March 5, 1940. G. D. HOFE 2,192,377

ALARM CLOCK TIME-SETTING MECHANISM

Filed May 6, 1937 2 Sheets-Sheet 1

Fig. 1.

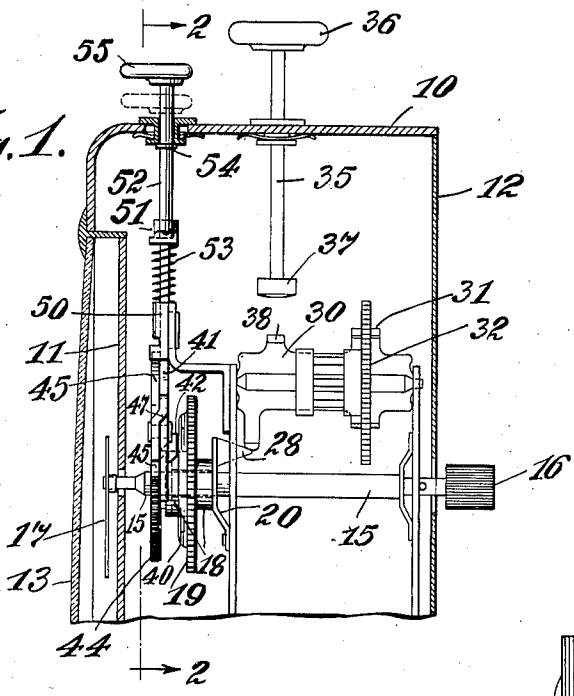


Fig. 3.

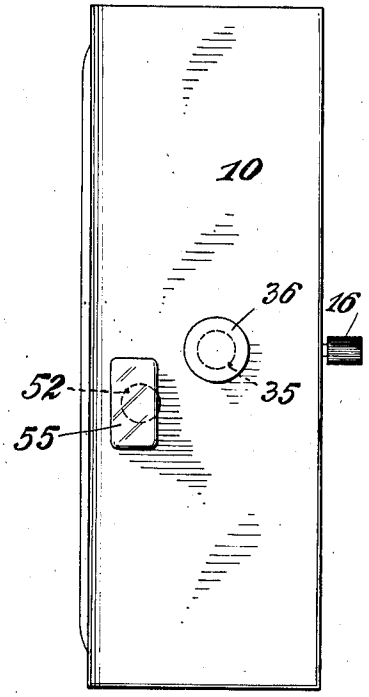
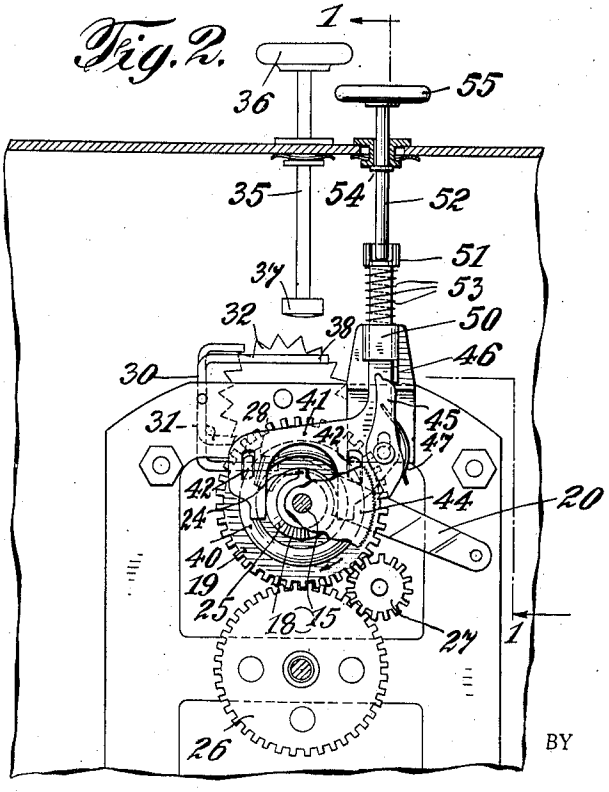


Fig. 2.



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Filed May 6, 1937 2 Sheets-Sheet 2

Fig. 4.

