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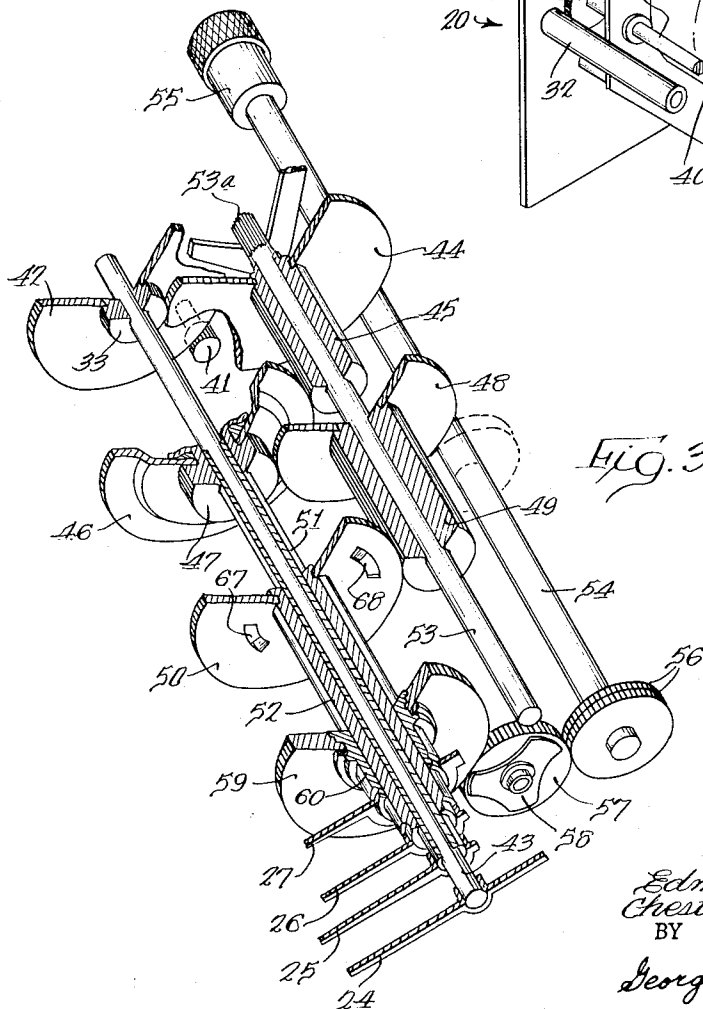
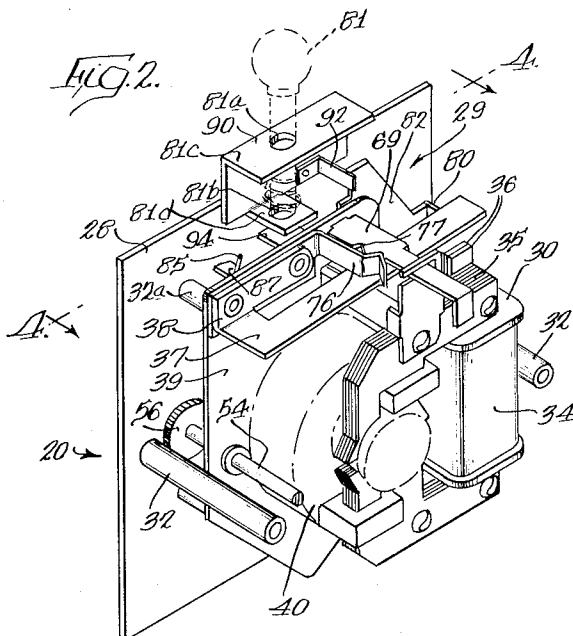
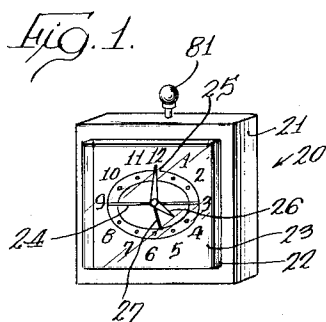
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2,996,874

