Jan. 29, 1952 H. D. PARKS 2,583,794

TWENTY-FOUR-HOUR ALARM CLOCK

Filed June 14, 1949 2 SHEETS—SHEET 1

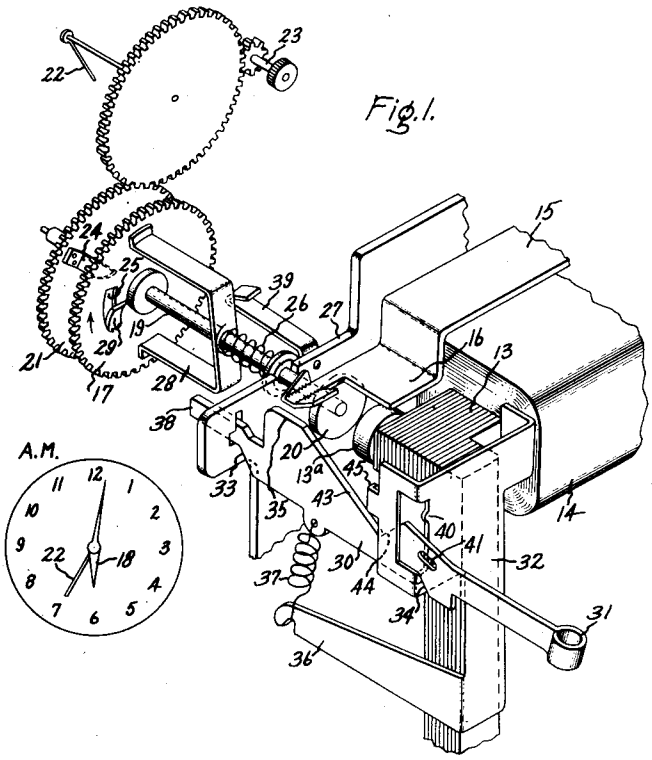


Fig. 1.

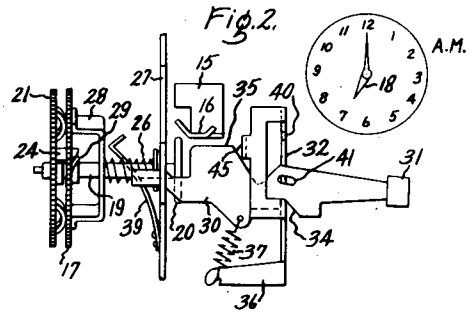


Fig. 2.

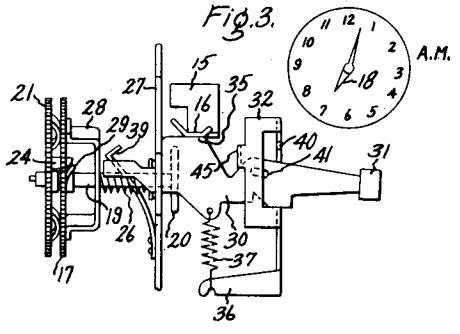


Fig. 3.

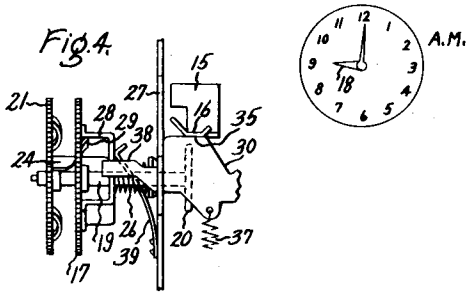


Fig. 4.

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TWENTY-FOUR-HOUR ALARM CLOCK

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Fig. 5

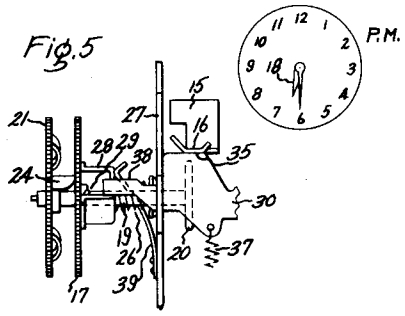


Fig. 6.