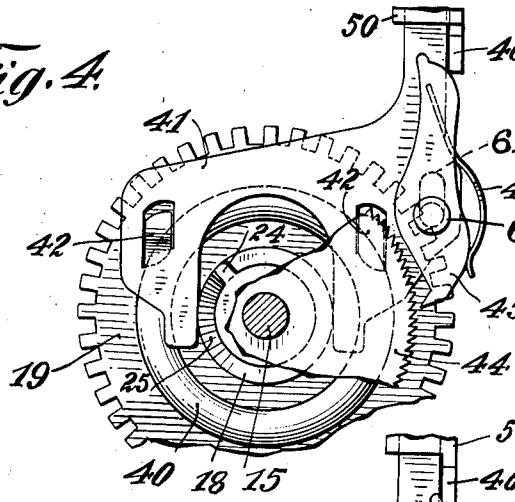


Fig. 5.

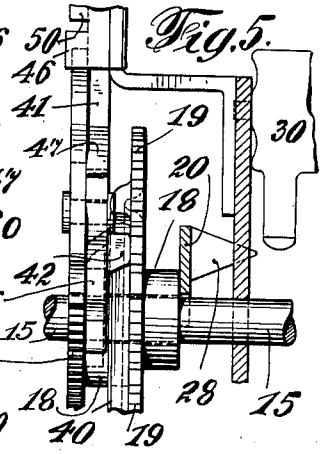


Fig. 6.

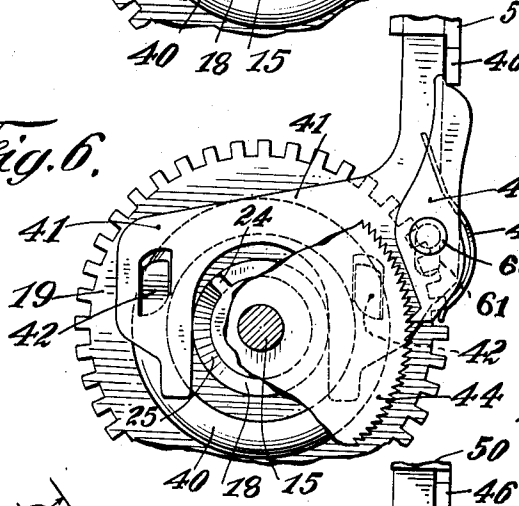
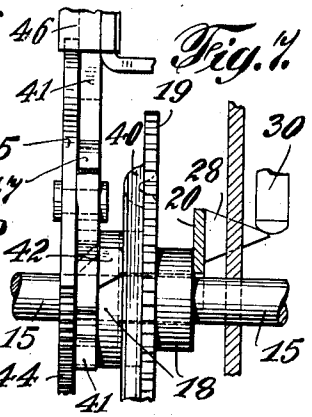


Fig. 7.



15 MINUTES TURNED FOREWARD

Fig. 8.

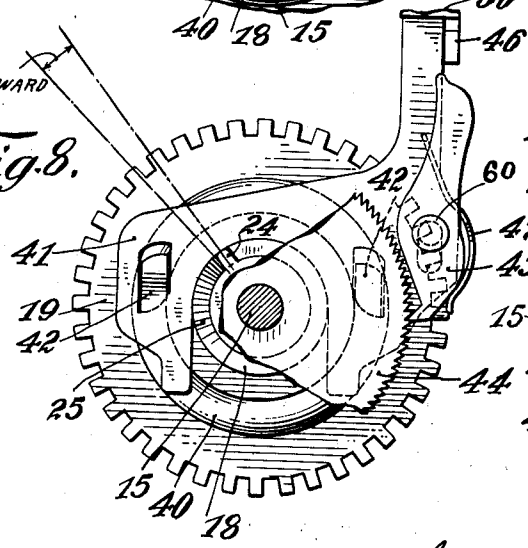
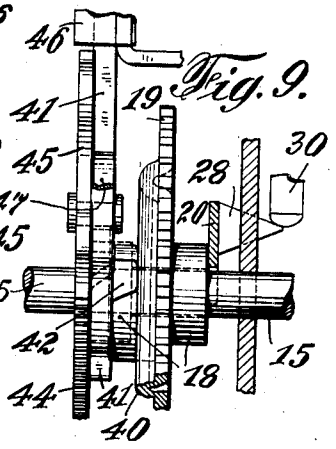


Fig. 9.



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UNITED STATES PATENT OFFICE

2,192,377

ALARM CLOCK TIME-SETTING MECHANISM

George D. Hofe, South Orange, N. J.

Application May 6, 1937, Serial No. 141,015

2 Claims. (Cl. 58—16)

My invention relates to clock mechanism and refers particularly to mechanism adapted for alarm clock time-setting mechanism.

A person on waking on the first strokes of an alarm may desire to shut off the alarm and at the same time re-set it to go off at a later time, say 15 or 30 minutes later. Also, a person, being awake before the alarm goes off, may wish to defer the time of setting by a like interval of time.