ALARM CLOCK DELAY CONTROL

Filed March 13, 1958

2 Sheets-Sheet 1



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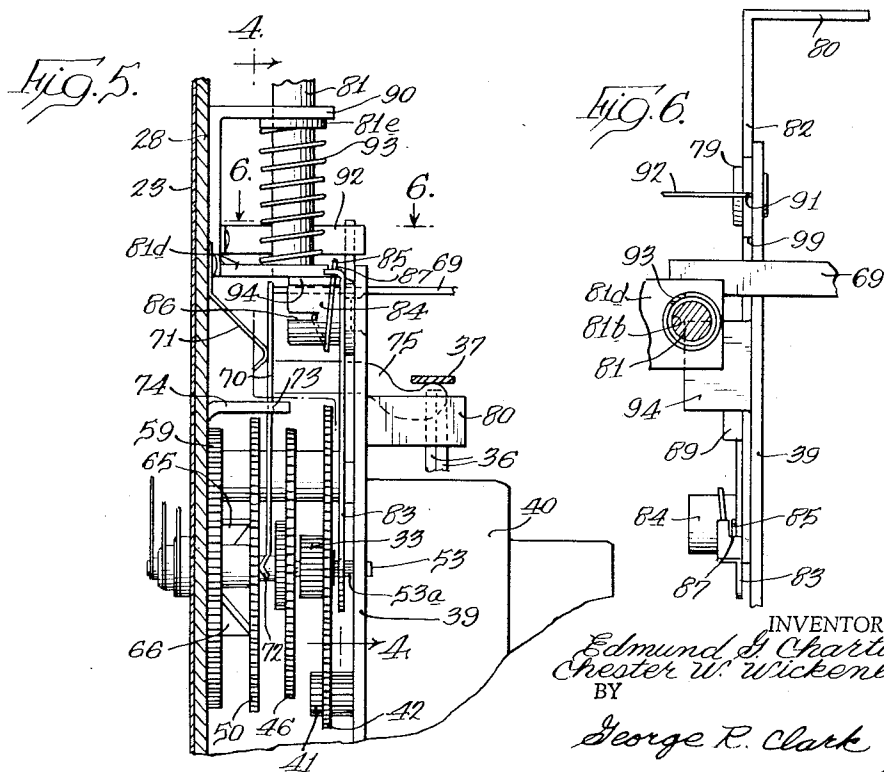
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2 Sheets-Sheet 2



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ALARM CLOCK DELAY CONTROL

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10 Claims. (Cl. 58—21.12)

The present invention relates to an electric alarm clock and more particularly to a resetting or alarm clock delay control for an electric alarm clock whereby a person may return to sleep for a short period of time without fear of oversleeping.

The present invention is particularly adaptable to the alarm clock disclosed and claimed in our co-pending application Serial No. 688,467, filed October 7, 1957, for "Electric Clock." This application discloses an electric alarm clock of the type having a synchronous motor driving the time indicating mechanism. A vibrator or alarm sounding device is provided which is energized by means of the alternating field of the synchronous motor. Since the vibrator is continuously subjected to the alternating field, a damping member is utilized to engage the vibrator to prevent the alarm from sounding. The engagement of the vibrator by the damping member is controlled either manually or by the automatic alarm mechanism. The alarm mechanism is designed to move the damping member out of engagement with the vibrator when the pre-selected time for which the alarm is set arrives. The manual shutoff is merely intended to retain the damping member in engagement with the vibrator even though the member has been released by the alarm mechanism. When both the manual shutoff and the alarm mechanism are set to release the damping member from engagement with the vibrator, the vibrator produces a buzzing noise because of its being free to move in the alternating magnetic field existing adjacent to the stator of the synchronous motor. When it is desired to terminate the sounding of the alarm, the manual shutoff is used to move the damping member back into restraining engagement with the vibrator. If the alarm clock is used to awaken a sleeping person in the conventional manner, it is not unusual for the awakened person to operate the manual shutoff before he has fully regained consciousness. As a result, the alarm mechanism will be rendered inoperative and the party will continue to sleep long past the desired hour for arising.

In an effort to reduce the chance of a person oversleeping in the manner described above, resetting or alarm delay control devices have been provided so that the alarm mechanism may be rendered inoperative for a relatively short period. Upon actuation of the alarm delay during the sounding of the alarm, the alarm is merely interrupted for an interval of about ten minutes. At the expiration of this period, the alarm begins to sound again. After operating the alarm delay device once or twice, the party operating the clock becomes wide awake at which time the manual shutoff for the alarm is operated to terminate the intermittent operation of the alarm mechanism. Normally, the alarm delay control is operated by means of a convenient button at the top of the clock, while the manual shutoff is in a more obscure location on the back of the clock, thus encouraging operation of the alarm delay until the sleeper has been fully awakened.

Previously known alarm delay mechanisms have been complex and expensive, and the interconnections with the shutoff device and alarm mechanism have complicated their construction. Such alarm delay devices, of course, add to the cost of clocks manufactured with them. Since some consumers prefer clocks without this feature, it would be desirable to provide an alarm delay device

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completely independent of the alarm tripping and shutoff device so that the clocks could be manufactured with or without the alarm delay device utilizing the same basic movement and motor for both types of clock.

