

Jan. 28, 1947.

B. REGENSTEINER ET AL

2,414,835

CLOCK CONTROLLED MECHANISM

Filed Feb. 12, 1945

FIG. 2

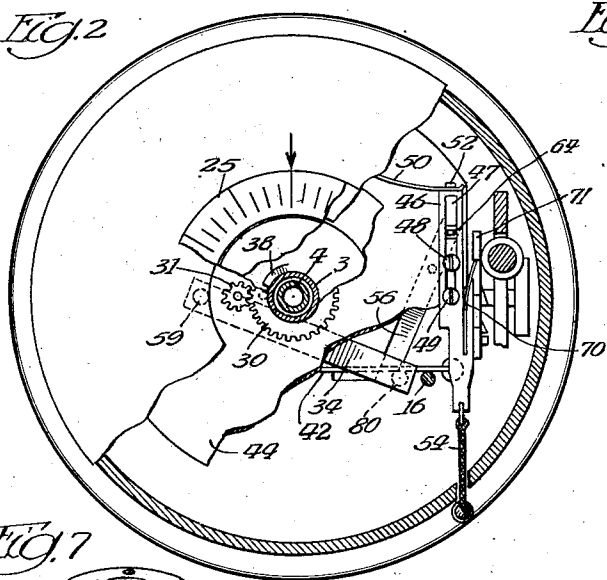


FIG. 1

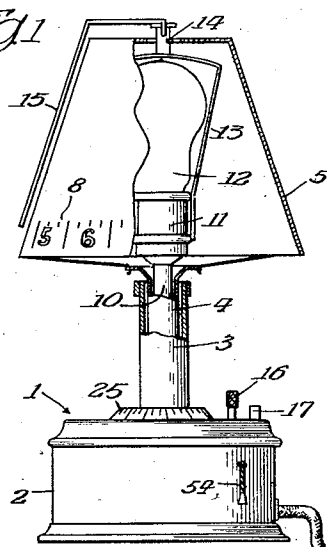


FIG. 7

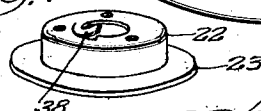


FIG. 4

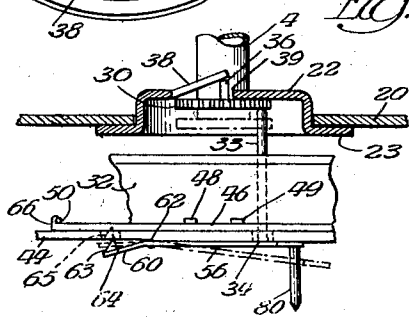


FIG. 3

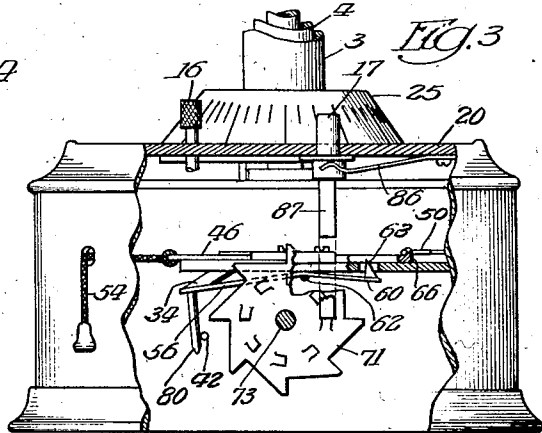


FIG. 5

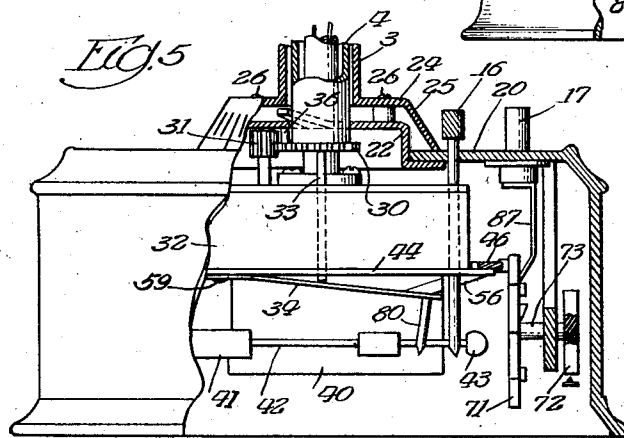
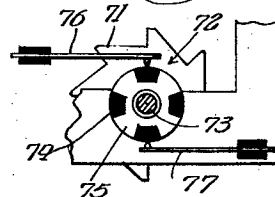


