Jan. 26, 1965 RENÉ-PHILIPPE JACCARD 3,166,887

ELECTRIC ALARM CLOCK

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FIG. 1

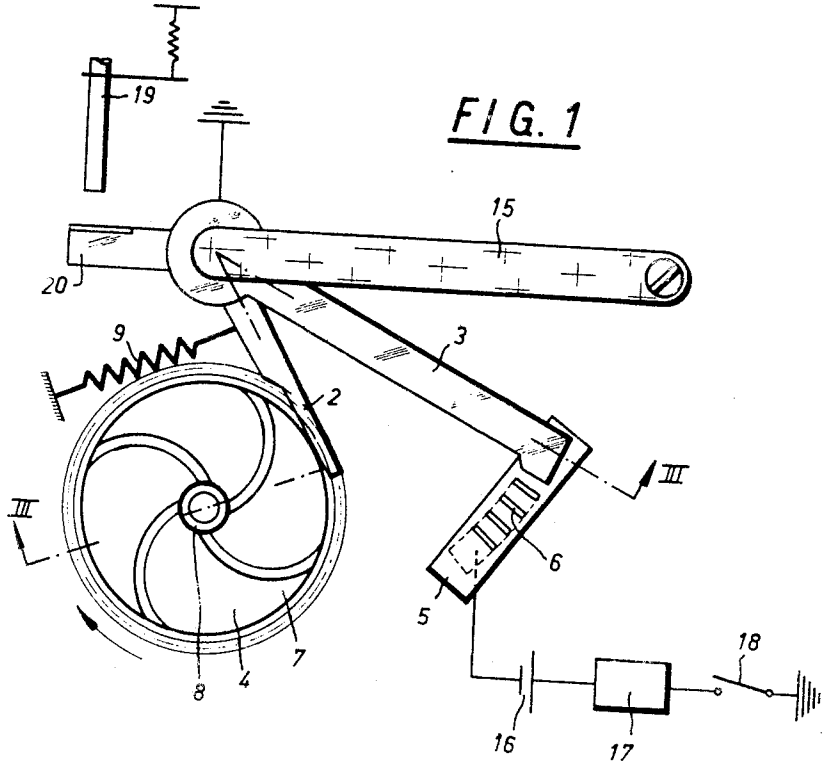

FIG. 2

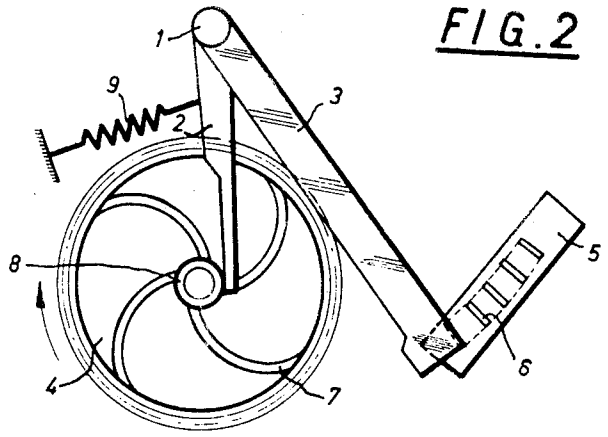

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FIG. 3

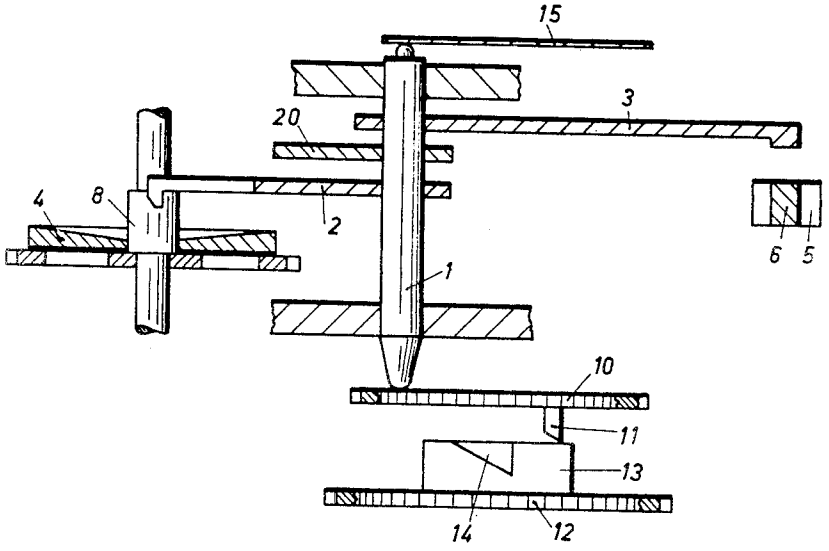
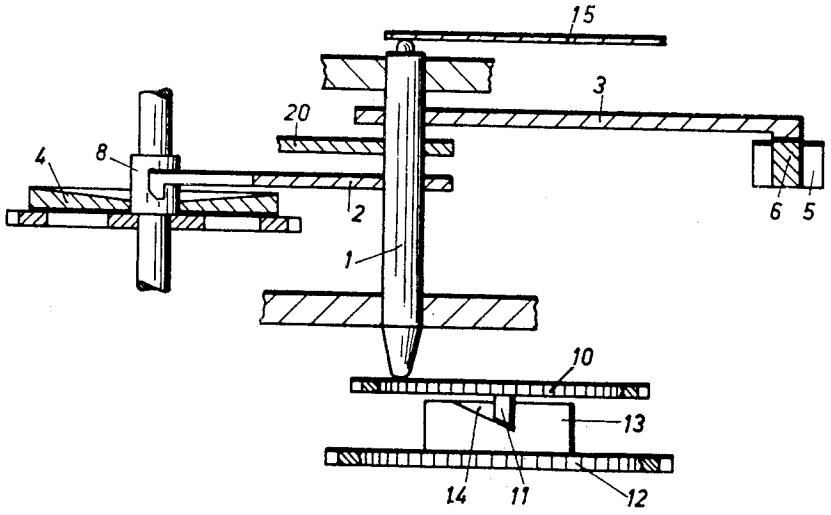


FIG. 4



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United States Patent Office

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ELECTRIC ALARM CLOCK

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10 Claims. (Cl. 58—18)

Electric alarm clocks are generally provided with releasing means which disengage the alarm mechanism once every twelve or twenty-four hours. Thus, each release allows the alarm to operate during a more or less protracted time. It is a well-known fact that a sleeper is impressed by the beginning of the ringing of a bell and it is not necessary for the ringing to last a long time for its operation to be efficient, but it would be preferable to provide an intermittent ringing.

Alarm clocks have already been made, wherein a mechanically controlled bell sounds for a short time and repeats its call until the sleeper is ready to cut off the ringing. Embodiments have also been proposed for actuating a radio or an optic system. Such arrangements show the drawback that they do not automatically stop operating.

An object of the invention is to provide an electric alarm clock with a releasing system which provides for the operation of an alarm system once every twenty-four hours. According to my invention, a rigid rod with two radial arms is rotated through action on one of its arms of a mechanism forming part of the timing or counting gearwork. The rotation causes the other arm on the rod to sweep over a series of contact-pieces inserted in parallel in an electric alarm circuit, whereby the alarm system operates each time said other arm passes over a contact-piece and is interrupted each time the arm passes over a non-conductive area between two successive contact-pieces, the number of alarm signals being defined by the number of contact-pieces provided.

I have illustrated, by way of example, in the accompanying drawings, a preferred embodiment of my invention. In said drawings:

FIGS. 1 and 2 are plan views of the alarm system for two different positions thereof,

FIGS. 3 and 4 are cross-sectional illustrations through line III—III of FIG. 1, showing the alarm system and the means for releasing same, for two different positions of the latter.