Some of the prior art alarm delay devices have included a toothed rack which may be actuated manually into engagement with a toothed pinion driven continuously by the clock works. When the rack has been driven to a predetermined position relative to the pinion, the delay device actuates the alarm mechanism. The length of the delay period from the time of manual actuation of the alarm delay device to its actuation of alarm is dependent upon the position of the rack when it is moved initially into engagement with the pinion. Since the time of manual actuation of the alarm delay device may vary relative to the position of the pinion teeth, the initial position of the rack meshing with the pinion will vary. This variation in position also results in a variation in the delay period. It would, therefore, be desirable to provide an alarm delay device in which the delay period is always of the same magnitude. It would also be desirable to provide an alarm delay device which could be actuated a plurality of times in succession merely by operating a control element each time it is wished to reset the alarm mechanism.

Accordingly, it is an object of the invention to provide a new and improved alarm clock having an alarm delay device therein.

Another object of the invention is to provide an alarm delay control adapted to be assembled easily to a conventional alarm clock and to operate independently of the alarm mechanism of that clock.

Yet another object of the invention is to provide an alarm delay device for an alarm clock to cause a uniform delay period upon each actuation.

Still another object of the invention is to provide for an alarm clock having an alarm delay control completely independent of the manual shutoff mechanism of the clock.

A further object of the invention is to provide an alarm clock having one manually operable mechanism adapted to engage the audible vibrator of the alarm indefinitely and a second manually operable alarm restoring mechanism having a shutoff member engaging the vibrator of the alarm completely separate from the first mentioned mechanism.

Still another object of the invention is to provide an alarm clock having an alarm controlling mechanism for disengaging a damping member from a vibrator at a selected time for which the alarm is set and an attachment operable to temporarily engage the vibrator by means of a latching mechanism releasable by a member moved into engagement with one of the shafts of the clock so that after a few minutes the latching mechanism is actuated to disengage said attachment from damping engagement with the vibrator.

A further object of the invention is to provide an alarm clock having a manual shutoff member operable from the back of the clock for setting an alarm mechanism to be operated at a predetermined time and an attachment including an auxiliary or temporary alarm delay mechanism operable by a member projecting from the top of the clock to move a damping member into engagement with a vibrator each time the member on the top of the clock is actuated manually. Means are provided to latch the damping member in a position in contact with the vibrator until an element of the resetting mechanism which was thrown into engagement with one of the shafts of the clock is moved by the shaft to a position causing the damping member to be again moved out of engagement with the vibrator.

Further objects and advantages of the present inven-

tion will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the invention, reference may be had to the accompanying drawings, in which:

FIG. 1 is a perspective view of an electric alarm clock embodying the present invention;

FIG. 2 is a perspective view of the rear of the alarm clock of FIG. 1 with the housing or casing thereof removed so as to show the electric motor and audible signaling device;

FIG. 3 is an exploded perspective and somewhat schematic view of the time and alarm gear mechanism of the clock shown in FIG. 1, more clearly to disclose the operation thereof;

FIG. 4 is an enlarged vertical section of the clock and an alarm delay device thereof and taken along line 4—4 of FIG. 2;

FIG. 5 is a vertical section of the clock taken along line 5—5 of FIG. 4; and

FIG. 6 is an enlarged, fragmentary top plan view of the alarm delay device taken along line 6—6 of FIGURE 5.

The present invention provides an alarm delay device in an alarm clock which permits the alarm of the clock to be set by the user to go off at a particular time and then selectively shut off indefinitely or temporarily shut off for a short period of time such as, for example, a period of about ten minutes, after which the alarm will again be actuated. Then, if desired, the alarm can again be temporarily shut off or, as an alternative, it can be shut off indefinitely. In order that the clock may be manufactured either with the alarm delay device or without it, the delay device and the alarm clock proper are so constructed that the clock is an operable unit without the delay device and a minimum of elements of the delay device need be attached to the clock to incorporate the delay device in the clock. This is accomplished by the provision in the delay device of a lever having an arm for restraining the audible vibrator or alarm sounding device of the clock which is independent of the vibrator restraining arm of the alarm mechanism of the clock. The lever is moved into restraining position by a manual push rod, and carries a hook-like latch into engagement with a cogwheel of the gear train of the clock when so moved. As the gear train of the clock operates, the cogwheel moves the latch out of engagement therewith after the desired alarm delay period, and the lever then is swung out of restraining engagement with the vibrator.

Referring now in detail to the drawings, there is illustrated in FIG. 1 an electric clock generally indicated at 20 comprising a suitable casing 21, the front of which comprises a transparent plate or crystal 22 which shields and exposes to view a clock face 23. Disposed between the transparent plate 22 and the clock face 23 are the conventional sweep second hand 24, minute hand 25, hour hand 26 and an alarm indicator 27. The elements 24, 25, 26 and 27 are rotatable about a common axis and are supported on an arrangement of concentric shafts. The clock 20 includes a front mounting plate 28 (FIG. 2) from which is supported a combined clock and alarm mechanism 29 including an electric motor 30. A suitable back plate (not shown) may be disposed and placed in spaced parallel relationship to the front plate 28 by means of spacing studs 32 which are riveted or otherwise suitably secured to the front plate 28. The back plate may be secured to the studs by conventional means such as, for example, screws, to permit ready removal and assembly of the back plate so that the clock mechanism within the casing 21 is readily accessible.