Among the desirable objects of my invention is the provision of simple means for enabling the time of operation of the alarm to be set ahead by a predetermined interval of time. A further object is to provide means for effecting the above object so constructed that it may be applied to alarm clocks of standard types with a minimum of expense and trouble.

Other desirable attributes of my invention will hereinafter appear.

The invention is more particularly adapted for use in connection with alarm clocks provided with a rotatable spindle by which the time at which the alarm goes off may be fixed. This spindle carries an arm, and rotatably mounted on the spindle is a sleeve driven by the clock train and pressed by a leaf spring against this arm. In the end of this sleeve is a recess having one wall perpendicular to the end of the sleeve and the opposite wall inclined thereto. The sleeve rotates continuously, and when the recess comes under the arm, the sleeve is free to move towards the arm under impulse of its spring and thereby permit a stop to move out of the path of oscillation of the bell striking member and so release the alarm mechanism. As the sleeve continues to rotate, the inclined wall of the recess engages the arm and by its cam action forces the sleeve back into its initial position against the pressure of its spring.

In clocks of this type, as heretofore constructed, means are provided for moving the spindle carrying the arm in one direction only, that is in the direction necessary to make the alarm go off at an earlier time, for the reason that movement of the arm in the opposite direction may involve bringing it against the wall of the recess which is perpendicular to the end of the sleeve. If that should occur, further movement of the arm will be impossible, and, in attempting to move it, the arm may be sheared off. This is to say, if the alarm is set for 7:00 a. m. and it is desired to set it for 7:15, it is necessary to turn the arm-carrying spindle anti-clockwise through an angle corresponding to 23¾ hours.

Mechanism for carrying out my invention includes means for temporarily holding the alarm release sleeve in inoperative position and means for turning the time-setting mechanism, say 15 minutes, so as to release the alarm at 7:15 instead of at 7:00.

More particularly, in accordance with my invention I attach a ratchet wheel to the time-setting spindle and provide a pawl therefor reciprocable by pressing down a knob on the top of a rod projecting through the clock casing. This pawl has a limited stroke, so that after engaging such wheel it turns it through the angle necessary to change the time of alarm release from, say, 7:00 to 7:15. Operatively connected to such a rod is a projection which contacts with the sliding sleeve, or more conveniently the gear mounted thereon, to push it back into and hold it in inoperative position while the pawl is moving the time-setting spindle clockwise from 7:00 to 7:15.

The alarm-clock time-setting mechanism of my invention also includes various features of construction and combinations of parts, as will appear from the following description and the appended claims.

For further description, reference will now be had to the accompanying drawings, illustrating a practical embodiment of my invention, similar parts being designated by similar reference numbers, and in which:

Figure 1 is a central vertical section through the upper part of an alarm clock embodying my invention.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a top plan view of the clock as a whole.

Figures 4, 6 and 8 are enlarged detail front elevations, with parts broken away, of a part of the time setting mechanism in successive operating positions.

Figures 5, 7 and 9 are side elevations of the parts shown in Figures 4, 6 and 8, respectively, with parts broken away and in section.

The practically workable exemplification of the alarm clock time-setting mechanism of my invention illustrated in the accompanying drawings will now be particularly described as to its construction and manner of operation.

The mechanism is shown as applied to an alarm clock of a standard type comprising a casing 10, face 11, back 12, and glass 13. Only such parts of the clock and alarm mechanisms are shown as are necessary to illustrate the operation of my improved time-setting mechanism.

The time-setting spindle 15 has the usual knob

16 at its rear end and the time-indicating hand 17 at its front end. Rotatably and slidably mounted on the spindle 15 is a sleeve 18 yieldingly pressed forwards towards the front of the clock by a leaf spring 20. Its forward movement is limited by an arm 24 extending radially outwards from the spindle 15. In the end of the sleeve 18 is a recess 25 having one wall perpendicular to the end of the sleeve (shown in contact with the upper side of the arm 24 in Figure 4) and the opposite wall inclined thereto. This sleeve rotated is clockwise (Figures 2, 4, 6 and 8) by the minute gear 26, pinion 27 and gear 19 non-rotatably mounted on the sleeve 18. As soon as the perpendicular wall of the recess passes from under the arm 24, the sleeve slides forward under the action of spring 20 until the bottom of the recess engages the arm 24. The spring 20 has a rearwardly turned end 28 which normally lies in the path of oscillation of the bell-striking member 30, as shown in Figures 1, 7 and 9. When, however, the spring 20 moves the sleeve 18 forwardly, the end 28 of the spring also moves forwardly so as to be clear of the bell-striking member, as shown in Figure 5. The latter is then free to be oscillated by the engagement of an escapement 31, forming part of such member, with a spring-driven toothed wheel 32. The clock may be provided with any suitable alarm shut-off mechanism, such as a plunger 35, having a knob 36 at the top, whereby it may be pushed down or pulled up, and a button 37 at the bottom for engagement with an arm 38 forming part of the bell-striking member.