FIG. 6



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UNITED STATES PATENT OFFICE

2,414,835

CLOCK CONTROLLED MECHANISM

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Application February 12, 1945, Serial No. 577,505

6 Claims. (Cl. 58—19)

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This invention relates to clock controlled mechanisms and more particularly to an improvement in the time controlled means for turning on or off an electric lamp or an alarm, or both, especially of the type shown in British Patent No. 380,624 of September 22, 1932.

It is one of the objects of the present invention to provide an improved clock released trip means which operates an electric switch to turn the light on or off, and which may be arranged to operate an alarm. In the preferred embodiment of the present invention the clock operates a shaft or tube which supports the lamp shade. A manually rotatable plate or escutcheon surrounds the clock operated tube where the tube joins the base of the lamp. The escutcheon positions a pin-receiving depression or opening which receives a pin carried by a plate or gear on the clock operated tube. When the clock operated tube reaches a position set for it by the manually rotated escutcheon a spring pressed pin moves upwardly, thus releasing a manually set spring operated pawl which advances a ratchet of an electric switch one step. The electric switch controls the circuit for the lamp and/or other electrical devices. The same pin also actuates an alarm release.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawing forming a part thereof.

In the drawing:

Figure 1 is a front view of a clock embodying the present invention, with certain parts thereof broken away to illustrate the interior construction;

Figure 2 is an enlarged top view of the structure of Figure 1 below the lamp shade, with certain parts broken away to illustrate progressively different parts of the mechanism;

Figure 3 is a side view of the base with parts broken away to illustrate the interior construction;

Figure 4 is a fragmentary view illustrating the manner of action of the trip mechanism;

Figure 5 is a view similar to Figure 3 but with the base turned through an angle of 90°;

Figure 6 is a fragmentary view of the electric commutator switch of the present clock lamp; and

Figure 7 is a perspective view of one of the parts of the mechanism.

The lamp 1 of the present invention comprises a base 2 of a generally circular cross section from

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which extends upwardly a tube 3 which, during normal use of the lamp, is stationary with respect to the base but which may be manually rotated about its longitudinal axis, as will be more fully set forth as this description proceeds. Extending through the tube 3 is a rotatable hour hand tube 4 which is so geared to a clock mechanism within the casing 2 as to make one complete revolution in exactly twelve hours. The tube 4 supports a lamp shade 5 which is rotatable therewith and is calibrated by being divided into twelve equal and consecutively numbered parts designating the respective hours, as indicated at 8, each division being further sub-divided into approximately four parts designating the quarter hours. Within the rotatable hour hand tube 4 is a stationary tube 10 which supports an electric lamp socket 11 for an electric lamp 12 and also provides space within it for a pair of electric wires for furnishing energy to the lamp 12. Mounted on the socket 11 is a wire yoke 13 that supports a stationary spindle 14 that carries a stationary pointer 15 which extends downwardly into the region of the calibrated movable scale 8. Extending above the lamp base 2 is a vertically slidable on and off alarm pin 16 and a vertically slidable switch actuating pin or button 17, both of which will be more fully described as this specification proceeds.

