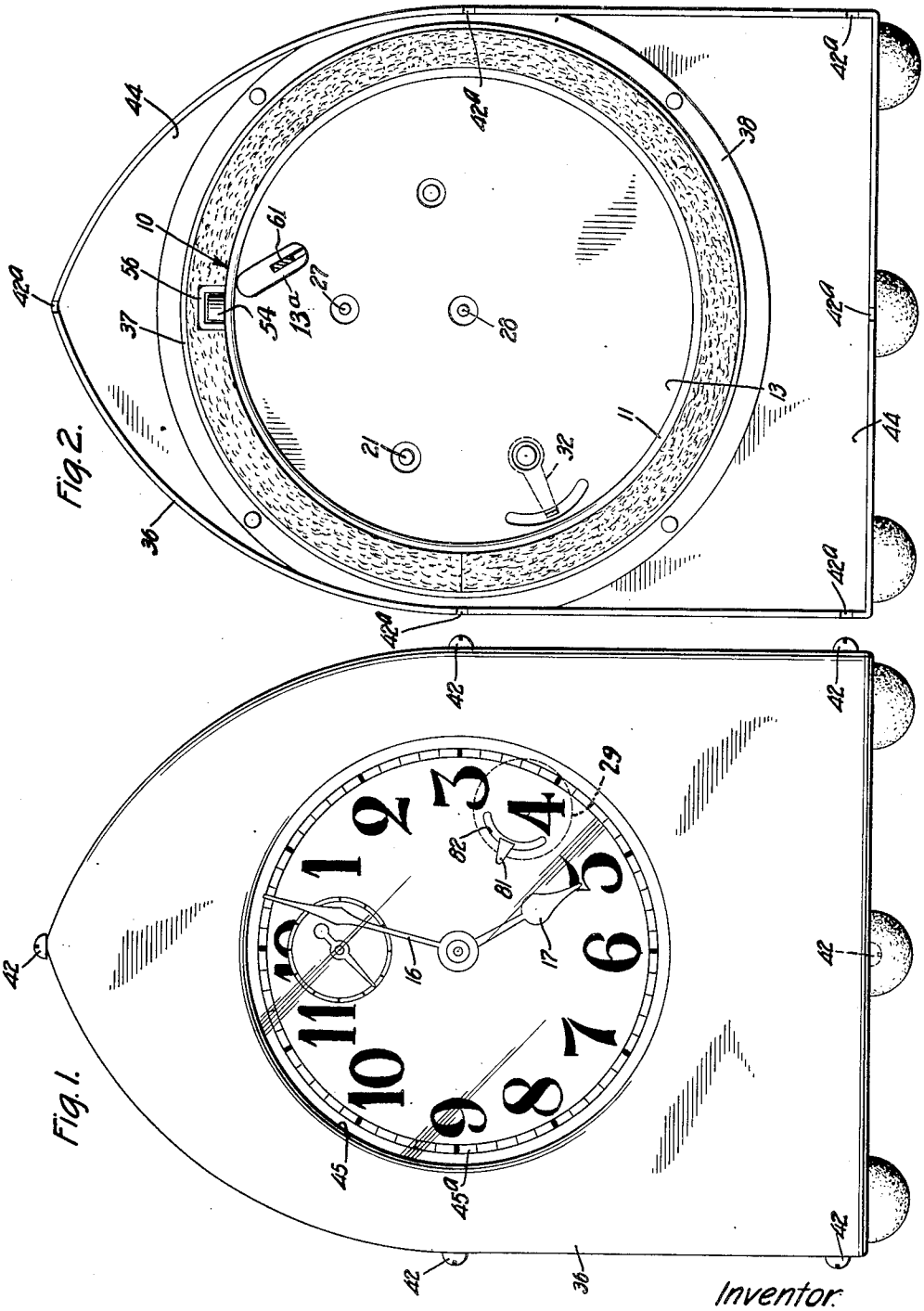
May 2, 1933. J. WALDHEIM 1,907,283

MEANS TO CONTROL THE SOUND OF A CLOCK

Filed Dec. 17, 1929 3 Sheets-Sheet 1



Inventor:

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MEANS TO CONTROL THE SOUND OF A CLOCK