As disclosed fully in our above-mentioned co-pending application, the motor 30 is synchronous and includes an alternating current winding 34 energized by alternating

current supplied thereto. The motor also has a laminated core of magnetic material, and the alternating current supplied to the winding 34 also alternately magnetizes the core and a projection 36 of the core which provides a source of power for the audible alarm. A vibrator or magnetic reed 37 is positioned with one end adjacent to projection 36. When the vibrator or alarm sounding device 37 is subjected to the alternating magnetic field adjacent projection 36 and undamped or unrestrained, it produces an audible alarm sound. However, when the vibrator 37 is damped or otherwise restrained from vibration, it does not produce an audible sound. The reed 37 is supported rigidly from the left-hand end thereof, as viewed in FIG. 2, by a mounting portion 38 suitably secured to a plate 39 fixed relative to the plate 28 and supported thereby. The plate 39 co-operates with the front plate 28 to mount the clock movement therebetween. Posts 32a retain plates 28 and 39 assembled in spaced relation to each other.

The motor 30 drives an armature (not shown) thereof enclosed in a reduction gear box 40 eventuating in an output gear 41 at the front of the box 40. The gear box 40 is sealed as described in our above-mentioned co-pending application, and the plate 39 and the field laminations retain the gear box 40 in assembled relation to the clock movement. The motor 30 turns its armature 3,600 revolutions per minute, and the gearing (not shown) in the gear box 40 transmits this power to the gear 41 and preferably is of such a ratio that the gear 41 is rotated at approximately six revolutions per second. As may be best seen in FIG. 3, the output gear 41 meshes with a second gear 42 six times the diameter of the gear 41 to drive a second shaft 43 at one revolution per minute. The driving of the minute hand 25 and the hour hand 26 is effected, as described in detail in the above-mentioned co-pending application, at appropriate speeds by gears 33, 44, 45, 46, 47, 48, 49 and 50. The gear 46 is the minute gear and turns a minute shaft 51 at one revolution per hour. The gear 50 is an hour gear and turns an hour shaft 52 one revolution every twelve hours. The gears 44 and 45 are keyed to a shaft 53 having a knurled or toothed gear portion or cogwheel 53a, and rotate the shaft 53 at a rate of one-sixth of a revolution per minute.

To set the alarm mechanism for the time at which it is to be actuated and to set minute and hour hands, setting shaft or rod 54 (FIG. 3) having knurled handle or knob portion 55 is provided. A pair of aligned gears 56 are secured to shaft 54 for selective engagement with either the alarm mechanism or the time indicating mechanism. To permit the selective engagement of gears 56, shaft 54 is mounted slidably on the plate 39. The shaft 54 may be moved between a position in which the gears 56 mesh with an idler gear 57 for setting the alarm to a predetermined time and a position in which the gears 56 mesh with the gear 49 for setting the hour and minute hands 25 and 24 to a predetermined time. The gear 57 is mounted on the front plate 28 and is frictionally restrained against movement by a friction plate 58. The gear 57 meshes with an alarm gear 59 keyed to a shaft 60 to which the alarm indicator 27 also is keyed. The friction plate 58 is necessary to prevent gears 59 and 57 from being rotated by the hour gear.

In order to cause the alarm vibrator 37 to be released so that it is vibrated by the magnetic projection 36 and creates an alarm, the alarm gear 59 is provided with spacing wedges or cams 65 and 66 (FIG. 5) spaced at different distances from the axis of the gear 59. The hour gear 50 is held away from the gear 59 by the cams 65 and 66 until the hour gear 50 rotates to a position relative to the alarm gear 59 at which a slot 67 in the gear 50 is directly opposite the cam 65 and a slot 68 in the gear 50 is directly opposite the cam 67. At such times as the cams 65 and 66 are aligned with slots 67 and 68, the hour gear may move toward alarm gear 59 due

to the slidable mounting of hour shaft 52. The slot 67 and the cam 65 are spaced the same distance from the common axis of the gear 50 and gear 59. The slot 68 and cam 66 are spaced the same distance from the common axis of the gear 50 and gear 59. The slots 67 and 68 are designed to receive the cams 65 and 66, respectively. The different radial distances for the two cams and their respective cam slots is required so there will be only one position every 12 hours in which the alarm gear and hour gear will move together.

