Oct. 18, 1932. A. VAN VEEN 1,883,162

SYNCHRONOUS MOTOR ELECTRIC AUDIBLE SIGNAL CLOCK

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Fig. 2.

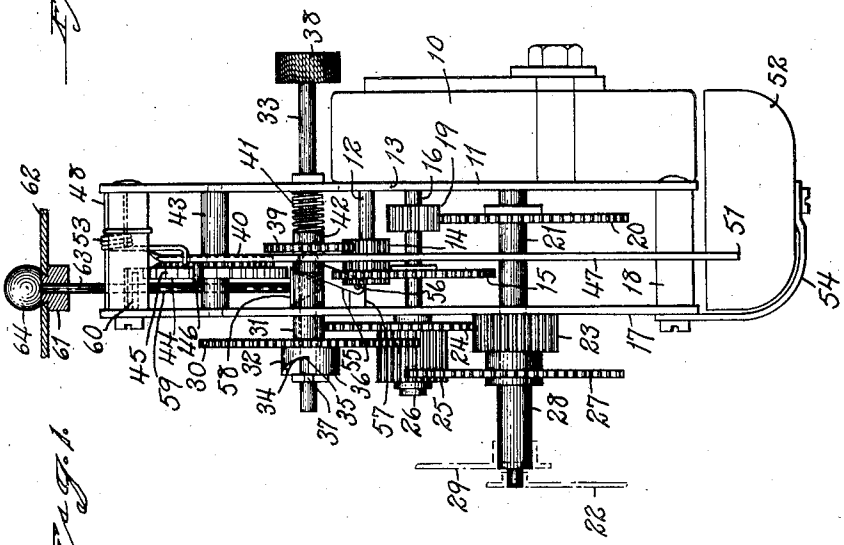
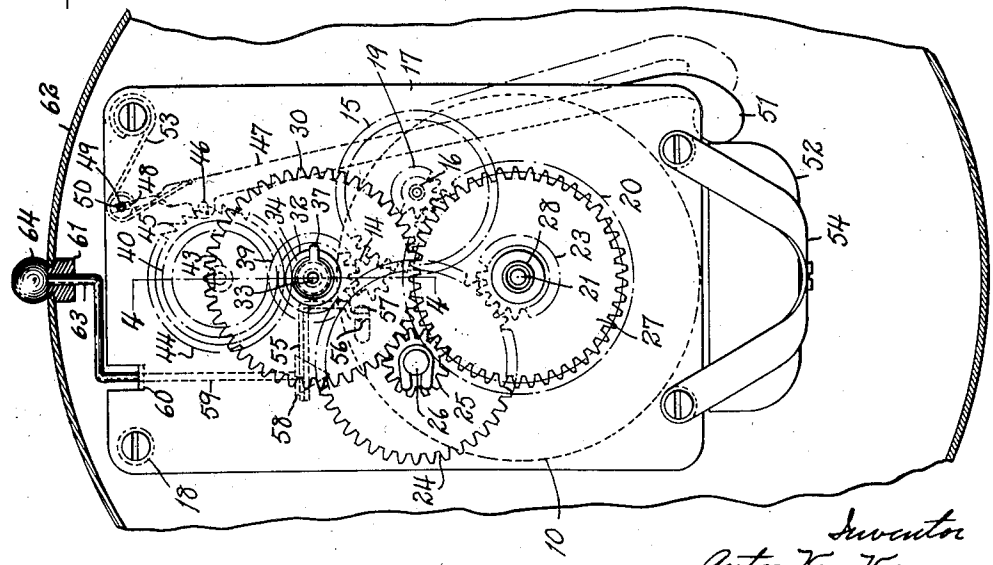


Fig. 1.



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Fig. 4.