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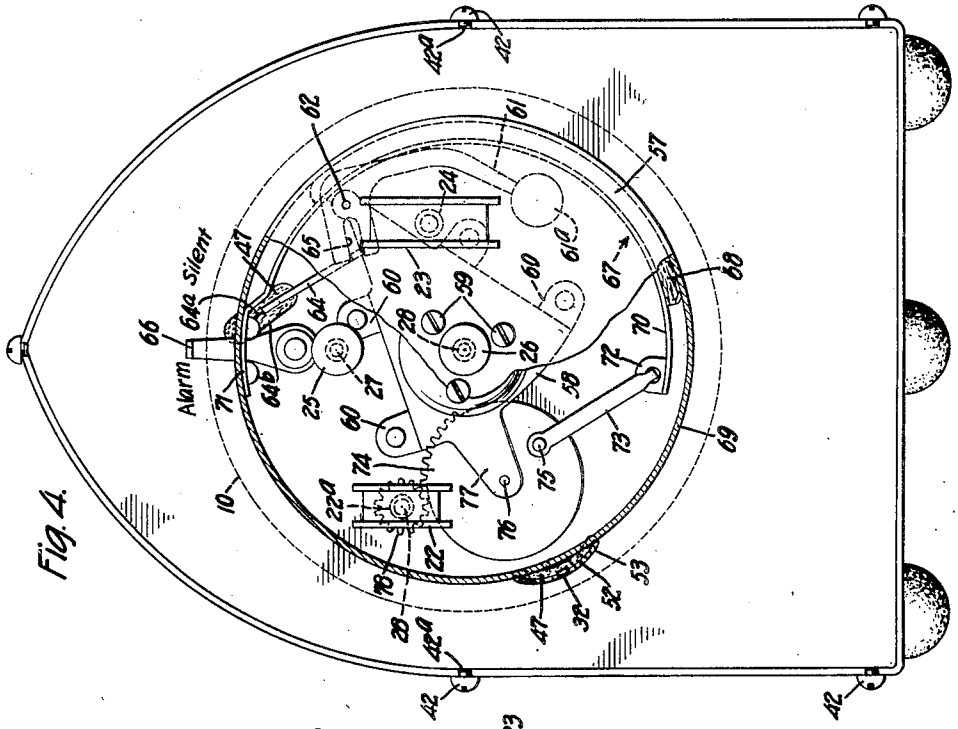


Fig. 4.

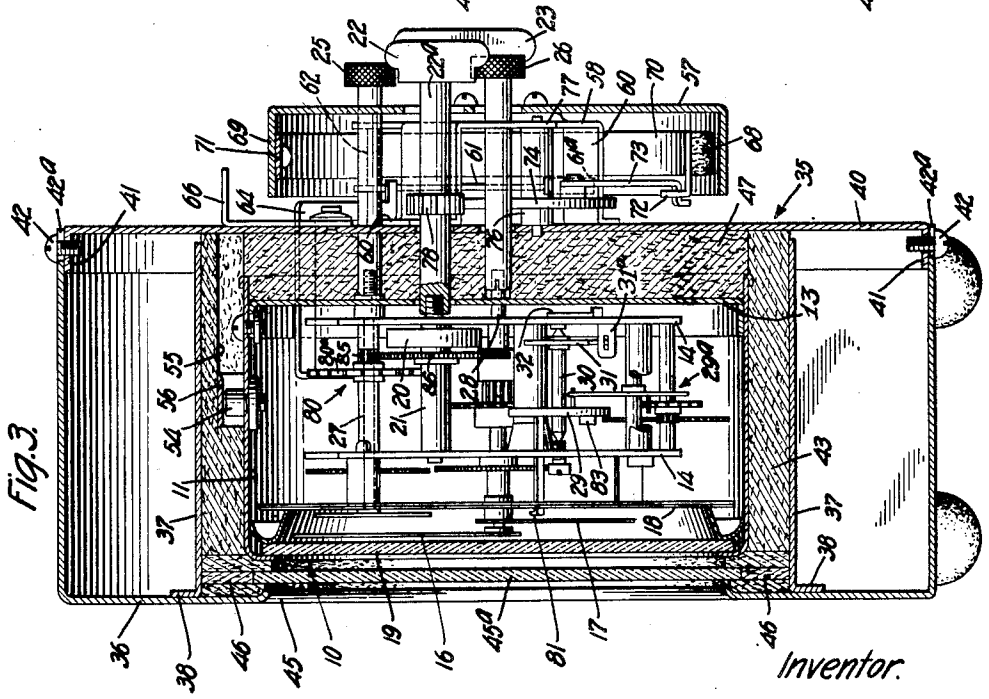


Fig. 3.