After the sleeve 18 has moved forward and permitted the spring 20 to release the alarm, further clockwise movement thereof brings the inclined wall of the recess 25 into engagement with the arm 24 and the sleeve is gradually pushed back into its original position.

Since the vertical wall of the recess 25 normally prevents clockwise rotation of the arm 24, it is customary to connect the arm 24 to the spindle 15 and/or its operating knob 16 so that it can be turned only in an anti-clockwise direction. If, however, means are provided for pushing the sleeve back and holding it in its rearward position, the arm 24 is free to move clockwise, so as to change the time of alarm release from, say, 7:00 to 7:15 a. m., irrespective of the position of the recess 25 with respect to the arm 24.

Various means may be provided for pushing the sleeve rearwardly and holding it in such position. As shown, such means include an annular rib 40 on the front face of the gear 19 and a vertically slidable fork 41 straddling the sleeve 18 and having two tongues 42 stamped therefrom and pressed rearwardly to engage the rib 40 and push the gear 19 and sleeve 18 rearwardly. In the uppermost position of the fork, the tongues 42 are clear of the rib 40, so that the sleeve 18 is free to slide forward and release the alarm, as shown in Figure 4. If, however, the fork is moved downwardly, the tongues engage the rib and push the gear 19, sleeve 18 and spring 20, rearwardly into alarm-locking position, as shown in Figures 6 and 7.

The arm 24 is now free to be turned clockwise, and provision is made for so turning it by the simple operation of continuing the downward movement of the fork. For this purpose, a ratchet wheel 44 is rigidly mounted on the time-setting shaft 15. The number of teeth on such wheel are such that a movement of one tooth corresponds with a suitable interval of time, say 7½ minutes. On the fork is a pawl 45 connected thereto by a pin 60 slidable in a slot 61 in the fork. The pawl is provided with a spring 47, the upper end of which is inserted in a slot in the fork 41 and held in position in such slot by any suitable means. The lower part of the spring 47 is offset, as shown in Figure 1, so that it overlies the pawl 45. Provision is made for preventing the pawl engaging the ratchet wheel under pressure of its spring 47 until after the tongues 42 have engaged the rib 40. For this purpose, the tail of the pawl is formed with an inclined edge for engagement with an arm 46 secured to the clockwork frame when the fork is in its top position. As the fork moves downwardly, the pressure of the spring 47 being exerted on the pawl not only laterally but also upwardly, holds the pawl stationary until the pin 60 strikes the top of the slot 61. Thereafter, the fork and pawl move downwardly together and the tail of the pawl slides under the arm 46 and the head of the pawl is pushed by its spring into engagement with the teeth of the ratchet wheel, so that further downward movement of the fork causes the wheel 44 to be moved, say two teeth, and thereby change the setting of the alarm 15 minutes.

On the upward return movement of the fork, the pawl is held stationary by reason of the engagement of its head with the teeth of the wheel 44 until the pin 60 strikes the bottom of the slot when the pawl is drawn upwardly into engagement with the fixed arm 46. When that occurs the pawl is moved out of engagement with the wheel 44.

The shank of the fork 41 is slidable vertically in a portion 50 of the clockwork frame and is provided with a terminal cup-shaped part 51 to receive the lower end of a plunger 52 extending upwardly through the clock case. This separable connection allows the clockwork to be removed readily from the clock case. A spring 53 between the portion 50 of the frame and the cup 51 yieldingly holds the fork in its upper position. Upward movement of the fork is limited by a stop, either on the fork, or, as shown at 54, on the plunger 52. On top of the plunger is a button 55, conveniently oblong in form to distinguish it from the round button 36 on the alarm shut-off plunger 35. When the button is pushed down, the fork and pawl are moved down also. As soon as pressure on the button is released, the parts return to their initial position under the action of spring 53. To ensure equal movement of the time-setting spindle for each downward movement of the button, suitable stop means are provided for limiting the stroke of the pawl. This stop may be the under side of the button 55 engaging the bushing in the clock casing, or the circular recess of fork 41 abutting against the sleeve 18 as shown in Figure 8.