The base 2 consists of a cylindrical casing open at the bottom and closed at the top by a closure 20, the top closure having a central opening therein. An inverted circular cup-shaped member 22 is inserted through the opening in the top 20 and has a peripheral flange 23 of spring material bearing against the under side of the top 20. The tube 3 has at its lower end a peripheral flange 24 (Fig. 5) terminating in a frusto conical escutcheon 25 that embraces and overhangs the part of the cup-shaped member 22 that extends through the opening 20. The circular flange 24 of the tube 3 is secured to the member 22 as by screws 26. The bottom of the frusto conical portion 25 rests upon the top 20 of the base 2 and thus holds the cup-shaped member in place. By tightening of the screws 26 the cup-shaped member is pulled upwardly so that its bottom flange is in spring pressure engagement with the under side of the top 20 of the base. It is in frictional engagement with the base so that upon turning of the tube 3 the cup-shaped member 22 turns with it and is held by friction in its adjusted position. The outer surface of the frusto conical escutcheon 25 is calibrated by being divided into twelve equal parts each representing one hour

and each of which is further sub-divided into four equal parts representing, respectively, quarter hour intervals.

The hour hand shaft 4 has a spur gear 30 at the bottom thereof, which spur gear is in mesh with a pinion 31 that is driven by an electric motor actuated gearing 32 at such a speed that the gear 30 makes one complete revolution per twelve hours. The gear 30 is constantly pushed upwardly by a vertically slidable pin 33 the bottom of which is constantly pressed upwardly by a leaf spring 34. A short pin 36 secured to the top surface of the gear 30 slides along the under surface of the inverted circular cup-shaped member 22 and thus limits the extent of vertical upward movement of the rotatable hour hand tube 4. The top periphery of the inverted circular cup-shaped member 22 has a cut and upwardly bent tongue 38 therein. When the pin 36 in its movement rides past the edge 39 it snaps up into the hole formed by the bent up part 38 and rises therein under the lifting action of the pin 33, which then permits the spring 34 to rise. As the tube 4 continues to turn, the pin 36 gradually slides down on the inclined lower surface of the tongue 38, thus drawing the tube 4 downwardly to its normal position and restoring the pin 33 and the spring 34 to the positions illustrated in Figure 5. It is thus apparent that once during each revolution of the hour hand tube 4 the tube will rise and permit the spring 34 to move from the position illustrated in Figure 5, which is the dotted line position illustrated in Figure 4, to the full line position illustrated in Figure 4. The particular time of the day when this action takes place will be determined entirely by the angular position of the inverted circular cup-shaped member 22 which, as previously stated, is manually adjustable. By turning the tube 3, which carries with it the member 22, the position of the member 22 is manually adjustable to bring about the temporary release of the spring 34 from the position illustrated in Figure 5 to that of Figure 4 at any desired time of the day. The calibrated scale on the conical member 25 indicates the time of the day when this action will take place.

An electric clock motor, indicated in general by the reference numeral 40, is mounted on the inside of the base 2 in any desired manner. Any standard type of electric clock motor may be used. The clock motor preferably is of the type that has a buzzer or alarm 41 which is continuously electrically energized whenever the motor is energized, and tends to operate the vibrating wire 42 having a short weight or buzzer 43 at one end. Arrangements are provided for preventing vibration or oscillation of the wire 42 notwithstanding the fact that the buzzer is being electrically energized, which will be described as this description proceeds. On the top of the motor mechanism 40 there is mounted a flat brass plate 44 of a generally circular shape. This plate supports, on its upper side, the step down gearing 32.

On the top of the plate 44 there is mounted a slide 46. The slide has a rectangular lengthwise extending slot 47 therein and is held on the plate by the heads of two screws 48—49, the shanks of which pass through the slot 47 and thread into the plate 44, and the heads of which rest on the slide 46 and thus hold the slide on the plate while permitting the slide freedom of longitudinal movement within the limits of the length of the slot 47. A wire spring 50 is mounted

at one end on the top of the plate 44 and at the opposite or free end bears against a projection 52 on the slide 46 and thus constantly urges the slide to its released position, which is the position illustrated in Figure 2. The slide may be moved to its operative position by means of a flexible cable 54 one end of which is secured to the slide, as illustrated in Figure 2, and the opposite end of which extends through an opening in the casing so that by manually pulling on the cable 54 the slide is moved to its alternate position against the action of the spring 50.