In order to control the vibrator or reed 37 in response to the axial positioning of the hour gear 50, an L-shaped alarm lever 70 is pivotally mounted on the front plate 28. The L-shaped alarm lever 70 is formed with a bifurcated end portion 72 which embraces the minute shaft 51 and rides on the rear face of hour gear 50. To accomplish the pivotal mounting of lever 70, a tab 74 is punched out of front plate 28 so that it extends perpendicular to the front plate. A slot 73 is formed in the end of tab 74 to receive and pivotally support the lever 70. A leaf spring 71 is mounted with one end secured to plate 28 and the other end biasing lever 70 into engagement with hour gear 50. The upper end of the lever 70 is engaged by a slidably mounted shutoff rod 69 which serves to manually terminate the sounding of the alarm mechanism.

When the slots 67 and 68 in the gear 50 become aligned with the cams 65 and 66, respectively, the bifurcated end 72 of lever 70 moves the gear 50 to the left under the influence of spring 71. To restrain movement of the vibrator 37, a damping arm 75 extends rearwardly from the upper end of lever 70. In the normal position of gear 50 in which the cams 65 and 66 are not in registry with the cam slots 67 and 68, the arm 75 is in engagement with the bottom of vibrator 37 to restrain it from vibrating. When the gear 50 moves forwardly as a result of the cams 65 and 66 and the cam slots 67 and 68 being aligned, the lever 70 pivots about its midpoint and causes arm 75 to swing away from vibrator 37. The vibrator 37 then makes an audible noise or alarm to signal the user of the alarm clock of the time for which the alarm is set.

If the user wishes to shut the alarm off completely, the arm 69 is pushed inwardly by the user until the arm 69 engages the upper end of the lever 70 and pushes the lever 70 against the action of the spring 71 until the arm 75 engages the vibrator 37 to prevent vibration thereof. A leaf spring detent 76 (FIG. 2) mounted on the plate 39 is designed to engage one of two notches 77 spaced along the arm 69 to hold the arm 69 either in an alarm position or an alarm off position. To allow the alarm to continue sounding for a reasonable period of time, the lengths of the slots 67 and 68 are much greater than the respective lengths of the cams 65 and 66 so that the hour gear 50 may remain in the alarm position for a short portion of its revolution. A predetermined period of time after the cams 65 and 66 enter the slots 67 and 68, the hour gear 50 rotates to such an extent relative to the fixed alarm gear 59 that the cams 65 and 66 ride up out of the slots 67 and 68 and displace gear 50 rearwardly. The gear 50 then holds the lever 70 in the alarm shutoff position. The slots 67 and 68 are sufficiently longer than the cams 65 and 66 that the alarm preferably may ring for a period, preferably greater than thirty minutes, unless the shutoff rod 69 is actuated or unless the alarm is temporarily shut off by an alarm delay or restoring device 78 illustrated most clearly in FIG. 4.

The alarm delay device 78 is provided for the purpose of permitting the user of the clock to turn the alarm off temporarily so that at the expiration of a short period of time, approximately ten minutes in one constructed embodiment of the invention, the alarm will sound again. If the user again wishes to shut off the alarm temporarily, the delay device 78 may be actuated a second time to provide another ten minute delay in the operation of the alarm. A third alarm delay period also may be

effected since the shutting off of the alarm by movement of the hour gear 50 away from the gear 59 by the cams 65 and 66 does not occur for somewhat over thirty minutes.

The delay device 78 is mounted on the front side of plate 39 and comprises in general a second vibrator damping arm 80 which may be swung into engagement with the vibrator 37 to prevent its audible vibration. The arm 80 is an integral portion of one end of a sheet metal lever 82 mounted pivotally on a pin 79 supported by and projecting from the plate 39. The lever 82 moves in a plane parallel to plate 39 while the arm 80 projects rearwardly past plate 39 to a position below vibrator 37 as can be best seen in FIGS. 4 and 5. The right-hand end of the lever 82, as viewed in FIG. 4, carries a latching member or hook arm 83 which is provided to hold the arm 80 of the lever 82 in engagement with the vibrator 37 for the selected delay period. The latch member 83 is pivotally mounted on a shoulder stud 84 fastened rigidly to the lever 82. The latch member 83 is biased about its pivotal mounting on stud 84 by a torsion spring 85. The stud 84 (FIG. 6) has an enlarged end which is formed with a transversely extending slot 86 into which one end of torsion spring 85 is received. The other end of the torsion spring 85 engages a tab 87 bent upwardly on latch arm 83. Torsion spring 85 acting between stud 84 on lever 82 and the tab 87 on latch arm 83 tends to move the latching member 83 in a clockwise direction, as viewed in FIG. 4.