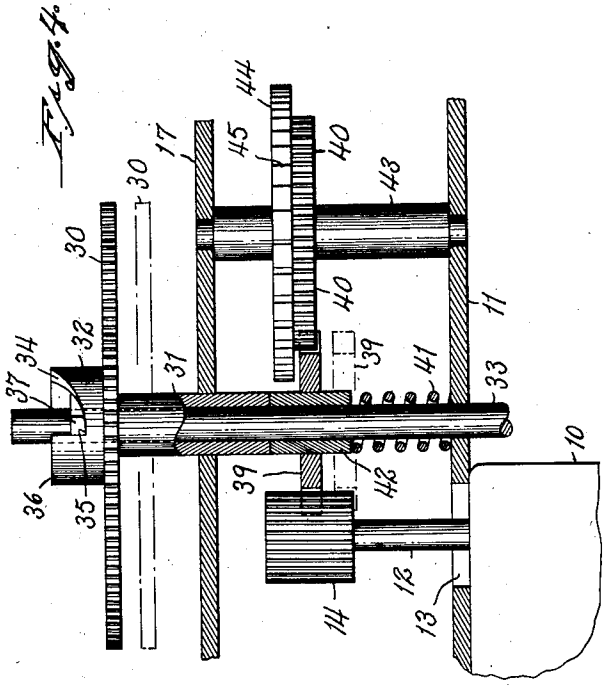


Fig. 5.

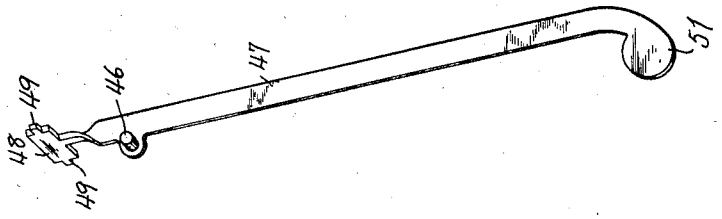
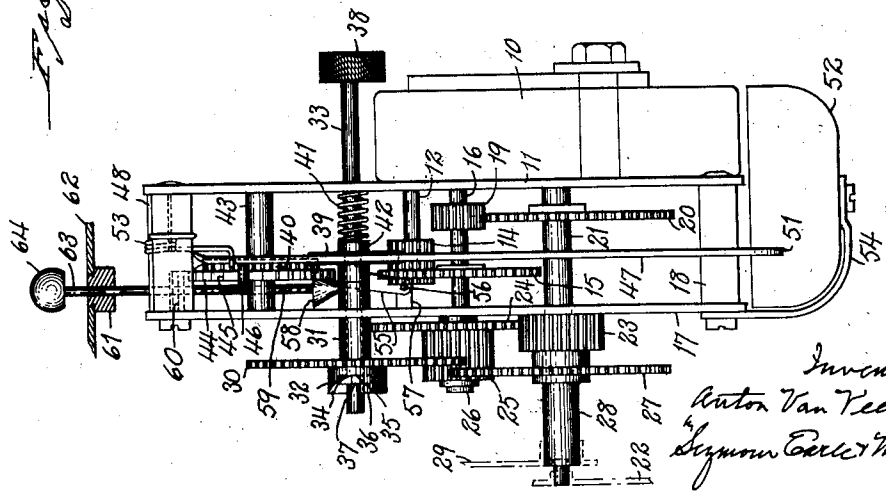


Fig. 3.



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UNITED STATES PATENT OFFICE

ANTON VAN VEEN, OF WEST HARTFORD, CONNECTICUT, ASSIGNOR TO THE E. INGRAHAM COMPANY, OF BRISTOL, CONNECTICUT, A CORPORATION

SYNCHRONOUS-MOTOR ELECTRIC AUDIBLE-SIGNAL CLOCK

Application filed June 14, 1930. Serial No. 461,070.

This invention relates to an improvement in electric audible-signal clocks, such as alarm clocks, strike clocks, chime clocks, or combinations of the same, and relates in particular to electric clocks of the character referred to which are driven by synchronous motors.

The main object of this invention is to provide, at a low cost for manufacture, a simple and reliable electric audible-signal clock in which a single synchronous motor serves to drive both the time-indicating means and the audible-signal mechanism.

With the above and other objects in view, as will appear from the following, my invention consists in an electric audible-signal clock having certain other details of construction and combinations of parts as will be hereinafter described and particularly recited in the claims.

In the accompanying drawings:

Fig. 1 is a view in front elevation of a synchronous-motor alarm clock illustrating one form which my invention may assume, the case being broken away and shown partly in section;

Fig. 2 is a broken view thereof in side elevation, the parts being shown in the positions due to them when the alarm-mechanism is idle;

Fig. 3 is a corresponding view showing the parts in the positions due to them when the alarm-mechanism has been automatically coupled to the electric motor for actuation thereby;

Fig. 4 is a broken detail sectional view taken on the line 4—4 of Fig. 1 and showing the axially slidable coupling-gear in its coupling position for driving the alarm-mechanism; and

Fig. 5 is a detached perspective view of the hammer-arm and its integral hammer.