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Fig. 5.

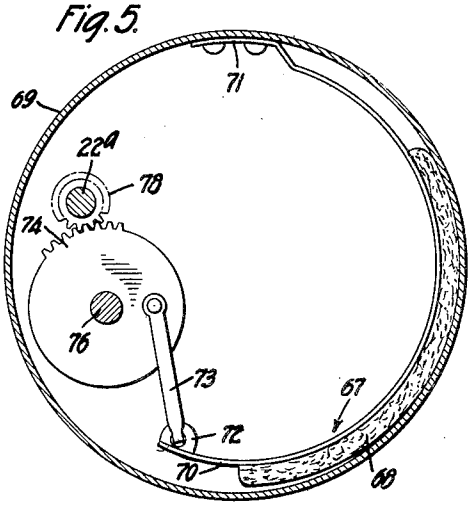
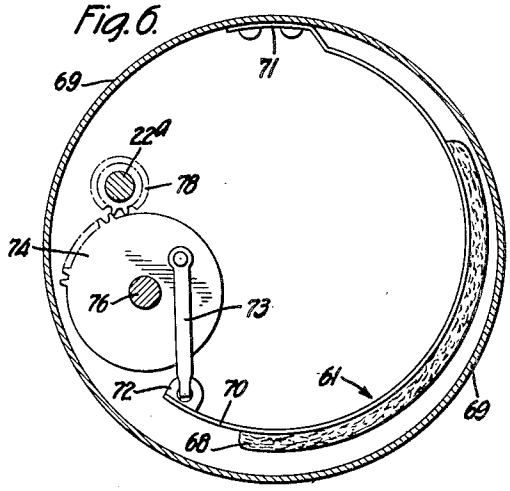


Fig. 6.



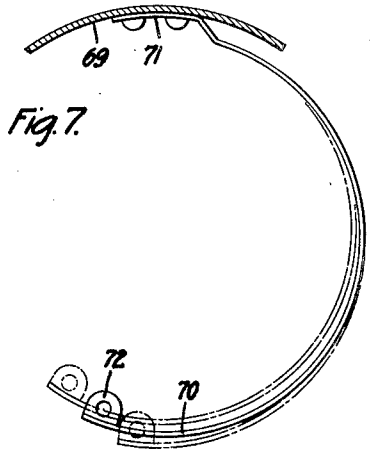


Fig. 7.

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Patented May 2, 1933 1,907,283

UNITED STATES PATENT OFFICE

JOHN WALDHEIM, OF ELIZABETH, NEW JERSEY

MEANS TO CONTROL THE SOUND OF A CLOCK

Application filed December 17, 1929. Serial No. 414,636.

This invention relates to means to overcome the objectionable noises of an alarm clock. It includes features which may be used with some of those disclosed in my applications, Serial Nos. 169,197 and 391,590, filed February 18, 1927 and September 10, 1929, respectively.

An object of the invention is to silence the ticking sound of an alarm clock.

To this end the clock operating mechanism, including the escapement, is housed in a sound deadening casing. The keys extend through the casing to the exterior thereof so that they may readily be manipulated for setting and winding.

Another object of the invention relates to means to control the sound of the alarm so as to increase the alarm sound from a minimum to a maximum as the alarm continues ringing.

In carrying out this object of the invention there is provided an alarm damping device which is normally in contact with the alarm bell to dampen the vibration thereof caused by the hammer, and which is gradually and automatically released from the bell to effect an increase of sound thereof.

Another object of the invention is to deaden the sound of the pawl and ratchets associated with the winding keys.

A feature of the invention relates to means which may include an indicator, on the face of the clock, which vibrates to show that the clock is running.

Another feature of the invention relates to the construction of the sound-deadening casing.

Other features and advantages will hereinafter appear.