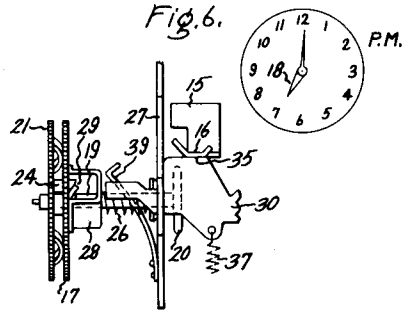


Fig. 7.

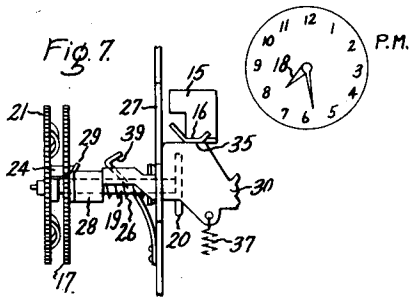


Fig. 8.

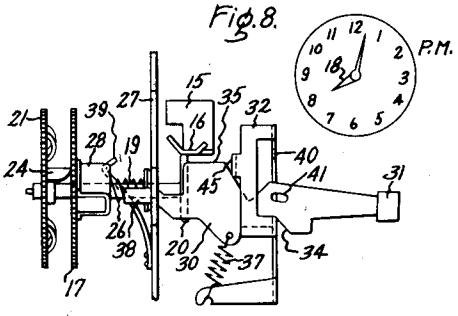


Fig. 9.

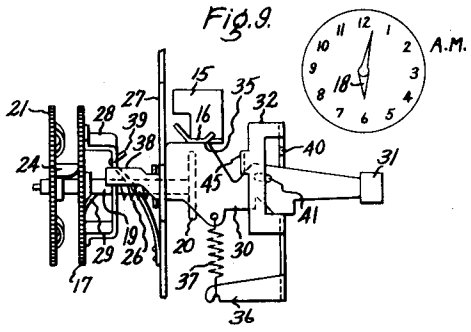
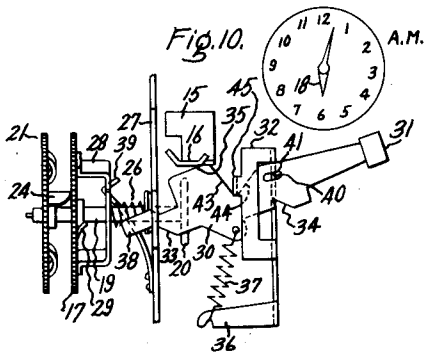


Fig. 10.



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UNITED STATES PATENT OFFICE

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TWENTY-FOUR-HOUR ALARM CLOCK

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Application June 14, 1949, Serial No. 99,077

10 Claims. (Cl. 58—21.15)

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This invention relates to a 24-hour alarm clock but employs a 12-hour alarm cam and thus has the convenience and simplicity of a 12-hour alarm clock with respect to setting the time when the alarm shall sound, without using a 24-hour setting dial or a. m. and p. m. indicators.

An important feature of the invention is a form of escapement mechanism which after an alarm sounding operation and the manual shutting off of the alarm, automatically returns the manual shutoff to the alarm on position after a 12-hour period. Thus, if the user has his alarm set for 7 a. m., he is awakened thereby and normally shuts it off prior to the time it would be shut off automatically. He needs to pay no further attention to it and it will next sound in 24 hours, without the necessity of any manually resetting or adjustment operation. The manual shutoff device is moved from shutoff to alarm on position automatically by the 12-hour alarm cam mechanism shortly after the alarm cam operates at 7 p. m. Hence, the alarm is not only prevented from sounding in the evening, but the operator is relieved of the necessity of moving the shutoff device from off to on position some time after 7 p. m., in order to have the alarm operate the following morning.

Another feature of the invention is an arrangement whereby the same manual shutoff device referred to above may be moved to a permanent shutoff position at any time.

