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2,396,947

ALARM CLOCK

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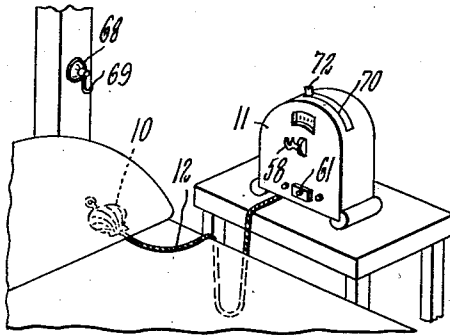


Fig. 1.

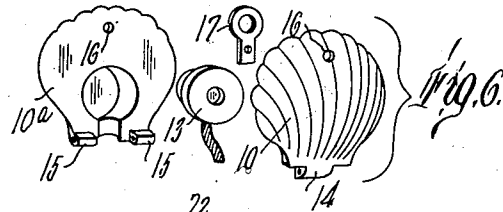


Fig. 6.

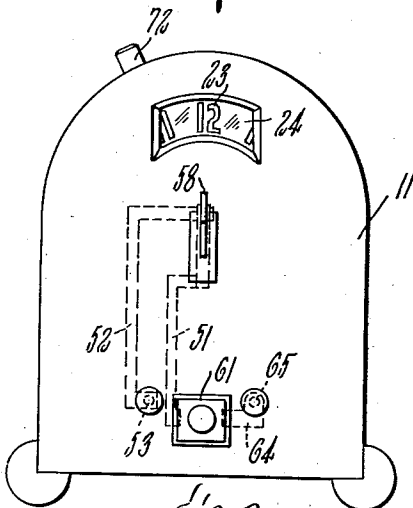


Fig. 2.

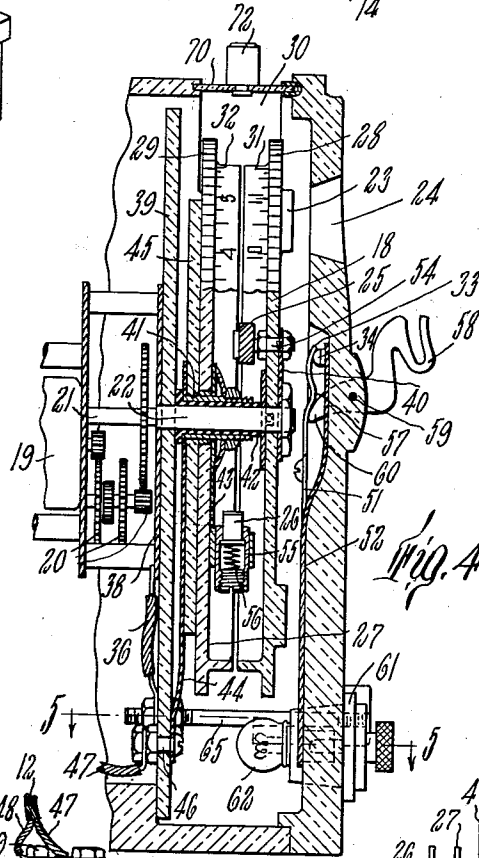


Fig. 4.

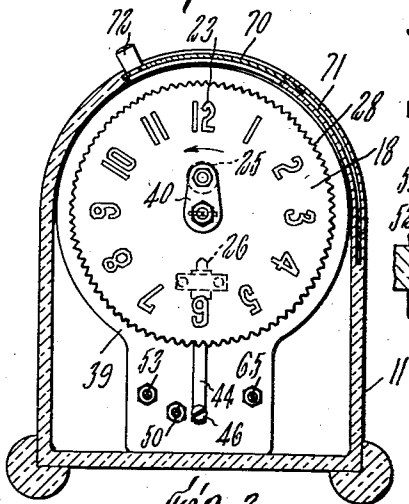


Fig. 3.

