2, reference numerals 10 and 11 designate the front and rear plates respectively, which may be connected together by suitable spacing members in the usual 25 fashion and which serve as a frame work for the clock. Journaled in the front and rear plates are minute wheel shaft 12, alarm shaft 13 and alarm setting shaft 14. Shaft 14 is provided with a collar 15 exteriorly of the rear plate and is threaded on its extreme rear end to receive an alarm setting knob not shown herein. The forwardmost end of shaft 14 terminates in a cam rider 16 which is in the form of a finger projecting at right angles from the shaft. 30 Cooperating with cam rider 16 and positioned between it and the front plate is a sleeve-like cam 17 and gear wheel 18 rigidly associated therewith, both of which are loosely mounted on shaft 14. Anchored to front plate 10 is a releasing spring 19 which passes between the gear 18 and 40 the front plate, and bears against a washer 20 mounted on the shaft to urge gear 18 and cam 17 forwardly into engagement with cam rider 16. The cam 17 is provided with a drop 23 on the surface thereof between the upper cam surface 22 and the lower cam surface or notched portion 24. A friction member 21, anchored on the rear plate, bears against collar 15 and prevents rotation of the cam rider by the rotating cam 17. 50

Gear 18 is adapted to mesh with a portion of the clockwork in such a way that it rotates once in twelve hours. The gear 18, for instance, may be driven by idler pinion 70, mounted with associated gear 71 on a stud 72, the gear 71 being 55

driven by a pinion 73 on minute wheel staff 12. Pinion 75 may also drive hour wheel 74 on hour sleeve 75, which may be concentric with and mounted on the minute staff, according to the usual construction. It will be seen that during the major portion of its revolution the cam rider will bear on upper cam surface 22, but at a time which is determined by the position of the cam rider the cam drop 23 will be rotated into registry with the cam rider and allow the cam and gear 18 to be moved forward by spring 19, the motion of which spring can be utilized to release the alarm.

Mounted upon alarm staff 13 is the usual alarm actuating construction comprising the coil spring 25 and an alarm gear wheel 26 which meshes with and drives pinion 27 mounted on arbor 28 which arbor is journaled in the plates. An alarm escapement wheel 29 is mounted on arbor 28 in such a manner as to cooperate with verge 30 which is rigidly affixed to verge staff 31. Lever 32 is also carried by verge staff, one arm of which lever carries at its extremity hammer 33 adapted to repeatedly strike alarm bell 34. A second arm of lever 32 carries an upstanding projection 35 which is adapted to cooperate with a bent over portion 36 at the free end of spring 19. It will be seen that it is only when the alarm spring 19 is in its released position that the lever 32 will be free to oscillate and operate the alarm.

A third arm 37 has at its extremity an upstanding projection 38, in this embodiment being shown as of a triangular cross section. The alarm may be shut off by engaging arm 37 of the oscillating lever with the cone 41 as shown in Figure 5 by withdrawal of the knob 39 on axially displaceable shaft 40. The shaft is slidably mounted in the front and rear plates and has an expanded portion or a portion of the shape of a double cone 41, which upon withdrawal of the shaft will engage arm 37 to shut off the alarm. The alarm can also be shut off, it is noted by engaging the upstanding projection 38 on arm 37 by suitable means.

Tongue 42 adapted for cooperation with projection 38 extends from lever 43 near one end thereof. This lever is mounted on staff 44 and the staff is journaled in the plates for oscillatory motion. Spring 45 anchored to front plate 10 engages lug 46 of lever 43 to urge the lever in clockwise direction and urge tongue 42 into disengaged position with respect to triangular projection 38. The knob 39 may be pushed in toward the rear plate so that cone 41 engages the lever 43 at an end portion 47 thereof to move the lever in opposition to spring 45, thereby displacing lever 43 in the counter-clockwise direction and bringing tongue 42 into engagement with projection 38.

It will be noted in Figure 3 that the cone is in intermediate position. After it has been pushed in to engage portion 47 thereby temporarily shutting off the alarm, spring 48, one end of which is anchored to front plate 10 and the other end of which engages shaft 40, will return the cone to its intermediate position. Pin 49 in shaft 40 limits the extent to which the shaft may be withdrawn to permanently shut off the alarm, as indicated in Figure 5. Consequently it will be seen that shaft 40 may be displaced in either direction from its intermediate position to shut off the alarm. When it is drawn out it will permanently shut off the alarm by directly engaging lever 32, and when it is pushed in it will temporarily shut off the alarm by engaging lever 32 indirectly

through tongue 42. The tongue 42 is adapted to be retracted from engagement with projection 38 by the action of clockwork.