Means is provided for releasably latching the slide 50 in its operative position and holding it in that position against the action of the spring 50 which constantly tends to return it to its normal position, illustrated in Figure 2. The latching means is secured to the under side of the plate 44 and comprises a short leaf spring 56 one end of which is free and the opposite end of which is rigidly secured to the end of the leaf spring 34. The opposite end of the leaf spring 34 is rigidly secured to the under side of the plate 44 as by a screw 59. The spring 34 is a straight spring whereas the spring 56 is a bent leaf spring. The forward end 60 of the spring 56 has been bent downwardly out of the plane of the rest of the spring 56, as is illustrated in Figure 4. At the juncture of the bent portion 62 with the rest of the spring 56 there is located a short protuberance 62 which bears against the under side of the plate 44 and acts as a fulcrum for the spring 56. At the forward end of the bent part 60 there is welded or otherwise secured a catch 63, one face 64 of which is at right angles to the surface 65 and the opposite face of which is beveled, as may be seen from Figure 4. A hole 66 is provided in the plate 44 immediately above the catch 63. When the spring 56 is in its normal or released position the top of the catch 63 is below the top of the plate 44 and therefore the catch 63 does not interfere with the sliding movement of the slide 46. The pin 33 rests upon the spring 34 and is constantly urged upwardly by the spring 34 and in turn forces the spring 34 downwardly at all times except when the gear 30 is in the position illustrated in Figure 4.

When the pin 33 forces the spring 34 downwardly from the position illustrated in Figure 4, the spring 56 is moved downwardly at its juncture with the spring 34. The spring 56 pivots about the fulcrum 62 under the natural resiliency of the spring 56 to move the catch 63 upwardly through the opening 66 in the plate 44 and into the opening 47 in the slide 46. If now the slide is pulled forward until the back end 65 of the slide passes the catch 63 and then released, the upright surface 64 of the catch will bear against the back of the slide and hold the slide against retraction by the spring 50. As the clock operates, the gear 30 rotates and once during each twelve hours the pin 36 on the gear 30 comes to the edge 39 of the opening in the inverted circular cup-shaped member 22. The spring 34 then acting upwardly on the pin 33 causes that pin to force the gear 30 upwardly to the position illustrated in Figure 4. The upward movement of the spring 34 causes a corresponding downward movement of the catch end of the spring 56, thus withdrawing the catch from behind the back 66 of the slide 46 so that the slide then returns to the position of Figures 2 and 4 under the action of the spring 50. The slide 46 has a pawl 70 thereon which engages a tooth on a ratchet wheel 71 rotatably mounted in the base

2, and advances the ratchet wheel one notch. The ratchet wheel rotates a commutator 72 which is mounted on the same shaft 73 that carries the ratchet 71. The commutator consists of alternate segments of insulation 74 separated by intervening alternate segments of conducting material 75, the conducting segments being all electrically connected together. Brush contacts 76—77 (Fig. 6) have sliding engagement with the commutator 72. When the brush contacts are resting on the insulating segments there is no circuit between them whereas when they are resting on the conducting segments there is a circuit between them. These brush contacts are in series with the electric lamp 12.

Two separate means are provided for preventing audible operation of the buzzer 41. One of these means consists of the pin 16 which is slidably mounted in the top 20 of the base 2 and extends downwardly through an oversized hole in the plate 44 and is movable into and out of the path of movement of the vibrating wire 42. When the pin 16 is in its lowered position, as illustrated in Figure 5, it bears against the wire 42 and holds the same against vibration. Therefore there is no audible signal. When the pin 16 is pulled upwardly it clears the wire 42 and thus is out of position of interference with vibration of this wire. The other means consists of a pin 80 on the under side of the spring 34. When the spring 34 is in the position illustrated in Figure 5 the pin 80 is in the path of movement of the wire 42 and holds that wire against vibration. When the spring 34 moves upwardly to the position illustrated in Figure 4 it draws the pin 80 upwardly and out of interference with the vibrating action of the wire 20, which wire may then vibrate if the pin 16 has previously been pulled upwardly to position it out of interference with the vibrating action.