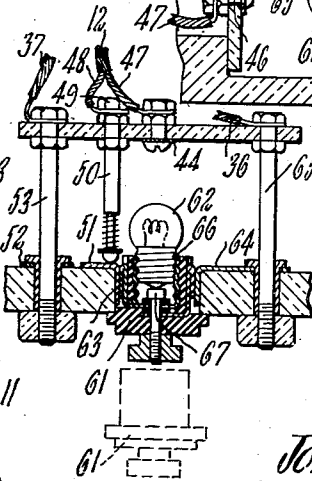


Fig. 5.

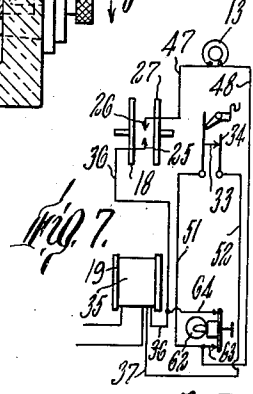


Fig. 7.

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UNITED STATES PATENT OFFICE

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ALARM CLOCK

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7 Claims. (Cl. 58—19)

An object of the present invention is to provide an alarm in connection with a timepiece, particularly adapted for the use of deaf people to arouse them from sleep. A related object is to provide an alarm for this purpose which may be made virtually inaudible to all except the person who wishes to be aroused by it. These objects are accomplished by providing an electrically actuated sound-making device, such as a buzzer, capable of being placed under the sleeper's pillow and operable through the medium of an electrical conductor or cord by a clock at more or less distance from the sleeper.

Further objects are to provide means whereby an electrically driven clock will set such an alarm into action; to provide means whereby the alarm instrument may be supported where it is not muffled by a pillow, and other supporting means for the alarm device adapted to disconnect the control circuit when said device is supported by it; to provide means for adjusting the time at which the alarm will operate; and to provide for illuminating the clock dial. All of these, and other objects, are accomplished by the electric clock and alarm and illuminating devices illustrated in the drawing furnished herewith and described in the following specification.

In the drawing—

Figure 1 is a perspective view showing a portion of a bed and pillow thereon, an alarm device under the pillow, and a clock at a distance from the alarm device in operating connection therewith by an electric cable.

Figure 2 is a face view of the clock shown in Figure 1, with illustration by broken lines of part of the electrical connections therein.

Figure 3 is a face view of the clock dial, the case of the clock being shown in section.

Figure 4 is a vertical section through the clock case, dial, and time-setting means for the alarm, a part of the driving mechanism being shown in elevation.

Figure 5 is a fragmentary sectional view taken on line 5—5 of Figure 4.

Figure 6 is a dismembered view of one form of alarm device suitable for use as one of the elements of this invention.

Figure 7 is a diagram of the electrical connections and circuit-controlling means of the electric clock and alarm combination.

Like reference characters designate the same parts wherever they occur in all of the figures.

In the present illustrative embodiment of the invention the alarm device is shown at 10 and is connected with a clock 11 by cord 12 containing

electrical conductors. The alarm device may be any one of a number of available noise-making instruments, all of which are preferably electrically operated. The one which I have adopted, and show conventionally in Figure 6, is a commercial electric buzzer. It is enclosed for use in a two-part housing, of which the parts are designated 10 and 10a in Figure 6, which are detachably connected together by a pin passing through registering lugs 14 and 15 on these parts and by a pin or screw passing through a hole 16 in each of the parts. A ring 17 is secured between the parts of the housing by the same pin or screw. This ring serves as a hanger whereby the alarm device may be suspended from a hook.