The operation is as follows:

When the alarm goes off, the mechanism is in the position shown in Figures 2, 4 and 5. To delay its operation fifteen minutes, the button 55 is pushed down as far as it will go, carrying with it the fork 41 and the pawl 45. During the first part of the movement the tongues 42 of the fork engage the rib 40 of the gear 19 and push it, the sleeve 18 and spring 20, rearwardly. This movement causes first, disengagement of the arm 24 with the vertical wall of the recess 25 in the end of the sleeve 18; second, movement of the end 28 of the spring into the path of oscillation of the bell-striking member which then stops the ringing of the alarm.

During this first part of movement, the pawl 45, through its pin and slot arrangement, is kept out of engagement with the gear 44 by its cam engagement with projection 46 of the frame. After these movements have been completed, further downward movement of the fork and pawl releases the tail of the latter from engagement with the projection 46 sufficiently to permit the head of the pawl to engage the ratchet wheel 44. The final part of the downward movement of the fork and pawl causes the pawl to turn the ratchet wheel, and with it the arm 24, the distance of two teeth in a clockwise direction, i. e., the time of ringing of the alarm is delayed 15 minutes.

When the finger is removed from the button 55, the spring 53 raises the fork 41, pawl 45, and plunger 52 until the stop 54 on the latter strikes the bushing in the clock casing. This upward movement draws the pawl away from the ratchet wheel 44 by reason of the engagement of its tail with the projection 46 and then moves the tongues 42 out of contact with the rib 40. The spring 20 is now free to act on the sleeve 18 and push it forward. However, the arm 24 has been moved 15 minutes to the right of the position shown in Figure 4, so that the sleeve has to rotate a further period of 15 minutes to bring the recess 25 once more beneath the arm 24 to cause the alarm to go off.

It will be obvious that if the button 55 is pushed twice, the time the alarm goes off will be delayed 30 minutes instead of 15, and so on. The unit of delay may be 10 minutes, 20 minutes, or any other desired interval of time.

It is obvious that various modifications may be made in the construction of the mechanism of my invention shown in the drawings and above particularly described, within the principle and scope of my invention as defined in the appended claims.

What I claim is:

1. Alarm clock mechanism, comprising an oscillatable member adapted to carry a bell striker, a supporting frame therefor, an alarm time-setting spindle rotatably but non-slidably mounted on said frame, a ratchet wheel fixedly mounted on said spindle, a sleeve slidably and rotatably mounted on said spindle, a toothed wheel fixedly mounted on said sleeve and adapted to be continuously driven, a projection on said spindle adapted to engage one end of said sleeve, a spring for yieldingly pressing said end against said projection, said end having a recess therein with one wall perpendicular to such end and the other inclined thereto to permit the sleeve to move toward said ratchet wheel when said recess comes into register with said projection and thereby release the said oscillatable member, an annular cam surface carried by said sleeve, a cam member slidable transversely to said spindle adapted to engage said cam surface and force the sleeve clear of said projection to permit said spindle to be turned in the same direction as the sleeve is rotated to delay the time of operation of the said oscillatable member.

2. Alarm clock mechanism, comprising a casing, an oscillatable member adapted to carry a bell striker, a supporting frame therefor, an alarm time-setting spindle rotatably but non-slidably mounted on said frame, a sleeve slidably and rotatably mounted on said spindle, a toothed wheel fixedly mounted on said sleeve and adapted to be continuously driven, a ratchet wheel fixedly mounted on said spindle, a spring for yieldingly pressing said sleeve towards said ratchet wheel, a projection on said spindle adapted to engage the end of the sleeve facing said ratchet wheel when the sleeve is free to move towards it under the action of said spring, said end having a recess therein with one wall perpendicular to such end and the other inclined thereto to permit the sleeve to move toward said ratchet wheel when said recess comes into register with said projection and thereby release said oscillatable member cam means rigidly connected to said toothed wheel, a cam member slidable transversely to said spindle between the ratchet wheel and the toothed wheel to bring a cam surface on said cam member into engagement with said cam means for forcing the sleeve clear of said projection to permit the spindle to be turned in the same direction as the sleeve is rotated to delay the operation of the said oscillatable member, a pawl carried by said cam member adapted to engage said ratchet wheel as said cam member moves between the ratchet wheel and the toothed wheel, means for preventing engagement between said pawl and ratchet wheel until after the sleeve has been moved clear of said projection, and means extending through the casing for manually moving said cam member.

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