An explanation will now be given of the manner of operation of the apparatus thus far described. Assume that it is desired to turn on the light and to actuate the buzzer alarm at any specific time, say, 8:00 o'clock. The tube 3 is then turned manually to bring the 8:00 o'clock marking on the escutcheon 25 opposite an index point marked on the top of the base 2. The turning of the tube 3 results in turning of the inverted circular cup-shaped member 22 thus locating that member in such a position that the pin 34 of the hour hand spur gear 30 will come past the point 39 of the member 22 at exactly 8:00 o'clock. This fixes the time of operation of the mechanism. The pin 16 is then pulled upwardly out of engagement with the vibrating wire 42 so that now only the pin 80 on the spring 34 prevents the vibration of the wire 42. The cable 54 is pulled outwardly of the casing until the end 66 of the slide passes the catch 63 on the spring 56. The catch 63 then bears against the end 66 of the slide 46 and holds the slide against retraction. The apparatus is now in the position illustrated in Figure 5, except that the pin 16 has been elevated to bring the bottom thereof above the wire 42. The pinion 31 drives the gear 30 which drives the hour tube 4. As the hour tube rotates it will, ultimately, at 8:00 o'clock come to a position such that the pin 36 on the spur gear 30 comes opposite the cut part 39 in the member 22. The pin on the spur gear 30 and the hour tube 4 are thus permitted to rise to the position illustrated in Figure 4 under the action of the pin 33, which is pushed upwardly by the spring 34. In that position the gear 30 is still

in mesh with the pinion 31. When the spring 34 rises from the position illustrated in Figure 5 to that illustrated in Figure 4 it raises the pin 80 out of position holding the wire 42, hence the wire 42 commences to vibrate due to the fact that it is continuously electrically energized by the motor mechanism 40. This gives an audible alarm. At the same time the end 60 of the spring 56 is retracted to the position illustrated in full lines in Figure 4, thus retracting the catch 63 from behind the end 66 of the slide. The slide then returns to the position illustrated in Figure 2, under the action of the spring 50. This movement of the slide causes the pawl 79 which is on the slide to advance the ratchet wheel 71 one step. If the commutator was previously in a position such that its insulating segments were engaged by the brushes 76—77 this turning of the commutator will bring its conducting segments into engagement with the brushes, thus turning the light 12 on. On the other hand, if at the time of actuation of the commutator 72 the brushes were in contact with conducting segments of the commutator this movement of the commutator will bring the insulating segments into engagement with the brushes and the light will be turned off. It is thus apparent that the movement of the slide 46 actuates the commutator to bring the light from an off to an on position, or from an on to an off position. As the clock continues to operate, the pin 34 on the gear 30 will ride on the under side of the inclined upwardly projecting tongue 38 on the member 22, thus gradually forcing the gear 30 and with it the tube 4 downwardly from the position illustrated in full lines in Figure 4 to the dotted lines in that figure. At that time the pin 80 will be brought back into abutment with the vibrating wire 42 and stop the audible alarm. The catch 63 will move back through the opening 65 in the plate 44 and extend into the opening 47 of the slide. The slide 46, however, remains in its retracted position unless it is manually reset. Thereafter the clock will not operate the light unless the slide 46 is reset. The clock will, however, give an audible alarm every twelve hours, unless and until the pin 16 is pushed downwardly to prevent the automatic alarm action.

As previously stated, the automatic mechanism which advances the commutator 71 one step merely changes the condition of the lamp circuit from off to on or vice versa. The same effect may be accomplished manually. To that effect there is provided a vertically slidable push-button 17 that extends through an opening in the top of the casing 2 and is held in its elevated position by a spring 86. Downward movement of the push button 17 against the action of the spring causes a pawl 87 to actuate the ratchet 71. It is thus apparent that by successive actuations of the manual push button 17 the commutator 72 may be advanced in a step by step manner to turn the light on or off. Whatever may be the condition of the light, an automatic time clock operation of the commutator, as hereinabove described, will result in an alternate condition.