The clock or timepiece with which the alarm device is combined includes novel and useful features which I claim as my invention. The time-indicating part of the clock is a dial or disk 18 driven rotatively by a synchronous electric motor 19 through gearing shown collectively at 20 and a main shaft 21. The disk 18 is secured to a sleeve 22 which has a frictional engagement with the shaft 21 of suitable character to transmit rotation from the shaft to the disk and also permit the disk to be rotated independently for setting to the correct time. The disk carries on its outer face a series of time indications 23 arranged concentrically around its axis, which designate the hours, and permissibly also minutes or other fractions of hours, of which the indications successively showing the present time are exposed to view through a window 24 in the front wall of the case. This disk carries on its rear side a contact 25 which forms one of the complemental contacts of a circuit closer by which the alarm device is caused to sound. The complemental or cooperative contact 26 of the circuit closer is carried by a disk 27 which is normally stationary but is adapted to be turned about the axis of the time-indicating disk for determining the moment at which the alarm will be sounded; in other words, for setting the alarm.

The disks 18 and 27 have toothed or notched rims 28 and 29 which are accessible through an opening 30 in the top side of the clock case; the teeth or serrations serving to facilitate turning of the disks by a finger of the operator or a tool inserted through the opening 30. The disks also are provided with coaxial ribs or flanges 31 and 32 projecting toward one another and each preferably bearing on its outer circumference numerals or other indications by which the interval between the time of setting the alarm and

the time when it will sound may be measured and indicated. For convenience, these indications are made in terms of hours and fractions of hours and are correlated with the indications on the face of the time disk and the positions of the contacts 25 and 26 so that the indication at the uppermost point of the flange 31 will be the same as that exposed to view at the center of the window 24, and the indication at the topmost point of flange 32 will show the time when the alarm will sound. As these parts are located in the illustrative drawing, the indication of present time is twelve o'clock and the alarm is set to sound at six o'clock.

The contacts 25 and 26 are connected electrically with a source of current and the alarm device through normally closed but separable contacts 33 and 34, and conductors substantially as shown diagrammatically in Figure 7. The current for operating the alarm device is taken from the magnet winding 35 of the clock motor 19, the terminals of the conductors 36 and 37 being tapped into the winding at points between which there is a difference of potential, less than that of the service current by which the clock is driven, suitable for actuating the alarm device. Or these conductors may be connected in a secondary winding in which current of suitable voltage is induced by that in the main winding of the motor. For the purpose of this description, winding 35 is considered as the source of current for actuating the alarm device, and typifies any and all sources suitable for that purpose. Conductor 36 leads to contact 25 of the circuit closer, being connected therewith by a conductive strip 38 secured to a plate 39 of insulating material, which forms part of the clock movement frame, the sleeve 22, which is in electrical connection with strip 38, and an arm 40, in electrical connection with this sleeve and the contact 25, lying against the outer face of disk 18. It may be noted at this point that the disks 18 and 27 are made of insulating material and that the alarm-setting disk 27 is mounted to turn on a bushing or sleeve 41, of conductive material, which surrounds the sleeve 22 and is insulated therefrom by an intermediate sleeve 42 of insulating material, or equivalent means.

The contact 26 of the circuit closer is electrically connected to a metallic strip 43 lying against the disk 27 and extending into electrical connection with the sleeve 41; and a metallic strip 44, connected with sleeve 41, extends along a stationary plate 45 of insulating material to connection with a binding post 46. A conductor 47 leads from this binding post to one terminal of the alarm device 13, and is one of the conductors forming the cord 12.

The other conductor in this cord, shown at 48 in the diagram, leads to a binding post 49 having an extension 50 of conductive material which bears against a conductive strip 51 on the rear surface of the front wall of the clock case. This strip carries at its extremity the contact 33 of the circuit breaker previously described. The complementary contact 34 of this circuit breaker is carried by a metal strip 52 which extends along the rear surface of the clock case front wall and is connected with a post 53 to which the terminal conductor 37 is connected. Thus, if the contacts 33 and 34 are closed together, the circuit through the current source and alarm device is closed when the contact 25 engages contact 26.