The features of the invention which are believed to be novel and patentable will be pointed out in the claims appended hereto. For a better understanding of the invention reference is made in the following description to the accompanying drawings in which Fig. 1 shows a perspective and somewhat exploded view of the alarm mechanism as it would appear, looking at the same from the rear and to one side thereof. Figs. 2 to 10, inclusive, are side views of parts of the alarm mechanism shown in Fig. 1 in various different operating conditions. In the several figures a clock face is also shown indicating the time and setting of the alarm hand for the corresponding position of the alarm mechanism.

Referring now to Fig. 1, the clock in which the alarm is used is assumed to be driven by a self-starting synchronous electric motor. Portions of the stator magnet core and energizing coil are shown at 13 and 14, respectively. A resilient magnetic vibrator 15 operated by leakage flux from the motor is arranged to have its near end portion 16 vibrate against a part 13a, extending from the stator core part 13, and produce an

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audible alarm at all times when the motor is energized, unless the armature is prevented from such vibration by one of the alarm control parts to be described. The invention is applicable to other forms of alarms.

A gear wheel 17 forming part of an alarm cam is driven, in the direction shown, by the motor with the clock mechanism at one revolution in 12 hours. While not here shown, a complete motor, vibrator, and clock drive of the character thus far referred to may be found in United States Patent No. 2,421,986, June 10, 1947, assigned to the same assignee as the present invention. The gear 17 is geared to the hour hand shaft of the clock and rotates with it and at the same rate, and when the hour hand 18 is set, the gear 17 is likewise set. The clock face shown in connection with Fig. 1 faces to the rear for convenience in indicating the time setting of the alarm mechanism illustrated and is not intended to illustrate its proper orientation with the remainder of the apparatus shown. Gear 17 is secured on a shaft 19 with a smooth surfaced wheel 20, and in the position of these parts shown in Fig. 1 the wheel 20 is beneath and lifting the end 16 of vibrator armature 15 and prevents such armature from vibrating. On the same axis of rotation with shaft 19 is an alarm setting gear wheel 21 which is normally stationary but which is geared to an alarm hand 22 and to a setting shaft 23 by means of which wheel 21 may be rotatively set in any desired position, such position being indicated on an ordinary 12-hour clock face by hand 22 in terms of the time when the alarm will sound. In all figures the alarm hand is assumed to be set at the 7:00 o'clock position. The gears 17 and 21 form an alarm cam. Thus gear 21 has a cam-shaped part 24 on one side extending toward gear 17, which cam part normally rides on the adjacent surface of gear 17 as the latter rotates. Gear 17 has a cam slot 25 in it on the same radius as cam part 24, such that when the slot 25 has rotated into axial alignment with cam part 24, the latter may and will enter the slot accompanied by an axial movement of gear 17, shaft 19, and alarm shut-off wheel 20 to the left in Fig. 1. This axial movement is permitted by reason of the shaft 19 and parts secured thereto being axially movable in the supporting bearings, and is caused by a compression spring 26 which is coiled about shaft 19 and compressed between the clock plate 27 and a U-shaped part 28, the yoke of which has a bearing on shaft 19 and limbs of which press against wheel 17. The ends of the part 28 which press against wheel 17

are bent over parallel to the side surface of the wheel to provide a good bearing surface, and rest against such wheel at points outside or inside the radius of the slot **25**. The slot **25** in wheel **17** is formed with a curved lip **29** punched out of the wheel, and this lip and the cam finger **24** are so shaped that after the cam finger **24** has entered the slot **25** it will ride out again by reason of the normal clock rotation of wheel **17** and push the wheel **17**, shaft **19**, and shutoff wheel **20** to the right again in Fig. 1 to the position shown, against the compression of spring **26** and also lifting armature part **16** if necessary to silence the alarm. When the cam finger **24** enters cam slot **25**, the wheel **20** moves from beneath the armature part **16** so that if the armature is otherwise free, it will vibrate and sound an alarm. The alarm permitting position of wheel **20** and gear **17** is shown in Fig. 2.