From the above description it is apparent that I have provided a simple and effective time clock controlled means for turning an electric light on or off and for actuating an alarm, both selectively, without substantially increasing the cost of the clock mechanism.

In compliance with the requirements of the patent statutes we have here shown and described a preferred embodiment of our invention.

It is, however, to be understood that the invention is not limited to the precise construction here shown, the same being merely illustrative of the principles of the invention. What we consider new and desire to secure by Letters Patent is:

1. An electric lamp clock having a base which includes a top, clock mechanism within the base, an upwardly extending time shaft above the base, a tube surrounding said shaft and having at its lower end an escutcheon which rests on the top of the base, said base having an opening therein surrounded by the escutcheon, an inverted dished member extending through the opening and having a peripheral flange in spring contact with the underside of the top of the base, and means securing the escutcheon to the dished member thereby securing the escutcheon and the dished member to the top of the base.

2. An electric lamp clock having a base which includes a top, clock mechanism within the base, an upwardly extending time shaft above the base, a tube surrounding said shaft and having at its lower end an escutcheon which rests on the top of the base, said base having an opening therein surrounded by the escutcheon, an inverted dished member extending through the opening and having a peripheral flange in spring contact with the underside of the top of the base, means securing the escutcheon to the dished member thereby securing the escutcheon and the dished member to the top of the base, time clock operated means slidable along the dished member, and means at one location on the dished member for controlling the motion of the clock operated means.

3. An electric lamp clock having a base which includes a top, clock mechanism within the base, an upwardly extending time shaft above the base, a tube surrounding said shaft and having at its lower end an escutcheon which rests on the top of the base, said base having an opening therein surrounded by the escutcheon, an inverted dished member extending through the opening and having a peripheral flange in spring contact with the under side of the top of the base, means securing the escutcheon to the dished member thereby securing the escutcheon and the dished member to the top of the base, time clock operated means slidable along the dished member, and means at one location on the dished member for controlling the motion of the clock operated means, said dished member being manually turnable by turning the escutcheon to vary the time of control of the time clock operated means by the dished member.

4. An electric lamp clock having a base which includes a top, clock mechanism within the base, an upwardly extending time shaft above the base, a tube surrounding said shaft and having at its lower end an escutcheon which rests on the top of the base, said base having an opening therein surrounded by the escutcheon, an inverted dished member extending through the opening and having a peripheral flange in spring contact with the underside of the top of the base, means securing the escutcheon to the dished member thereby securing the escutcheon and the dished member to the top of the base, time clock operated means slidable along the dished member, means at one location on the dished member for controlling the motion of the clock operated means, and cooperating time scale and pointer means on the escutcheon and base top for indicating the time of operation of the time clock operated means under control of the dished member.

5. A clock controlled actuating means comprising, a leaf spring secured to one end and free at the other, a pin holding the free end flexed against the natural resiliency of the spring, an alarm stop pin at the free end of the spring, a second leaf spring secured at one end to the free end of the first spring and free at its opposite end and having a latch at said opposite end, said second spring being fulcrumed intermediate its ends so that upon movement in one direction of the end thereof that is secured to the first spring the opposite end of the second spring will move in the opposite direction. a slide member, manual means for moving the slide from one position to an alternate position, spring means for returning the slide to said one position, said latch releasably holding the slide against said return movement, and manually adjustable time controlled means for actuating the first mentioned leaf spring to withdraw the alarm stop pin and the latch.

6. An alarm clock mechanism comprising a plate, an electric clock motor on the under side of the plate, speed reducing clock gearing on the upper side of the plate and driven by the motor, a slide on the upper side of the plate, spring means urging the slide to one position, a spring pressed latch on the under side of the plate and extending through a hole in the plate to hold the slide, a pin extending through the plate at right angles thereto and controlling the spring pressed latch, and means controlled by the clock gearing for controlling actuation of the pin.

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