When the lever 82 is in its full-line position, as illustrated in FIG. 4, a cam finger 88 of the lever 83 engages a camming stop 89 pressed out of the plate 39 and holds the latching member 83 in its full-line position as shown in FIG. 4. To provide a biasing force tending to rotate lever 82 and arm 80 out of engagement with vibrator 37, a projecting portion 91 of the lever 82 is contacted by a leaf spring 92 which is rigidly secured to bracket 90 on the plate 39. The spring 92 normally urges the lever 82 to its full-line position as shown in FIG. 4 in which the damping arm 80 is out of contact with the vibrator 37. To enable the operator to manually rotate the lever 82 and the damping arm 80 into engagement with vibrator 37, an alarm delay plunger 81 is slidably mounted in aligned bores 81a and 81b in arms 81c and 81d of the bracket 90. The bracket 90 is riveted or otherwise secured to the plate 28. To permit rotation of the lever 82 by the plunger 81, a forwardly projecting tab 94 is provided at the upper edge of lever 82. When plunger 81 is depressed, the lower end thereof engages the tab 94 rotating lever 82 clockwise as viewed in FIG. 4 against the biasing force of spring 92. The arm 81d serves a secondary function as a stop to limit counterclockwise movement of the arm 82 by engagement with the tab 94 as can be seen in FIG. 4.

As C-ring 81e secured against sliding on the plunger 81 serves as a stop for a spring 93, the spring 93 bears against the C-ring and the arm 81d. When the reset plunger or rod 81 is pressed downwardly, as viewed in FIG. 4, by the user against the action of a compression spring 93, the lower end of the rod 81 engages the tab 94 of the lever 82 and pivots the lever 82 in a clockwise direction and moves the arm 80 into damping engagement with the vibrator 37 as illustrated by the broken-line positions of the arm 80 and the lever 82.

In order to retain the lever 82 in the depressed or dotted-line position shown in FIG. 4, a hook or arm portion 95 provided on the latch member 83 is moved downwardly. The cam finger 88 provided thereon is in engagement with stop 89 permitting only limited movement of member 83 relative to arm 82. The torsion spring 85 biases the lever 83 in a clockwise direction, as viewed in FIG. 4, against the stop 89 until the cam finger 88 moves to the left of stop 89 which occurs when the left-hand end of the arm 95 is substantially below the axis of knurled portion 53a and the finger cam 88 has been

moved out of engagement with the camming stop 89 to permit clockwise movement of the member 83. However, at the instant the finger 88 is moved out of contact with the stop 89 to permit the latch member 83 to be swung freely in a clockwise direction, the left-hand end of the arm 95 is not quite but almost completely below the level of the gear portion 53a. Hence, the arm 95 cannot be swung above the gear portion 53a if the plunger 81 is not depressed further. However, when the plunger 81 is fully depressed by the user, the arm 95 moves completely below the gear portion 53a before it contacts the gear portion 53a, inertia of the hook member 83 restraining its clockwise movement until the arm 95 is moved completely below the gear portion 53a.

The plunger 81, when fully depressed, pivots the lever 82 slightly farther downwardly than necessary for the arm 95 to swing completely under the gear portion 53a so that a full time cycle is provided. Then, as the plunger 81 is released by the user, the lever 82 is rotated counterclockwise by spring 92 forcing hook 95 into engagement with the knurled gear portion 53a of the shaft 53. The hook 95 is formed with an arcuate inner edge 96 which engages gear portion 53a. With the hook 95 so positioned, the latching member 83 then holds the lever 82 and the damping arm 80 in their positions shown in broken lines in FIG. 4 in which the vibrator 37 is damped and kept inaudible. The inner edge 96 of the arm portion 95a preferably is smooth and the knurled teeth of the gear portion 53a drive the arm portion 95 to the right by friction. The arm portion 95 may be of softer metal than the teeth of the gear portion 53a so that these teeth dig slightly into the arm portion 95 to make the drive positive. Also, the edge 96 may, if desired, be toothed, or may be roughened, and, in effect, may be considered a rack portion. When either the pinion portion 53a or the edge 96 is not toothed, there is no meshing of these portions and the position of the arm portion as it initially engages the portion 53a is always the same regardless of the rotative position of the pinion portion 53a. That is, the latch member 83 rotates until the vertical portion stops against the gear portion 53a and driving engagement between edge 96 and gear 53a takes place adjacent this vertical portion.

To aid in the drive of the arm portion 95 by the gear portion 53a, the edge 96 is at an angle relative to a line between the center of the pivotal mounting stud 84 and the center of the gear portion 53a such that the upward pull of the lever 82 tends slightly to cam the hook 83 to the right, as viewed in FIG. 4. The edge 96 is curved upwardly in a varying degree such that the engaging gear portion 53a always is slightly to the right of the line between the mounting stud 84 and the axis of shaft 53, and the component of force camming it to the right remains constant. Preferably, the portion of the edge 96 engaging the gear portion is always engaged with the gear portion 53a at a point on the gear portion such that there is little or no drag on the gear portion 53a, and this angle may be made such that the pull of the lever 82 provides the entire force pushing the hook 83 to the right with the gear 53a serving as a restraining regulator, the pull of the lever 82 providing a force just insufficient to overcome the friction between the gear portion 53a and the hook 83.