From the foregoing description it will appear that the mechanism thus far described will cause the alarm to sound every 12 hours at a time set by the rotary position of gear wheel **21**, forming the normally stationary part of the cam and for a period of time, of the order of 30 to 60 minutes, for the cam parts to move apart and return wheel **20** beneath armature part **16**. A manual shutoff device is provided in the form of an endwise sliding bar **30** operatively accessible from the rear of the clock by a handle **31**, and slidably held in openings through plates **27** and **32**. Thus shutoff lever is shown as moved out to the rear or in the alarm on position in Fig. 1. It may be pushed inwardly or to the left in Fig. 1 and when so pushed in, it is also raised by reason of the beveled surfaces at **33** and **34** on its underside where it passes through the openings in its supporting plates **27** and **32**. Fig. 3 shows this manual slider in the alarm shutoff position. When moved to the off position, an upper edge **35** comes beneath and raises the free end of armature **15** and prevents its audible vibration. Such manual shutoff should raise the armature slightly more than does the shutoff wheel **20** so that when the manual shutoff is in, the armature does not produce any drag or wear on the wheel **20** which is driven by the clock with shaft **19** and gear **17**. The shutoff bar will stay in either of the positions described until moved from such positions either manually or automatically.

Forward of the beveled surface at **34** is a straight vertical surface facing the rear in the under edge of the push rod **30**. This acts as a stop by abutting against the inner lower edge of the opening in plate **32** when the push bar is out, as shown in Fig. 1, and helps to prevent the bar from getting out of place. Secured between the lower part of the bar and finger **36** bent forward from plate **32** is a tension spring **37** which exerts some downward pull on the bar **30** and assists in returning the same from alarm off to alarm on position automatically as will be described.

In the usual 12-hour alarm clock a manual shutoff device is used which after the alarm sounds at the desired alarm time, say at 7 a. m., is usually moved from an alarm on position to a shut-off position to stop the sounding of the alarm before it would otherwise stop automatically. Also, in the usual 12-hour alarm clock such shutoff device is left in the shutoff position until time to retire (usually after the next 12-hour alarm period, for example after 7 p. m., to prevent the sounding of the alarm at such time) and then it is manually moved to the alarm on position so that the alarm will sound again the next morning at the set time. The shut-off device of the present invention is used in the same way except that it is moved from the alarm off to the alarm on position after 7 p. m. automatically, and under normal conditions of alarm clock use where the alarm is sounded every morning, the only manual operation required is to shut the alarm off in the morning by pushing in the shutoff bar **30**.

The mechanism for returning the bar **30** to alarm off position after the evening alarm period will now be described.

Most of the parts used for this purpose have already been mentioned. As was mentioned previously, the yoke of the U-shaped yoke **28** has a bearing on shaft **19** and is free to rotate on such shaft, but is normally turned with the shaft by the friction of its ends in contact with the side of gear wheel **17**. This U-shaped yoke **13** in addition to the function heretofore described for it is used to eject the manual shutoff device **30** from alarm off to alarm on position automatically, and this ejector action is brought about by its rotary and axial motions when it is properly rotatively positioned with respect to the forward end **38** of such manual shutoff bar when the latter is in the alarm off position. When bar **30** is pushed in to alarm off position and ejector **28** is pushed to the rear by the separation of cam gear wheels **21** and **17**, the end **38** of bar **30** projects into the path of rotation of the ejector **28** as shown in Fig. 5, and should either limb of the ejector (rotating clockwise as viewed in Fig. 1) be rotated into contact with the underside of such end of bar **30**, the ejector will stop rotating and will slip where it bears against wheel **21**. This is the condition represented in Fig. 5.