In order to ensure a good electrical contact

between these members, contact 25 is made as a knurled roll rotatably supported on a pin 54 secured in the disk 18 and to which one end of the strip 40 is secured; and the contact 26 is a conductive plunger mounted slidably in a conductive socket or thimble 55 which is connected to the conductive strip 43. Said plunger is forced toward the axis of the disks by a spring 56 reacting against an abutment at the outer end of the socket. The roller 25 travels between the inner end of the contact plunger 26 and the axis of the disks, and it is set so that its outer side comes to bear on the end of the plunger and rolls across the latter, forcing the plunger outward and being itself rotated by the traction of the plunger end. This arrangement accomplishes the purpose of making a good electrical connection between the contact members without causing the traveling contact 25 to exert any considerable force tending to rotate and thereby displace the disk 27.

The circuit interrupter constituted by the contacts 33 and 34 is provided so that the alarm circuit may be made inoperative under control of the alarm device itself at such times as it is desired that no alarm will be sounded. The strip 51 is resilient and is mounted and secured as a spring at a point near to the extremity which forms the contact 33. It has an outward offset at 57. A hook 58 is mounted in the front wall of the clock case by a pivot 59 and has a tail 60 projecting through said wall into engagement with the strip 51 below the offset 57. These parts are so arranged that the offset acts on the tail of the hook, by virtue of the resilience of the spring, to hold the hook normally in its raised position, and to raise it after being depressed, the contact 33 being then in engagement with the contact 34; and the tail 60 is disposed as a cam element to displace contact 33 from its circuit closing position when the hook is depressed. The alarm device, when intended to be made inoperative, is hung by means of its eye 17 on the hook 58, and its weight then depresses the hook and causes the tail 60 to be raised, thereby breaking the circuit as described.

The electrical connections precedently described form parts of a circuit by which a removable electric lamp may be activated to illuminate the dial or disk 18. In the front wall of the clock case there is an opening in which a plug 61 carrying an incandescent lamp 62 may be placed, and from which it may be withdrawn. A lug 63 extending from the strip 51 lies against one side of that opening, and the terminal portion of a strip 64 lies against the opposite side of the opening. Strip 64 is connected by a binding post 65 with the circuit conductor 36 previously described. The plug 61 has a conductive lamp socket 66 and a conductive stud 67, arranged to make contact with the lamp terminals in the common manner, which have external connections arranged so as to make contact with the lug 63 and strip 64 respectively, when the plug is inserted in its opening. The conductive portions of the plug and intermediate bodies of insulation are clearly shown in Figure 5 and need no further detailed explanation.

For the use of deaf persons, and also in situations where it is desired to muffle the noise of the alarm, the alarm device is placed under the pillow of a bed, as shown in Figure 1, where it will be close to the ear of a sleeper resting on the pillow, and thus easily heard even if the sleeper is hard of hearing. The cord 12 may be

as long as may be desired and the clock may be placed at any desired location, near to or remote from the sleeper. This combination affords an effective audible time indicator of which the audibility is or may be limited to the one person who needs to be awakened at a given hour.

In order that the alarm may be mounted so as to send forth its noise more loudly and widely, I have provided a suction cup 68 and an attached hook 69 to be mounted on a bed post or other non-porous surface, from which the alarm device may be suspended by its ring 17.

The opening 30 in the top of the clock is normally covered by a shutter 70. The shutter is preferably made of a flexible, relatively thin sheet of plastic or metal entered at its opposite edges in guideways in the parts of the frame which bound the opening 30. The frame contains an extension of the guideways beyond the end of the opening, as shown at 71 in Figure 3, which permits the shutter to be moved endwise back and forth to cover and uncover the opening. A handle stud 72 is secured to the shutter to facilitate so moving it. Where the top of the case is smoothly curved and tangent to straight side walls, as shown in these drawings, the flexibility and resiliency of the shutter enable it to be bent in conformity with that curvature and cause it to exert pressure on the walls of the guideways, whereby it is held frictionally in either its closed or open position.

In addition to the utility and advantages previously mentioned as inherent in the invention, there are the following advantages.

The housing of the alarm device is formed with ribs and grooves on its outer faces, as appears plainly from Figure 6 of the drawing, which have the effect of preventing this device from slipping and sliding when laid under the pillow. In other words, it is a non-slip design.