The shaft 53 is rotated in a counterclockwise direction, as viewed in FIG. 4, and the knurled or gear portion 53a engages the rack portion 96 of the hook arm 95 and swings the member 83 in a counterclockwise direction until the left-hand end of the arm portion 95 clears the gear portion 53a of the shaft 53. The leaf spring 92 then swings the lever 82 in a counterclockwise direction to its full-line position in which the arm 80 is moved out of damping engagement with the vibrator 37 and the alarm is again sounded. The lever 82 is provided with a notch 97 to provide clearance for the damping arm 75 of the alarm lever 70 which projects through a clearance slot 98 in the plate 39. The lever 82 also is provided with a

clearance notch or slot 99 in the upper portion thereof providing clearance for the control arm 69 which projects through a slot 100 in the plate 39.

In converting an assembly line from the manufacture of the clock 20 without the alarm delay mechanisms 78, to its manufacture with the alarm delay mechanism, the only changes required are those for securing the bracket 90 with the spring 92 to the plate 28, mounting of the lever 82 with the arm 83 carried thereby on the pin 79 and assembling the rod 81 and spring 93 to the clock. Also, the manufacture may be converted back to the clock without the delay device merely by omitting these few parts. The convertible feature is facilitated by having the damping arm 75 and the damping arm 80 separate and independent. It should also be noted that the alarm delay device 78 and arm 80 are actuated independently of the alarm tripping mechanism of the clock.

In view of the detailed description included above, the operation of an electric clock with its alarm and alarm delay mechanism of the present invention will be readily understood by those skilled in the art and it will be appreciated that there has been provided a very simple and inexpensive alarm delay device which, with the alarm construction, permits the user to delay the sounding of the alarm time after time or, at any chosen time, to shut off the alarm completely. It should also be noted that when the alarm delay device is not in its operative position, the delay device is completely out of contact with the gear train of the clock.

Although there has been illustrated and described a preferred embodiment of the present invention it will be understood that various changes and modifications may occur to those skilled in the art. It is intended in the appended claims to cover all those changes and modifications which fall in the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In an alarm clock having drive means including a cogwheel, time-indicating means and an alarm-sounding member, the improvement comprising a movable element for restraining said alarm-sounding member, means biasing said element away from said member, manually operable means for moving said element against said biasing means to an operative position restraining said member, a hook member having an arm thereon and pivotally mounted on said movable element, and means urging said arm of said hook member into latching engagement with said cogwheel when said movable element is moved to its operative position, said cogwheel being driven in a direction such as to move said hook member out of latching engagement therewith, said biasing means urging said hook member out of contact with said cogwheel after said hook member has been driven out of latching engagement with said cog wheel.

2. In an alarm clock including drive means having a gear, time-indicating means driven by the drive means, an alarm-sounding member, first means for restraining said alarm-sounding member, alarm-tripping means actuated by said drive means for rendering said first means inoperative to restrain said alarm-sounding member, the improvement comprising second means for restraining said alarm-sounding member independently of said first means, manually operable means for rendering said second means operative to restrain said member, and driven means operable by said gear for rendering said manually operable means inoperative a predetermined period of time after actuation thereof, said driven means including a latching member provided with a curved portion adapted to engage said gear and resilient means urging said latching member against said gear.

3. In an alarm clock having drive means including a gear, time-indicating means driven by the drive means, an alarm-sounding member, first means for restraining said alarm-sounding member, and alarm-tripping means

actuated by said drive means for rendering said first means inoperative to restrain said member, the improvement comprising second means for restraining said alarm-sounding member independently of said first means, manually operable means for rendering said second means operative to restrain said alarm-sounding member, latching means for holding said second means operative for a predetermined period of time after actuation by said manually operable means, said latching means including a curved arm adapted to engage said gear and be moved by said gear in a predetermined direction, and means for urging said curved arm into engagement with said gear.

4. In an alarm clock, a mounting plate, a vibrator, a lever mounted for pivotal movement about a fixed axis on said plate and having a portion movable into restraining engagement with said vibrator, said lever being rotatable about said axis between a first position in which said portion is out of restraining engagement with said vibrator and a second position in which said portion is in restraining engagement with said vibrator drive means, means independent of said drive means urging said lever toward said first position, alarm-tripping means normally restraining said vibrator and actuable by said drive means to release said vibrator, manual shutoff means for preventing actuation of said alarm-tripping means, a hook member carried pivotally by said lever, and means operable when said lever is moved to said second position for urging said hook member into latching engagement with said drive means, said drive means serving to move said hook member out of latching engagement with said drive means a predetermined period of time after initial engagement thereof.