The purpose of this is to position the ejector in such a position that when the next 12-hour alarm camming operation occurs, the ejector will first move axially forward or to the left in Fig. 5, so that it clears the arm as shown in Fig. 6 and then during the next approximately ½ to 1 hour interval before the cam wheel parts **21** and **17** have completely separated again, the ejector will rotate so as to be in partial axial alignment with the bar **30** and subsequently move axially against it as shown in Fig. 7. And as the camming action continues, the ejector will push the bar **30** out towards alarm on position sufficiently that the beveled surfaces at **33** and **34** reach the openings in plates **27** and **32** through which they slide, and the spring **37** pulls the bar **30** down and out the rest of the way. By the time that the bar **30** has thus been ejected automatically from alarm off position, the wheel **20** has moved under the armature part **16** so that although there was an alarm period operation of the camming mechanism, no alarm was sounded. However, since the manual shutoff device **30** has now been moved to alarm on position, the next subsequent 12-hour alarm camming operation will sound the alarm.

Unless prevented from doing so, the ejector **28** will rotate by friction contact with wheel **17** at all times. Hence, after being rotatively positioned on wheel **17** to ejecting position, it will rotate with wheel **17** and remain in such position on wheel **17** until and unless otherwise positioned. This is undesirable as it will result in the alarm sounding every 12 hours. To permit automatic alarming every 24 hours, it is necessary to have an ejector operation between the evening or silent and morning or audible 12-hour alarm periods, but no ejector action between

the morning and evening 12-hour alarm periods. Hence, other means is provided for rotatively shifting the ejector 28 from ejecting position to some non-ejecting position between the evening and morning 12-hour alarm periods. Such means consists of the resilient detainer finger 39 riveted to plate 27 and projecting into the path of rotation of ejector 28 when the latter is in the rear axial position shown in Fig. 1, but which allows such ejector to rotate by when the ejector is in the forward axial position when cam finger 24 is in cam slot 25 as shown in Fig. 2. Thus, end 38 of shutoff bar 30 when in shutoff position and stop finger 39 together with the axial and rotary movement of ejector 28 function as escapements alternately to retard and thus alternately rotatively position ejector 28 such that it performs an ejector action once in 24 hours at the desired time, whereas otherwise it would perform an ejector action every 12 hours. The sliding bar 30 therefore remains under the armature 16, preventing it from alarming at the undesired 12-hour periods, but is moved automatically by ejector action to the alarm on position following the alarm silent 12-hour intermediate period.

I will now review the operation of the mechanism during a 24-hour period, assuming that the clock is properly adjusted and set to sound the alarm at 7 a. m. Fig. 1 shows the parts at about 6 a. m. Fig. 2 shows the position of the parts just after the 7 a. m. automatic alarm on operation. Wheel 17 has rotated its cam slot into alignment with cam finger 24, and spring 26 has moved parts 19, 20, 28 and 17 to the left, so that armature 16 is free to vibrate, and is assumed to be vibrating and sounding the alarm.

In Fig. 3 it is a few minutes past 7 a. m. and the user of the clock has pushed the shutoff bar 30 in to shut off the alarm, and thus armature 16 has been raised and is prevented from vibrating.

By 9 a. m. (Fig. 4) gear 17 has ridden up to the top of cam 24 and in doing so has moved parts 17, 19, 20 and 28 back to the right, so that both wheel 20 and the high part 35 of the shutoff bar 30 are beneath the vibrator armature 16, and either will prevent it from vibrating although it rests on part 35. In the operation just described yoke 28 moves resilient stop finger 39 to the right also, so that yoke 28 is not retarded on wheel 17 at this time but rotates with such wheel until about 10 a. m., when the yoke 28 is stopped by coming against the underside of end 38 of shutoff bar 30 and the yoke is thus stopped as shown in Fig. 5, and remains in this position until 7 p. m., at which time the cam finger 24 enters the cam slot 25 in gear 17, and the parts 17, 19, 20 and 28 move to the left as shown in Fig. 6. The alarm, however, does not sound because the shutoff bar 30 is in alarm shutoff position.