Ratchet wheel 50 is mounted on minute staff 12 as herein shown, although the ratchet may be mounted on any suitable staff which is driven by the minute staff or any other rotating member in the clockwork so that the ratchet will be driven at a considerably higher rate of speed than the gear 18. Pawl 51 is positioned at the other extremity of lever 43, remote from portion 47. A suitable spring engages pawl 51 and the lever arm on which it is mounted in the usual manner so that the pawl may slip over the ratchet wheel in counter-clockwise direction but will engage the teeth on the ratchet 50 to prevent clockwise rotation of lever 43 with respect to the ratchet. It will be noted that the spring 45 tends to rotate lever 43 in a clockwise direction and thereby to hold the pawl in engagement with the ratchet. The motion of lever 43 is such that at the extreme limit of its clockwise rotation or at such a point wherein the tongue 42 and projection 38 are disengaged the pawl will swing free of the ratchet wheel.

It will be seen that the interval between successive releases of tongue 42 from projection 38 will be determined by the time it takes for the tongue to slide over projection 38 before it is disengaged therefrom, which in turn is determined by the extent of rotation of the lever 43 in a counter-clockwise direction. As the lever 43 is rotated in its counter-clockwise rotation by the action of the cone 41 on portion 47, it will be seen that by restricting the axial displacement of the cone the extent of rotation of the lever may be determined and hence, the interval between successive releases of the alarm.

The manner in which this axial displacement is limited is shown in Figures 6 and 7, wherein reference numeral 52 designates a portion of the clock case on which is mounted one end of spring 53, the other end of which carries collar 54 which surrounds shaft 40 and extends through an aperture 55 in the clock case. The collar is adapted to engage the knob 39 and thereby limit its inward displacement from the intermediate position of the knob. The spring 53, however, aided by coil spring 58, tends to withdraw the collar into the clock case, thereby allowing greater displacement of knob 39 and shaft 40. Cam 56 is mounted on shaft 57 which shaft is journaled in rear plate 11 and case 52. The cam, it is noted, bears on spring 53 in opposition thereto and to spring 58 in such a manner as to determine the position of collar 54. Lever 59 is mounted on shaft 57 to rotate the cam and hence, to move collar 54. Indicia 60 are formed on the outside of the clock case and cooperate with lever 59 to indicate the time interval between successive releases.

Regarding the operation of the alarm striking mechanism, it will be seen that the shaft 14 may be set to a position wherein the clockwork will rotate the cam 17 so that the spring 19 may be released from striking lever 32 at the desired hour. According to the usual construction, a hand may be affixed to shaft 14 cooperating with the dial to indicate such hour. Figures 1 and 2 indicate the alarm striking mechanism in set position.

After the alarm has been released, the pushing in of knob 39 will cause cone 41 to engage portion 47 of lever 43, displacing the same to cause tongue 42 to engage projection 38 of the striking lever 75

32, thereby shutting off the alarm. As the tongue 42 slides over the edge of projection 38 towards the disengaged position at a rate of speed determined by ratchet wheel 50, it is evident that the distance through which tongue 42 must slide is a function of the time interval between engagement and disengagement of projection 38, or between successive releases of the alarm. The said distance is determined by the angular displacement of lever 43, which in turn is controlled by the axial displacement of cone 41, shaft 40 and knob 39. The position of collar 54, which limits the displacement of knob 39 is determined by the position of lever 59, which in cooperation with indicia 60, indicates the displacement in terms of the time interval required for restoration of tongue 42 to the disengaged position. This position, which may be termed as "temporary shut off position" is indicated in Figures 3 and 4. It will be noted that the knob has been returned to the intermediate position by spring 48. After the desired interval, say four minutes, the striking lever 32 is again released by lever 43, the rotation of which in a clockwise direction to the released or disengaged position is controlled by ratchet wheel 50. Subsequent engagements and releases may be effected as many times as desired until the alarm spring 25 runs down, each release being indicated by an alarm which awakens the sleeper long enough to push in knob 39 before he drops off to sleep again.

When the sleeper is fully awake he may withdraw the knob 39 to its limiting position as shown in Figure 5, wherein cone 41 directly engages the striking lever 32 which position may be termed the "permanent shut off." The knob may be restored to the set position after the rotating cam 17 has caused the cam rider 16 to displace the cam and spring 19 into engagement with the striking lever 32 as shown in Figure 1.