In the drawings,

Fig. 1 is a front elevation of the sound deadening casing with the clock therein;

Fig. 2 is a rear elevation showing the back plate of the sound deadening casing removed;

Fig. 3 is a vertical, staggered section through the clock and casing;

Fig. 4 is a rear elevation, a portion of the bell being broken away;

Fig. 5 is a diagrammatic view showing the bell damping device partly released;

Fig. 6 is a view similar to Fig. 5 showing the damping device completely released from the bell; and

Fig. 7 is a detail view illustrating the spring element of the damping device.

Similar reference characters represent similar parts throughout the several views.

A clock 10, which may be similar to the Westclox Sleep-Meter, includes a shell 11 having a rear plate 13 secured thereto. Within the shell 11 is supported a frame 14 which carries the clock movement to drive hands 16 and 17 which rotate over a dial 18. A window 19 is provided in the front of the shell 11 through which the dial or face of the clock may be observed.

The clock also includes an alarm operating spring 20 which may be wound by a shaft 21 to which is detachably connected a stem 22^a of a key 22. A clock winding key 23 is also detachably connected to a shaft 24 which winds the main spring, not shown. Similarly keys 25 and 26 are detachably connected to an alarm setting shaft 27 and the hand setting shaft 28.

The clock further includes escapement mechanism 29^a including a balance wheel 29 on a shaft 30 to which is connected one end of a hair spring 31, the other end of said hair spring being connected to a fixed support 31^a in the usual manner. A conventional regulating lever 32 is also provided.

To deaden or silence the ticking sound of the clock, produced by the escapement mechanism 29^a, there is provided a sound-deadening casing 35 including an outer shell 36 and an inner shell 37 having a flange 38 by which it may be secured to the front wall of the outer shell 36. A back plate 40 has a flange 41 which fits into the outer shell 36 and may be secured thereto by screws 42 which pass through open end slots 43, of the outer shell 36, and are threaded into the flange 41.

The inner shell 37 may conform to the shape of the clock shell 11, which is cylindrical, and is provided with a lining 43 of sound-deadening material into which the clock may fit snugly. The shells 36 and 37 form a chamber or air space 44 which also acts as insulating means for the clock.

A window pane or transparent closure 45ª is provided at an aperture 45 in the front wall of the outer shell 36 through which the face of the clock may be observed; said window pane being supported in a piece 46 of sound insulating material which fits into the inner shell 37; the lining 43 assisting in holding the window pane supporting portion 46 in place in the casing.

A disc 47 of sound-deadening material is located at the back of the clock and may bear against the plate 13 to dampen the vibration of said plate. Said disc 47 may fit into the lining 43 and is held against the back 13 of the clock by the rear plate 40 of the casing. The disc 47 and the back plate 40 are provided with apertures through which the keys 22, 23, 25 and 26 may pass to connect them to their respective shafts. The regulating lever 32 extends through an arcuate slit 52 in the insulation disc 47 and through a corresponding slot 53 in the back plate 40.

The clock 10 within the casing is cylindrical and accordingly there is provided means to correctly position it circumferentially in the casing so that the shafts 21, 24, 27 and 28 register with their respective apertures of the back plate 40. To this end there is attached to the shell 11 a head 54 extending into a groove 55 which may be lined with a portion 56 of sheet metal to be engaged by said head. It will readily be understood that with this arrangement the clock may be positioned properly in the casing.

An alarm bell 57 is supported on a bracket 58 by screws 59; said bracket having arms 60 by which it is secured to the back plate 40. The bell 57 is sounded by a hammer 61ª, carried by a lever 61, pivoted by a shaft 62 supported in an ear 63, of the bracket 58, and in the back plate 40.

The hammer lever 61 is oscillated by actuable means including an arm 64 extending from suitable operable means within the clock through a slot 13ª in the plate 13, a slot 64ª in the disc 47 and a slot 64ᵇ in the back plate 40; the free end of the arm 64 engaging in a slot 65 of the hammer lever 61. An alarm stop lever 66 may be frictionally supported by a pivot on the back plate 40 and may be set from its position in Fig. 4 against the actuating arm 64 to the "silent" position to prevent the operation of the arm 64 at will.

To control the sound of the alarm there is provided a damping device 67 which may include a shoe 68 of rubber, felt or the like, to engage a flange 69 of the bell 57 and thus produce a dull sound of the bell so as not to startle the sleeping person. As the sounding of the bell continues the shoe 68, which is flexible, is automatically and gradually disengaged from the bell to accordingly increase the sound of the bell and thus gradually awaken the sleeper instead of suddenly arousing him as heretofore.