In Fig. 7 at approximately 7:30 p. m., the gear 17 has started rising on cam 24. At 7 p. m. the yoke 28 was released and started to move with gear 17 so that by 7:30 p. m. it has moved part way past the end 38 of shutoff bar 30, and as the gear wheel 17 is pushed to the right or rear, the yoke 28 has started to push the shutoff bar 30 to the right or rear as shown in Fig. 7. In Fig. 8 at about 8 p. m. this action has continued far enough so that the shutoff bar 30 has snapped to the out or alarm on position as previously described. However, before shutoff bar 30 snaps to the alarm on position, wheel 20 has moved under armature part 16, and hence, the alarm does not sound. The ejector yoke 28 continues to rotate with gear 17 until one of its arms engages stop finger 39 as shown in Fig. 1. The yoke 28 is thus stopped from about 10:30 p. m. to 7 a. m. Fig. 1 shows the position of the parts at about 6 a. m. The alarm is now ready to sound and does so at 7 a. m., which returns the parts to the condition represented in Fig. 2. At the 7 a. m. alarm period, yoke 28 again starts to rotate with gear 17, but prior to 7 a. m. its rotation was stopped by finger 39 so as to reposition the yoke 28 relative to gear wheel 17 in order that when the alarm is manually shut off shortly after 7 a. m. by pushing in bar 30 as represented in Fig. 3, the ejector yoke 28 is not in position immediately to start pushing the bar 30 out again, and hence, bar 30 remains in the shutoff position until after the 7 p. m. alarm operation. Had not the yoke 28 been repositioned as described between 10:30 p. m. and 7 a. m., it would have pushed bar 30 out between 7:30 a. m. and 8 a. m., which would have caused the alarm to sound at 7 p. m.

In case the user of the alarm does not wish the alarm to sound, for example, on Sunday morning, he may push the shutoff bar 30 in at any time after about 9:30 p. m. the previous evening. Fig. 9 represents the position of the parts at about 6 a. m., but with the shutoff bar pushed in so that the alarm will not sound at 7 a. m. This will not interfere with the subsequent normal operation of the device as previously described, but merely shows the shutoff bar 30 pushed in before instead of after the 7:00 a. m. alarm period.

In case the user wishes to shut off the alarm permanently, the same shutoff bar and its supporting structure are arranged to this end, and the permanent shutoff position of bar 30 is shown in Fig. 10. Here, the outer handle end of bar 30 is swung upward in the guide slot in plate 32 against the tension of spring 37 and armature 15. A latch 40 projects from one edge of the guide slot and engages an opening 41 in the bar 30, and resiliently holds the bar in this permanent shutoff position until manually returned to a normal position. In moving the bar 30 to such permanent shutoff position, slopes 43 and 44 on the upper edge of bar 30 cooperate with a finger 45 on the slot plate to position the finger 45 in the notch of such slopes. This assures that the end 38 of bar 30 will be pulled back far enough so that it will not interfere with the rotation of ejector yoke 28, and assures positive contact between the end 16 of the vibrator armature and the upper edge of bar 30, with the armature raised where it cannot vibrate. The shutoff bar may be moved and guided to this permanent shutoff position from either the normal on or off positions, and hence, can be so positioned at any time of day or night. The bar is returned from such permanent shutoff position to a normal position by forcibly pressing down on its handle. The finger 45 and slope 43 also help to prevent accidental removal of the bar 30 by acting as a stop when the bar 30 is pulled or pushed out to the alarm on position.

When the alarm is first put into use, the alarm time is set for the desired alarm on position, and the clock is set for correct time and put into operation. The user need only pull out the manual shutoff bar 30 if it is not already in such alarm on position at some time after the evening alarm period to assure proper operation for

the first alarm period. Thereafter the clock will operate in the manner outlined above without requiring further attention on the part of the user with the exception of shutting the alarm off in the conventional manner.