In the alarm-clock herein chosen for the illustration of my invention, I employ a synchronous motor which may be of any approved form and in principle is so well understood in the art as to require no description other than to say that it is enclosed within a casing 10 secured to the rear movement-plate 11 of the movement and is provided with an arbor 12 forwardly projecting through an aperture 13 in the said rear movement-plate and carrying at its extreme forward end a driving-pinion 14 meshing into and driving a gear-wheel 15 mounted upon an arbor 16 journalled at its rear end in the rear movement-plate 11 already referred to and at its front end journalled in the complementary front movement-plate 17 coupled to the said rear movement-plate by the usual pillars 18.

The arbor 16 above referred to carries, near its rear end, a pinion 19 meshing into and driving a gear-wheel 20 staked upon the center-arbor 21 near the rear end thereof. The said center-arbor 21 is journalled in the rear and front movement-plates 11 and 17 and projects forwardly from the latter and carries at its extreme forward end a minute-hand 22 indicated by broken lines in Fig. 2.

Immediately forward of the front movement-plate 17 the center-arbor 21 above described has secured to it a cannon-pinion 23 meshing into and driving a dial-wheel 24 carrying a dial-pinion 25 and mounted together with the same upon a stud 26 forwardly projecting from the front movement-plate 17 in the usual manner of clock-dial-work. The dial-pinion 25 meshes into and drives an hour-wheel 27 staked upon an hour-sleeve 28 sleeved over and rotating freely upon the projecting forward end of the center-arbor 21 and carrying at its forward end the usual hour-hand 29, indicated by broken lines in Fig. 2.

The parts previously described constitute a synchronous-motor time-train for indicating the time, in consonance with the beat of an alternating current, in the usual manner of synchronous-motor electric clocks.

The dial-pinion 25 before referred to also meshes into and drives an alarm-cam wheel 30 staked to the hub 31 of a sleeve-like alarm-cam 32 mounted upon the forward end of an alarm-set staff 33 with freedom for relative rotation and axial movement thereon. The said sleeve-like alarm-cam 32 is formed with the usual alarm-cam contour, consisting of a rise 34, a low-point 35, and a high-dwell 36.

The alarm-set staff 33 carries at its forward

end a radially-offsetting alarm-cam finger 37 coacting with the outer face of the alarm-cam 32 in the usual manner of alarm clocks, and at its rear end mounts the usual knurled finger-button 38. Mounted upon the alarm-set staff 33, with freedom for relative axial and rotary movement thereupon and intermediate the front and rear movement-plates 17 and 11, is a coupling-wheel 39 constantly in mesh with the pinion 14 of the synchronous motor and urged forwardly upon the said staff, so as to mesh with an alarm-drive wheel 40, by means of a helical spring 41 encircling the said staff 33 and impinging at its rear end against the forward face of the rear movement-plate 11 and at its forward end thrusting against the rear face of the hub 42 of the said coupling-wheel 39.

The alarm-drive wheel 40 is mounted upon an arbor 43 journalled in the front and rear movement-plates 17 and 11 and also mounting a hammer-actuating wheel 44 having its periphery formed with triangular teeth 45 coacting with an actuating-pin 46 offsetting from a hammer-arm 47 formed of sheet-metal and formed at its upper end with an integral cross-bar 48 terminating at its respective opposite ends in trunnions 49 rocking in suitable bearing-openings 50 in the front and rear movement-plates 17 and 11.

The hammer 47 is swung from right to left, so as to cause its head 51 to strike a bell 52, as will hereinafter appear, by means of a torsion-spring 53, the said bell being supported upon a U-shaped bracket 54 depending from the lower edge of the front movement-plate 17.