As illustrated in FIG. 1, the angularly and vertically shiftable cylindrical control rod carries radially two arms 2 and 3 of which the arm 2 engages through its reinforced outer end the periphery of a cam 4 driven by the timing or counting gearwork of the clockwork. The arm 3 the end of which is bent downwardly, engages an insulating plate 5. The plate 5 carries a plurality of contact-pieces 6 inserted in parallel in the electric alarm circuit. The cam 4 engaged by the arm 2 is constituted by a cylindrical disc over the transverse surface of which are provided four substantially spiral-shaped grooves 7 while a core 8 is provided centrally on said disc. FIGS. 3 and 4 show the cylindrical rod 1 as engaging through its tip the side of a wheel 10 of the unlocking mechanism. The unlocking mechanism is of a conventional type and includes the releasing wheel 10 carrying a depending cylindrical pin 11. The releasing wheel 10 extends above a wheel 12 and is rigid with respect to the cam 13 provided with notches 14. The wheel 10 is driven at the rate of one revolution per twenty-four hours by the motion work, whereas the wheel 12 is actuated by the alarm setting gear. The wheel 12 is therefore stationary as long as the user does not proceed with a setting of the alarm to the desired time.

When the cylindrical pin 11 on the wheel 10 drops into the notch 14 of the underlying wheel 12, the wheel 10 moves nearer the wheel 12 and the control rod 1 engaging the transverse surface of the wheel is shifted axially. The shifting is furthered by the pressure of the blade spring 15, while the spring 9 urges the arm 2 against the core 8 of the cam 4. As long as the control rod remains in its upper position illustrated in FIG. 3, a sufficient clearance separates the arm 2 from the cam and the arm 3 from the contact-pieces 6 registering vertically therewith.

An electric circuit fed by the battery 16 extends through the contact-pieces 6, the arm 3, the shaft or rod 1, the casing of the alarm clock which grounds the circuit and back through a manually controlled switch 18 and an alarm system 17; said circuit is energized upon engagement of the arm 3 with a contact-piece 6.

The operation of the alarm system is as follows:

Slightly before the moment at which the alarm is to ring, the pin 11 drops into the notch 14 and the wheel 10 sinks toward the wheel 12. The control rod follows the wheel 10 and is shifted axially so as to bring the arm 2 into contact with the surface of the cam 4 while the arm 3 sinks onto the insulating plate carrying the contact-pieces 6. The clockwise rotation of the cam 4 sets after a very short time the outer end of the arm 2 inside the inner end of one of the cam grooves 7. The arm 2 is then guided along the grooves 7 and constrains the control rod 1 to turn anticlockwise, the arm 2 moving outwardly of the cam 4. The end of the arm 3 which is thus angularly shifted, enters in succession in contact with the different contact-pieces and with the intermediate insulating areas. When the arm 3 rests on a contact-piece 6, the electric circuit is closed and the battery feeds the alarm system. Thus, by providing four contact-pieces separated by insulating areas of a suitable size, it is possible to make the alarm ring four times in succession, each time for a duration of ten seconds, for instance, with separating silences lasting ten to thirty seconds. The alarm ringing cycle comes to an end while the cam continues guiding the arm 2. Thereupon, the arm 2 is brought onto the periphery of the cam 4. The 24 hour wheel 10 continues rotating and the sloping front surface of the notch 14 urges the pin 11 upwardly, so that the wheel 10 with said pin 11 lifts the control rod 1 together with the arms 2 and 3 against the action of the spring 15.

Thus, a short time after the alarm has rung, the arms 2 and 3 are lifted and are no longer in contact with the cam 4 and with the contact-pieces 6. The spring 9 urges then the arm 2 back into its starting position against the core 8 of the cam, so that the arm 3 enters the position illustrated in FIG. 2. This is an inoperative position for which the lower depending end of the arm 2 engages only the periphery of the core 8 of the cam 4. The upper surface of the cam 4 is slightly concave, so that during its return movement towards the core 8 the arm 2 is not held back by one of the grooves 7 in the cam.

When the alarm is being set according to requirement, a knob on the outside of the casing is caused to turn, so as to drive through a gearing which is not illustrated the wheel 12 in a direction such that the pin 11 moves away from the transverse rear surface of the notch 14. If the time setting of the alarm system is performed during the ringing of the alarm or slightly afterwards, the sloping surface to the front of the notch 14 urges the pin 11 on the wheel 10 together with the control rod upwardly and the ringing is brought to an end since the arms 2 and 3 are urged away from the cooperating surfaces on the cam 4 and on the plate 5. The spring 9 returns said arms as described into the position illustrated in FIG. 2 so that the mechanism enters its inoperative position.