It will be evident that the armature 15 instead of being vibrated by an electromagnet may comprise a switch lever which closes an alarm circuit when lowered and opens the circuit when raised. Also it could release the alarm of a conventional spring-operated alarm when lowered and lock it when raised.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A 24-hour alarm clock mechanism comprising a cam having a pair of cooperating rotary alarm initiating cam parts, one of which is driven one revolution in 12 hours and the other of which is normally stationary but is rotatively adjustable for the purpose of setting the alarm time during a 12-hour period, an alarm of the electric vibrator type including a vibratory armature and normally energized electromagnetic means for vibrating said armature, a first alarm shutoff device which is moved into the path of vibration of said armature to prevent the sounding of said alarm and out of the path of vibration of said armature to permit the sounding of the alarm in response to the operation of said cam mechanism once in each 12-hour period, a second shutoff device which is manually movable into and out of the path of vibration of said armature to prevent or permit the sounding of said alarm, and means operated by said cam mechanism for automatically moving said second shutoff device from alarm preventing to alarm permitting position once in 24 hours between selected 12-hour alarm periods.

2. A 24-hour alarm clock mechanism comprising a 12-hour cam mechanism having a pair of cooperating rotary cam parts one of which is driven at one revolution in 12 hours and is also movable axially on its axis of rotation and the other of which is normally stationary but is rotatively adjustable for the purpose of setting the alarm time during a 12-hour period, a normally energized alarm including an alarm sounding vibrator, a first alarm shutoff device which is moved into and out of the path of vibration of said vibrator once in each 12-hour period with the axial movement of said driven cam part in response to the operation of said cam, a second shutoff device which is manually movable into and out of the path of vibration of said vibrator, and an ejector escapement mechanism operated in response to the rotary and axial movement of said driven cam part for moving said second-mentioned shutoff device out of the path of vibration of said vibrator only once during each 24-hour period and at a time when the first-mentioned shutoff device is in the path of vibration of said vibrator.

3. A 24-hour alarm clock mechanism comprising an alarm, a conventional automatic 12-hour alarm mechanism for turning said alarm on for a relatively short alarm period and off for a relatively long silent period once in each 12 hours, a manual shutoff device movable between alarm on and alarm off positions for silencing said alarm after it has been turned on automatically and before it would be turned off automatically and consisting of the only means for preventing the sounding of the alarm during the next following 12-hour automatic alarm period, and ejector escapement means operated by said automatic 12-hour alarm mechanism for moving said manual shutoff device from alarm off to alarm on position only after said next following 12-hour automatic alarm period and prior to the second following 12-hour period.

4. In a 24-hour alarm clock, a 12-hour alarm mechanism comprising a gear wheel driven at one revolution in 12 hours, and forming one part of a cam, a cooperating cam member rotatively mounted adjacent said gear wheel on the same axis of rotation and rotatively adjustable for alarm time setting purposes, said parts producing a camming action and a back and forth axial movement of one of the parts once during each revolution of the gear wheel, an alarm, an automatic shutoff device for said alarm operated from alarm off to alarm on and back to alarm off position by said aforesaid camming action once during a 12-hour period at a time determined by the setting of said cooperating cam member, a manual shutoff device for said alarm movable between alarm on and alarm off positions, an ejector member rotatively mounted on the same axis of rotation as said gear wheel and in frictional driving engagement therewith and movable axially with said aforesaid axial movement for automatically moving said manual shutoff device from alarm off to alarm on position when said automatic shutoff device moves to alarm off position, and stop means effective only when said automatic shutoff device is in alarm off position for rotatively positioning said ejector relative to said gear wheel so that the described automatic movement of the manual shutoff device to alarm on position occurs only once during each 24-hour period.

5. In a 24-hour alarm clock, a 12-hour alarm control mechanism comprising a rotary and axially movable cam part driven at one revolution in 12 hours, a cooperating cam part rotatively adjustable about the same axis of rotation as said driven cam part for alarm time setting purposes, said parts performing a camming action and a back and forth axial movement of the driven cam part once during each 12 hours, an alarm, an automatic shutoff device for said alarm which is moved to and from alarm on position with said back and forth movement, a manual shutoff device for said alarm movable between alarm on and alarm off positions, an ejector yoke rotatively mounted on the same axis of rotation as said driven cam part and in frictional driving engagement therewith and axially movable therewith for moving said manual shutoff device to alarm on position when said automatic shutoff device is moved to alarm off position, and first and second stop means for alternately positioning said ejector yoke relative to said driven cam part so that it will automatically move the manual shutoff means to alarm on position only at alternate 12-hour alarm periods, said stop means being effective only when the automatic shutoff device is in alarm off position.