To provide for manually shutting off the alarm mechanism after the same has been automatically souned, I employ an ell-shaped rocking-lever 55 pivoted by means of a stud 56 to an ear 57 rearwardly bent from the front movement-plate 17. The said rocking-lever engages the forward face of the coupling-wheel 39 to force the same rearward out of engagement with the alarm-driving wheel 40, and is swung rearward, as just described, by means of a conical alarm-shut-off cam 58 mounted upon the lower end of a shut-off slide 59 vertically reciprocating in an ear 60 rearwardly bent from the front movement-plate 17 and in a bushing 61 secured to the periphery of the clock-case 62. The arm 63 of the shut-off slide 59 extends outward through the bushing 61 and is provided with a finger-button 64.

In the operation of the alarm clock herein chosen for the illustration of my invention, the synchronous motor effects the continuous rotation of the minute-hand 22, the hour-hand 29, the alarm-cam 32 and the coupling-wheel 39, but since the latter is out of mesh with the alarm-drive wheel 40, the hammer-arm 47 will not be vibrated for striking the bell 52.

Now in the continued rotation of the alarm-cam 32, the low-point 35 thereof will be brought into registration with the alarm-cam finger 37, so that the cam-wheel 30, together with the cam 32 and coupling-wheel 39, will snap forward under the urge of the spring 41, provided, of course, the manual shut-off slide 59 has been previously lifted by means of its finger-button 64 to permit such action, as shown in Fig. 3.

When the continuously-rotating coupling-wheel 39 snaps forward, as just above described, it will mesh with the alarm-drive wheel 40 (Figs. 3 and 4) and thereby effect the rotation of the hammer-actuating wheel 44, thus causing the teeth 45 thereof to alternately swing the hammer-arm 47 outward and then permit the same to be snapped inward by the spring 53 at close intervals, so as to effect the continuous sounding of an alarm or other audible signal.

When it is desired to check the sounding of the alarm, the user of the clock depresses the alarm shut-off slide 59 by means of the finger-button 64 and thereby causes the conical alarm-shut-off cam 58 thereof to swing the lever 55 rearward with the effect of de-meshing the coupling-wheel 39 from the alarm-drive wheel 40.

The continued rotation of the alarm-cam wheel 30 will eventually cause the alarm-cam 32 to move axially inward under the alarm-cam finger 37 and thus cause its hub 31 to assume the burden of holding the coupling-wheel 39 in its retired position until the next automatic release of the alarm after the manual shut-off device has been retired out of action by depressing the shut-off slide 59 as above described. The parts will now be restored to the positions in which they are shown in Figs. 1 and 2.

It will be understood by those skilled in the art that my invention may assume varied physical forms without departing from my inventive concept, and I, therefore, do not limit myself to the specific embodiment herein chosen for illustration, but only as indicated in the appended claims.

I claim:

1. In an electric audible-signal clock, the combination with a continuously-rotating electric synchronous motor; of time-indicating means driven thereby; a normally-idle audible-signal mechanism; means for coupling the said audible-signal mechanism to and uncoupling the same from the said motor, including a pair of complementary rotary gears, one of which is constantly driven by the said motor and the other of which is operatively connected to the said audible-signal mechanism for driving the same; and an automatic control-mechanism including an arbor, a coupling-gear axially movable upon the said arbor into and out of position to interconnect the aforesaid complementary

gears, a spring normally tending to move the said coupling-gear into position to interconnect the said complementary gears, and a cam and cam-finger, one of which is rigidly carried by the said arbor and the other being mounted for movement coaxially with respect thereto for forcibly moving the said coupling-gear into its retired position.

2. In an electric audible-signal clock, the combination with a continuously-rotating electric synchronous motor; of time-indicating means driven thereby; a normally-idle audible-signal mechanism; means for coupling the said audible-signal mechanism to and uncoupling the same from the said motor, including a pair of complementary rotary gears, one of which is constantly driven by the said motor and the other of which is operatively connected to the said audible-signal mechanism for driving the same; and an automatic control-mechanism including an arbor, a coupling-gear axially movable upon the said arbor into and out of position to inter-connect the aforesaid complementary gears, a spring normally tending to move the said coupling-gear into position to interconnect the said complementary gears, a cam-finger rigidly connected to the said arbor; and a cam engaging the said finger and mounted with freedom for relative rotation and axial movement upon the said arbor for forcibly moving the said coupling-gear into its retired position.

In testimony whereof, I have signed this specification.

ANTON VAN VEEN.