The construction and arrangement of the disks 18 and 27 and the opening 30 in the clock case enable the clock to be set for showing the correct time and for sounding of the alarm without the use or need of any external setting means, such as the knobs or handles which have heretofore been commonly provided in connection with alarm clocks at the back of the case.

The lamp-carrying plug 61 with its lamp socket and terminal stud is highly useful for the facility it affords for removing and replacing or renewing the lamp.

What I claim and desire to secure by Letters Patent is:

1. The combination with a clock having a movable time indicator, of a source of electric current, an alarm device external to the clock and operable by electric current, a circuit-closing member carried by said time indicator, a cooperative circuit-closing member normally stationary and adapted to be placed at different points along the path of the first named circuit-closing member, a normally closed circuit breaker, conductors connecting said current source, alarm device, circuit-closing members and circuit breaker in an electric circuit, and a supporter movably mounted on the clock structure adapted to support the alarm device and arranged to be shifted by the weight of the alarm device when supported thereby, said supporter having means for actuating said circuit interrupter to break the circuit when so shifted.

2. The combination with a clock having a movable time indicator, of a source of electric current, an alarm device external to the clock

and operable by electric current, a circuit-closing member carried by said time indicator, a cooperative circuit-closing member normally stationary and adapted to be placed at different points along the path of the first named circuit-closing member, a normally closed circuit breaker, conductors connecting said current source, alarm device, circuit-closing members and circuit breaker in an electric circuit, a hook pivoted on the clock structure adapted to support the alarm device, said hook being normally held in a raised position and being depressible by the alarm device when supported thereby, and the hook having a projection arranged to actuate the circuit breaker to interrupt the circuit when the hook is so depressed.

3. A clock having a rotatable time indicator, a circuit closing member constructed as a roller carried by said time indicator at a distance from the axis of rotation thereof and being rotatable relatively to the indicator, a carrier for a cooperative circuit closing member mounted for adjustment rotatably about the axis of rotation of the time indicator, a cooperative circuit closing member mounted on said carrier constituted by a socket secured to the carrier and a slidable plunger mounted in said socket under pressure normally holding its extremity in the path of a portion of the circumference of said roller and so situated that the roller will bear on said extremity in the course of a revolution of the time indicator, and electrical conductors mounted upon the time indicator and holder in connection with the respective circuit closing members and with a source of electric current.

4. The combination with a clock having a normally closed electric switch, of an electric alarm device external to the clock in circuit connection with said switch, and a supporter movably mounted on the clock structure adapted to support the alarm device and arranged to be shifted by the weight of the alarm device when the latter is supported thereby, said supporter having means for opening said switch when so shifted.

5. The combination of a switch making alarm clock, an electric alarm device external to the clock, a supporter movably mounted on the clock structure adapted to support the alarm device and being shiftable by the weight of the latter when so supported, and means operable by said supporter when so shifted for controlling the circuit of the alarm device.

6. The combination with a clock, of an electric alarm device external to the clock and movable relatively thereto, switch contacts mounted on the clock structure in circuit connection with the alarm device, one of said contacts being a spring normally engaging the other contact, and a supporter movably mounted on the clock structure adapted to support the alarm device, said supporter having a portion engaged with said spring contact so arranged that the spring contact holds the supporter in the raised position when engaged with the other contact, the supporter being depressible by the weight of the alarm device against the spring pressure and its portion which engages the spring contact being then operable to displace that contact from the other contact.

7. An electric alarm clock comprising an electric motor having a field winding, a time indicator in driven connection with said motor, an electric alarm device external to the clock, a circuit for supplying current to said alarm device

at suitable voltage therefor comprising a secondary winding associated with said field winding to have current induced in it by the current flowing through said field winding, a circuit closer in said circuit operable in synchronism with said time indicator for causing the alarm to sound, a supporter movably mounted on the

clock structure having means to support the alarm device and being shiftable by the weight of the latter when so supported, and means operable by said supporter when so shifted for controlling said circuit.

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