6. Apparatus as claimed in claim 5, in which the manual shutoff device has a portion which extends into the path of rotation of said ejector yoke only when the manual and automatic shutoff devices are in alarm off positions, and serving as one of said yoke positioning stop members.

7. A 24-hour alarm clock comprising an alarm, a movable member associated with said alarm which is normally biased to alarm operating position but which is movable to alarm off position to prevent the operation of said alarm, an automatic 12-hour alarm control mechanism operat-

ing on said movable member for turning said alarm on for a relatively short alarm period and off for a relatively long silent period once in every 12 hours, a manual shutoff device also operating on said movable member and having an alarm on position out of engagement with said movable member, a normal off position where it holds said movable member to alarm off position and a permanent off position where it also holds said movable member to alarm off position, a rotary and axially movable ejector device which is rotatively and axially moved in response to the operation of said 12-hour alarm control mechanism for moving said manual shutoff device from normal off to on position only following alternate 12-hour automatic alarm periods, said manual shutoff device having a part which extends into the path of movement of said ejector device for control thereby when the manual shutoff device is in normal manual shutoff position but which is removed from said path of movement when the manual shutoff device is in permanent off position.

8. In an alarm clock, an alarm, a pivoted lever for operating said alarm having a restrained nonoperating condition and a free operating condition, a 12-hour automatic alarm control mechanism for automatically restraining said lever in the non-operating condition for a relatively long silent time and freeing said lever for a relatively short alarm time during each 12-hour period, a single unitary manual shutoff device having an alarm on position out of contact with said lever, a normal off position where it restrains said lever in its non-operating condition and a different permanent off position where it restrains said lever in its non-operating condition, said shutoff device consisting of the only means for preventing the operation of said alarm at the normal 12-hour automatic alarm times, and ejector means under the control of said 12-hour automatic alarm control mechanism for moving said manual shutoff device to alarm on position only when it is in its normal off position, said ejector means having a 24-hour cycle of operation and performing its ejecting operation only once during each 24-hour period and at a time when said lever is restrained in non-operating condition by said automatic alarm control.

9. In a 24-hour alarm clock, an alarm, an automatic 12-hour alarm control mechanism for turning said alarm on for a relatively short alarm period and off for a relatively long silent period once during each 12 hours, said mechanism being adjustable for the purpose of setting the time of occurrence of such alarm periods, successive such alarm periods in each 24 hours of time being referred to for convenience as the morning and evening alarm periods, a single unitary manual shutoff device for said alarm movable between alarm on and normal alarm off positions for shutting said alarm off during the morning alarm period after it has been turned on automatically and before it would be turned off automatically and for preventing the automatic sounding of the alarm at the evening alarm period, and ejector means having a 24-hour operating cycle cooperating with said manual shutoff device only when the latter is in normal shutoff position and subject to the control of the 12-hour automatic alarm control mechanism for automatically moving said manual shutoff device from its normal alarm off position to alarm on position only following each evening alarm period and before the morning alarm period so that the alarm will be turned on automatically at the morning alarm periods, said manual shutoff device also having a permanent alarm off position (differing from the normal alarm off position) where it prevents the operation of the alarm at both evening and morning alarm periods and is removed from cooperative relation with said ejector means, said manual shutoff device being the only means for preventing the operation of said alarm at the morning and evening alarm periods.

10. In an alarm clock, an alarm, an automatic 12-hour alarm control mechanism for starting and stopping said alarm at predetermined times once in every 12 hours to obtain a morning alarm period and an evening alarm period, a manual shutoff device movable between alarm on and alarm off positions for stopping the operation of said alarm during the morning alarm period and consisting of the only means for preventing the operation of said alarm at the evening alarm period, and means operated by and in response to the normal 12-hour operations of said automatic alarm mechanism for moving said manual shutoff device from alarm off to alarm on position only when said mechanism performs its automatic alarm shutoff operation at the evening alarm period.

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