It will be noted that the construction shown herein is such that the pushing in of the knob effects a temporary shut off and pulling out the knob effects permanent shut off. This is preferable for a simpler motion is required to strike the knob than to grasp and withdraw the same, which motion is more readily achieved by the partially awakened sleeper.

It will be further noted that the first release is controlled by a cam which rotates once in twelve hours, whereas the second release is controlled by a ratchet which rotates faster thereby enabling one to time a short interval with a greater degree of accuracy. It is difficult to set the first release or any releasing means now commonly employed in the clock art to a short interval because of the small angle of rotation required for the setting operation. Consequently I have provided a second releasing means which is controlled by means rotating through a much greater angle in a given interval than the controlling means for the first release.

It is evident that this mechanism can be used for other purposes than that of successive alarms to awaken the sleeper. For instance, one may desire to use only the second releasing means to indicate the expiration of intervals of several minutes such as the timing of certain kitchen operations.

I have herein shown and described a preferred embodiment of my invention but it is understood that certain modifications therein and changes in the shape and the size of the parts may be

effected without departing from the spirit of my invention.

I claim:

1. An alarm clock comprising time responsive means, an alarm striking member, means directly engaging said alarm striking means to render the same inoperative, and secondary means for engaging said alarm striking member, said secondary means including a member adapted for oscillatory motion whose rate of motion in one direction towards disengaged position is limited by said time responsive means, said first means including a manually operated control member for selective actuation of either said first means or said secondary means.

2. An alarm clock including time responsive means, an alarm striking member, a member adapted to be displaced into engagement with said striking member to render inoperative said striking member, means for permitting restoration of said member to the disengaged position with respect to said striking member at a rate controlled by said time responsive driving means, and means for determining the extent of the displacement of said member from disengaged position.

3. An alarm clock comprising time responsive driving means, striking means, a first member adapted to be displaced into engagement with said striking means thereby rendering the same inoperative, a second member movable in one direction to directly engage said striking means and movable in the other direction to displace said first member into engagement with said striking means, and means controlled by said time responsive driving means to limit the rate of motion of said first member from the engaged position into the disengaged position, thereby releasing said striking means after a predetermined interval.

4. An alarm clock comprising a striking member, an alarm let off member normally engaging said striking member, and adapted to release said striking member at a predetermined time, a manually operable alarm stop member adapted to engage said striking member but normally in the released position, auxiliary alarm stop means adapted for operation when said first member and said second member are both in the released position said means being actuated by said manually operable alarm stop member to engage said striking member, and clockwork associated with said means to automatically release said means at a predetermined length of time after engagement with said striking member.

5. An alarm clock comprising time responsive driving means, an alarm striking member, a first holding means for normally rendering said striking member inoperative and adapted to release same at a predetermined time, a second holding means manually movable into temporary holding engagement with said striking member and adapted to be moved out of engagement therewith by said time responsive means, whereby the alarm is repeated after a predetermined time interval, a third holding means manually operable into permanent engagement with said striking member, and means to regulate the time interval during which said second holding means engages said striking member.

6. An alarm clock comprising time responsive driving means, an alarm sounding mechanism, means for releasing said alarm mechanism at a predetermined set time, a manually operable member, means responsive to the movement of

said member in one direction for temporarily rendering said alarm mechanism inoperative, means controlled by said time responsive means for again releasing said alarm mechanism after a predetermined interval, and means responsive to the movement of said member in the opposite direction for permanently rendering said alarm mechanism inoperative.

7. An alarm clock comprising time responsive means, an alarm sounding mechanism, means for releasing said alarm mechanism at a predetermined set time, a manually operable member, means responsive to the movement of said member in one direction for temporarily rendering said alarm mechanism inoperative, means controlled by said time responsive means for again releasing said alarm mechanism after a predetermined interval, means for varying the length of said interval, and means responsive to the movement of said member in the opposite direction for permanently rendering said alarm mechanism inoperative.

8. In an alarm clock, the combination with time responsive driving means, of an alarm bell, a striking member for said bell, means to oscillate said striking member, a pivoted member for engaging said striking member to render the same inoperative, means for rotating said pivoted member into engagement with said striking member, means controlled by said time responsive driving means for restoring said pivoted member to disengaged position with respect to said striking member, and means to regulate the length of time said striking member is rendered inoperative by engagement by said pivoted member.