5. In an alarm clock, a front plate, a second plate parallel to and spaced from said front plate in a position behind said front plate, a vibrator extending along said second plate, a lever mounted pivotally on said second plate and having an arm movable into restraining engagement with said vibrator, said lever being movable between a first position in which said arm is out of restraining engagement with said vibrator and a second position in which said arm is in restraining engagement with said vibrator, driven gear train means mounted between said plates, means independent of said gear train means urging said lever toward said first position, alarm-tripping means normally restraining said vibrator and actuable by said gear train means to release said vibrator, manual shutoff means for preventing release of said vibrator by said alarm-tripping means, a latch carried pivotally by said lever, means operable when said lever is moved to said second position for urging said latch into engagement with said gear train means, said latch being driven by said gear train means to a position out of engagement with said gear train means, and said latch holding said lever in its second position while said latch is in engagement with said gear train means.

6. In an alarm clock, a mounting plate, a driven gear train including a cogwheel positioned near said plate, a lever mounted pivotally on said plate, a latch member mounted pivotally on one end of said lever and having a rack portion positioned near said cogwheel, spring means urging said latch member toward said cogwheel, a stop on said plate, means urging said lever toward a first position, manually operable means for moving said lever away from said first position to a position in which said rack portion of said latch member engages said cogwheel, said member being provided with a cam finger for engaging said stop to hold said member in a position in which said rack portion can be moved past said cogwheel and into engagement with said cogwheel when said manually operable means is actuated, an alarm vibrator, said cogwheel being driven in a direction such as to move said rack portion out of engagement therewith, and means carried by said lever for holding said vibrator quiet when

said rack portion is in engagement with said cogwheel.

7. In an alarm clock, a mounting plate, a driven gear train including a cogwheel positioned near said plate, a lever mounted pivotally on said plate, a hook member mounted pivotally on one end of said lever and having a rack portion positioned near said cogwheel, spring means urging said member toward said cogwheel, a stop on said plate, means urging said lever toward a first position, manually operable means for moving said lever away from said first position to a position in which said rack portion of said hook member hooks on said cogwheel, an alarm vibrator, said cogwheel being driven in a direction such as to move said rack portion out of hooked engagement therewith, means carried by said lever for holding said vibrator quiet when said rack portion is in hooked engagement with said cogwheel, and said member being provided with a cam finger for engaging said stop to hold said member in a position in which said rack portion can be moved past said cogwheel and into hooked engagement with said cogwheel when said manually operable means is actuated.

8. In an alarm clock, a vertical mounting plate, a vibrator mounted on one side of said plate and having a free end extending parallel to said plate and beyond one edge of said plate, a stud on the other side of said plate, a plate-like lever mounted pivotally on said stud and having an arm portion extending past said one edge of said plate, means urging said lever toward a retracted position in which said arm portion is out of contact with said vibrator, a push rod for pivoting said lever to an operative position in which said arm portion is in restraining engagement with said vibrator, said push rod being spring biased in a direction away from said lever, a driven gear train having a cogwheel and positioned on said other side of said plate, a pin mounted on said lever, a hook member pivotally mounted on said pin and having a cam finger, a camming stop on said plate, and spring means urging said finger against said stop when said lever is in said retracted position and urging said hook member into latching and driven engagement with said cogwheel when said lever is moved to said operative position.

9. In an alarm clock, a time gear train including a driving element, an alarm-sounding device, main alarm control means operable by said train for controlling said device, a delay member for stopping operation of said alarm-sounding device when in an operable position, manually operable means for actuating said delay member, means independent of said gear train urging said member away from its operable position, a hook-type latch movable by said member into engagement with said driving element and being urged by the member urging means toward a position away from said driving element, said driving element serving to move said latch out of engagement therewith after a predetermined period of time to permit the member urging means to move said member away from its operable position and also move said latch completely out of contact with said driving element.

10. In an alarm clock, a mounting plate, a driven gear train including a cogwheel positioned near said plate, a lever mounted pivotally on said plate, a latch member mounted pivotally on one end of said lever and having a hook arm positioned near said cogwheel, a stop on said plate, means urging said lever toward a first position, manually operable means for moving said lever away from said first position to a position in which said hook arm hooks on said cogwheel, said member being provided with a cam finger for engaging said stop to hold said member in a position in which said hook arm can be moved into hook engagement with said cogwheel when said manually operable means is actuated, the lever urging means normally tending to move said cam finger against said stop, an alarm vibrator, said cogwheel being driven in a direction such as to move said hook arm out of engagement therewith, said stop and the lever urging means serving

to hold said latch member normally in a position in which said latch member is out of contact with said cogwheel, and means carried by said lever for holding said vibrator quiet when said hook arm is in hooked engagement with said cogwheel.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,996,874

August 22, 1961

Edmund G. Chartier et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 9, line 16, strike out "on said plate" and insert the same after "mounted" in line 15, same column; same column 9, line 21, after "vibrator" insert a comma.

Signed and sealed this 5th day of June 1962.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents

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