When the clock hands are set to time, a further knob on the outside of the casing is caused to turn so as to

control through a gearing which is not illustrated and through the motion work the 24 hour wheel 10. The pin 11 slides consequently over the flat surface of the cam 13. Said rotation is performed in a direction such that the pin does not engage the vertical rear surface of the notch 14. If the clock hands are set to time during or slightly after the bell has rung, the pin 11 slides as precedingly over the sloping front surface of the notch 14 and urges the wheel 10 upwardly together with the control rod, whereby the ringing is cut off and the arms 2 and 3 are urged away from the cooperating bearing surfaces; the spring 9 returns said arms into the position illustrated in FIG. 2 and the mechanism returns into its inoperative position.

The hand-operated switch 18 allows cutting out for long periods the operation of the alarm, whereas the pushing of the rod 19, of which one end which is not illustrated, projects outside the casing, allows a cutting of the alarm bell ringing through a speedy rotation of the control rod and of the arms 2 and 3 during the operative period of the alarm as provided through impact of the arm 19 on a further radial arm 20 rigid with the control rod 1. My invention is by no means limited to the embodiments described and it covers all other embodiments falling within the scope of the accompanying claims; in particular it is possible to adjust the number of ringing periods, their duration and the duration of the silences between said periods. The alarm system may be constituted by an acoustic generator such as a bell or a buzzer, but it may also be constituted by a generator of luminous rays, such as an intermittent light or else a combinatoon of these different arrangements. Such an alarm system may be positioned inside the casing of the alarm clock, in which case a plurality of alarm systems may be associated with a single clock.

My improved intermittently ringing alarm clock shows the advantage of repeating several times its signal and of stopping automatically said repeated signals after a predetermined period. This stopping cuts out the risk of protracting the ringing until the battery is exhausted. My improved alarm mechanism is of a sturdy and simple structure as concerns both the mechanical parts and the electric components, which ensure reliable operation with a cost price reduced to a minimum.

What I claim is:

1. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, a control rod adapted to rock round its axis, an arm radially rigid with said rod, a cam driven by the timing mechanism and adapted to angularly shift the control rod between two angular positions, a series of contact-pieces over which said arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism and means whereby the clockwork operatively interengages the cam with the control rod to angularly shift the rod between said positions and thereby make the arm sweep over said contact-pieces and produce at the time defined by the alarm time-setting mechanism, a succession of signals the number of which is equal to that of the contact-pieces.

2. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, a control rod adapted to rock round its axis, an arm radially rigid with said rod, a cam driven by the timing mechanism, a second arm radially rigid with the control rod and adapted to be controlled by the cam to angularly shift the control rod between two angular positions, a series of contact-pieces over which said first-mentioned arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism and means whereby the clockwork operatively interengages the cam with the second arm to angularly shift the rod between said positions and thereby make the first-mentioned arm sweep over said contact-pieces and produce at the time defined by the alarm time-setting mechanism, a succession of signals the number of which is equal to that of the contact-pieces.

3. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, an axially shiftable control rod adapted to rock round its axis, an arm radially rigid with said rod, a cam driven by the timing mechanism, a second arm radially rigid with the control rod and adapted to be controlled by the cam to angularly shift the control rod between two angular positions for a predetermined operative axial position of said rod, a series of contact-pieces over which said first-mentioned arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism, an axially shiftable wheel permanently controlled by the motion work and engaging through its transverse surface one end of the control rod and means whereby the alarm time-setting mechanism shifts said wheel axially between an operative and an inoperative position to shift said rod into its operative axial position for which the second arm engages the cam and angularly shifts the rod between said positions to make the first-mentioned arm sweep over said contact-pieces and produce a succession of signals the number of which is equal to that of the contact-pieces.

4. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, an axially shiftable control rod adapted to rock round its axis, an arm radially rigid with said rod, a cam driven by the timing mechanism, a second arm radially rigid with the control rod and adapted to be controlled by the cam to angularly shift the control rod between two angular positions for a predetermined operative axial position of said rod, a series of contact-pieces over which said first-mentioned arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism, an axially shiftable wheel permanently controlled by the motion work and engaging through its transverse surface one end of the control rod, a rotary member provided with a notch facing said wheel and the angular setting of which is defined by the alarm time-setting mechanism and a pin rigid with said wheel and adapted to drop into said notch at a time defined by the time-setting mechanism to thereby make the wheel drop axially out of an inoperative into an operative position to shift said rod into its operative axial position for which the second arm engages the cam and angularly shifts the rod between said positions to make the first-mentioned arm sweep over said contact-pieces and produce a succession of signals the number of which is equal to that of the contact-pieces.

5. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, a control rod adapted to rock round itis axis, an arm radially rigid with said rod, a cam driven by the timing mechanism and adapted to angularly shift the control rod between two angular positions, a series of contact-pieces over which said arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an acoustic alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism and means whereby the clockwork operatively interengages the cam with the control rod to angularly shift the rod between said positions and thereby make the arm sweep over said contact-pieces and produce at the time defined by the alarm time-setting mechanism, a succession of signals the number of which is equal to that of the contact-pieces.

6. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, a control rod adapted to rock round its axis, an arm radially rigid with said rod, a cam driven by the timing mechanism and adapted to angularly shift the control rod between two angular positions, a series of contact-pieces over which said arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an optic alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism and means whereby the clockwork operatively interengages the cam with the control rod to angularly shift the rod between said positions and thereby make the arm sweep over said contact-pieces and produce at the time defined by the alarm time-setting mechanism, a succession of signals the number of which is equal to that of the contact-pieces.

7. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, a control rod adapted to rock round its axis, an arm radially rigid with said rod, a cam driven by the timing mechanism and adapted to angularly shift the control rod between two angular positions, a series of contact-pieces over which said arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, a hand-operable switch adapted to switch off the circuit thereby to render the alarm system inoperative, an alarm time-setting mechanism and means whereby the clockwork operatively interengages the cam with the control rod to angularly shift the rod between said positions and thereby make the arm sweep over said contact-pieces and produce at the time defined by the alarm time-setting mechanism, a succession of signals the number of which is equal to that of the contact-pieces.

8. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, a control rod adapted to rock round its axis, an arm radially rigid with said rod, a cam driven by the timing mechanism and adapted to angularly shift the control rod between two angular positions, a series of contact-pieces over which said arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism and means whereby the clockwork operatively interengages the cam with the control rod to angularly shift the rod between said positions and thereby make the arm sweep over said contact-pieces and produce at the time defined by the alarm time-setting mechanism, a succession of signals the number of which is equal to that of the contact-pieces.

9. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, a control rod adapted to rock round its axis, an arm radially rigid with said rod, a cam driven by the timing mechanism and adapted to angularly shift the control rod between two angular positions, four contact-pieces over which said arm is adapted to sweep in succession upon angular shifting of the rod between said positions, an alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism and means whereby the clockwork operatively interengages the cam with the control rod to angularly shift the rod between said positions and thereby make the arm sweep over said contact-pieces and produce at the time defined by the alarm time-setting mechanism, a succession of four signals.

10. In an alarm clock, the combination of a motion work, a timing mechanism adapted to be driven by the latter, an axially shiftable control rod adapted to rock round its axis, an arm radially rigid with said rod, a rotary cylindrical cam provided with a concave transverse surface in which a plurality of arcuate grooves are formed between its center and periphery, a second arm radially rigid with the control rod and including at its outer end a depending section adapted for a predetermined operative axial position of the rod, to be guided by a cooperating arcuate groove from the center to the periphery of the cam to thereby shift the control rod between two angular positions, a mentioned arm when in its operative axial position, is adapted to sweep in succession upon angular shifting of the rod between said poistions, an alarm system, an electric alarm circuit feeding said alarm system in parallel over said contact-pieces, an alarm time-setting mechanism, an axially shiftable wheel permanently controlled by the motion work and engaging through its transverse surface one end of the control rod, means whereby the alarm time-setting machine shifts said wheel axially between an operative and an inoperative position to shift said rod into its operative axial position for which the second arm engages the cam and angularly shifts the rod between said angular positions to make the first-mentioned arm sweep over said contact-pieces and produce a succession of signals the number of which is equal to that of the contact-pieces, elastic means returning the outer end of the second arm into substantially axial registry with the center of the cam and further elastic means urging the tip of the control rod into engagement with the wheel.

No references cited.

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