9. In an alarm clock, the combination with time responsive driving means, of an alarm bell, a striking member for said bell, means to oscillate said striking member, a pivoted member for engaging said striking member to render the same inoperative, means for rotating said pivoted member into engagement with said striking member, said means including an axially displaceable shaft, means controlled by said time responsive driving means for restoring said pivoted member to disengaged position with respect to said striking member, a casing for said alarm clock, said axially displaceable shaft extending through said casing, a collar surrounding said shaft and adapted to extend through said casing, means on said shaft to engage the end of said collar and to limit the axial displacement thereof, and means to regulate the position of said collar with respect to said casing whereby the extent of the rotation of said pivoted member and the time interval required for the restoration thereof to disengaged position with respect to said striking member may be regulated.

10. In an alarm clock, the combination with time responsive driving means, of an alarm bell, a striking member for said bell, means to oscillate said striking member, resilient means normally engaging said striking member to render the same inoperative, means adapted to release said resilient means from engagement with said striking member at a predetermined time, secondary means for engaging said striking member to render the same inoperative, means for restoring said secondary means to a disengaged position with respect to said striking member only at a rate determined by said time responsive driving means, means for limiting the extent of engagement of said striking member by said secondary means, thereby determining the

time interval between engagement and disengagement of said striking member by said secondary means, and manually operable means to directly engage said striking member to render the same inoperative.

11. In an alarm clock, the combination with time responsive driving means, of an alarm bell, a striking member for said bell, means to oscillate said striking member, engaging means normally engaging said striking member to render the same inoperative, means adapted to release said engaging means from engagement with said striking member at a predetermined time, a pivoted member for engaging said striking member to render the same inoperative, a pawl on said pivoted member, a ratchet wheel driven by said time responsive means and adapted to be engaged by said pawl, a spring biasing said pivoted member to the disengaged position with respect to said striking member, means for rotating said pivoted member into engagement with said striking member and into engagement with said ratchet wheel, said ratchet wheel permitting angular restoration of said pivoted member to the disengaged position with respect to said striking member only at a rate determined by said time responsive driving means, and means for limiting the extent of rotation of said pivoted member, thereby determining the time interval between engagement and disengagement of said striking member by said pivoted member.

12. In an alarm clock, the combination with time responsive driving means, of an alarm bell, a striking member for said bell, means to oscillate said striking member, resilient means normally displaced into engagement with said striking member to render the same inoperative, cam means adapted to release said resilient means from engagement with said striking member at a predetermined time, said cam means being controlled by said time responsive driving means, a pivoted member for engaging said striking member to render the same inoperative, a reciprocable member adapted to be displaced in one direction from an intermediate position to engage said pivoted member and rotate the same into engagement with said striking member, and adapted to be displaced in another direction to directly engage said striking member, means controlled by said time responsive means for rotating said pivoted member to a disengaged position with respect to said striking member at a substantially constant rate, and means for limiting the motion of said reciprocable member to determine the extent of rotation of said pivoted member, thereby determining the time interval between engagement and disengagement of said striking member by said pivoted member.

13. In an alarm clock, the combination with time responsive driving means, of an alarm bell, a striking member for said bell, means to oscillate said striking member, resilient means normally displaced into engagement with said striking member to render the same inoperative, a cam adapted to release said resilient means from engagement with said striking member at a predetermined time, said cam being controlled by said time responsive driving means, a pivoted member for engaging said striking member to render the same inoperative, a reciprocable member for rotating said pivoted member into engagement with said striking member, means driven by said time responsive means for controlling the rotation of said pivoted member to a disengaged position with respect to said strik-

ing member at a substantially constant rate, means for limiting the motion of said reciprocable member to determine the extent of rotation of said pivoted member, thereby determining the time interval between engagement and disengagement of said striking member by said pivoted member, and manually operable means to directly engage said striking member to render the same inoperative.

10 14. In an alarm clock, the combination with time responsive driving means, of an alarm bell, a striking member for said bell, means to oscillate said striking member, resilient means normally displaced into engagement with said striking member to render the same inoperative, cam means adapted to release said resilient means from engagement with said striking member at a predetermined time, said cam means being controlled by said time responsive driving means, 15 a pivoted member for engaging said striking member to render the same inoperative, a recip-

rocable cam surface for displacing said pivoted member into engagement with said striking member, a pawl on said pivoted member, a ratchet wheel driven by said time responsive means and adapted to be engaged by said pawl, 5 a spring biasing said pivoted member out of engagement with said striking member, said ratchet wheel permitting angular restoration of said pivoted member to a disengaged position with respect to said striking member only at a rate determined by said time responsive driving means, 10 means for limiting the reciprocable motion of said cam surface to determine the extent of rotation of said pivoted member, thereby determining the time interval between engagement 15 and disengagement of said striking member by said pivoted member, and manually operable means to directly engage said striking member to render the same inoperative.

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