The shoe 68 is attached to a resilient band 70 secured at one end 71 to the flange 69 of the bell. Said band tends to assume an intermediate position shown in full lines in Fig. 7 for a purpose hereinafter described.

To release the shoe 68 the band 70 has connected to an ear 72 thereon, a link 73 which is connected to a curved rack or sector 74 by a pivot stud 75; said rack being secured to a shaft 76 supported in the back-plate 40 and an arm 77 of the bracket 58; the sector 74 being operable in either direction by a pinion 78 secured to the shaft or stem 22ª of the alarm winding key.

In Fig. 4 the band 70 of the alarm damping device is under tension and, through the link 73, tends to rotate the sector 74 in a counter-clock-wise direction; thus effecting a connection of said sector with the pinion 78 as soon as the latter rotates in a clockwise direction, in which direction said pinion rotates while the alarm is sounding.

Thus as the sounding of the alarm bell continues the shoe 68 is gradually disengaged from the bell slowly, due to the reduction gearing including the pinion 78 and sector 74, until it stands clear of the bell flange 69 as in Fig. 6. While the disengagement of said shoe increases the sound of the bell gradually increases until it reaches full volume. The sector 74 then passes out of mesh with the pinion 78, and the latter rotates freely while the alarm continues sounding at full volume. The operation of the alarm sounding mechanism may be controlled by suitable governing or retarding means 80 which is connected through suitable gearing to the alarm spring 20, which gearing includes a star wheel 80ª to actuate the arm 64 of the alarm sounding means.

The damping device 61 is subsequently rendered effective while the shaft 22ª is rotated in a counter-clock-wise direction by the key 22 to wind the alarm. It will be remembered that the band 70 of the damping device is under tension when in its extreme position (Fig. 6). Consequently, it tends to rotate the sector 74, through the link 73, in a clockwise direction. From this it follows that engagement of the sector 74, with the pinion 78, is effected immediately upon the winding operation of the key 22. Thus it will be understood that the shoe carrier 70 tends to assume a normal intermediate position (full line position in Fig. 7). Consequently it presses the end of the rack 74 against the pinion 78 when said shoe carrier is in either of its extreme positions to help connect the rack with the pinion 78.

As the rotation of the pinion 78 continues, by the winding key 22, the damping device 67 is set to its effective or damping position (Fig. 4). The sector then runs out of mesh

with the pinion 78 whereupon the latter may rotate freely independent of the sector 74 to complete the winding of the alarm operating spring 20.

In order that it may be known whether the clock is going or not there is provided an indicator or hand 81 which may be supported on the balance-wheel 29 associated with the escapement mechanism 29a. Said hand extends through a slot 82 in the dial 18 and vibrates back and forth therein. A counter weight 83 may be provided on the wheel 29 to balance the indicator 81.

The connection between the star wheel 80a and the alarm winding shaft 21 includes a pinion 85 driven by a gear 86 rotatably supported on the shaft 21; the gear 86 being connected to the shaft 21 by means of a pawl and ratchet, not shown, to permit the shaft 21 to be rotated by the key 22, independently of the gear 86 to wind the spring 20.

This pawl and ratchet connection and a similar one associated with the clock winding key, ordinarily make considerable noise when their associated keys are operated for winding; this noise being sufficiently loud, in an ordinary clock, to awaken a person in the same room where the clock is being wound. In many instances, because of this objectionable noise, the clock is carried from the sleeping chamber, so as not to awaken the sleeper, to wind it. It will be understood that with the present invention, however, the noise of the pawl and ratchet is deadened and the clock may be wound in the sleeping chamber without annoyance to any one.

While certain preferred embodiments of this device are shown and described, it will be understood that changes in the form, arrangements, proportions, sizes and details thereof may be made without departing from the scope of the invention as defined in the appended claims.

I claim:—

1. The combination of a clock including a face and keys, a permanently closed, sound-deadening casing for said clock, said casing comprising a body part in which the clock is supported, and a closure therefor at one end thereof, a window in said body part and at the face of the clock, said closure having apertures, said keys extending through said apertures to the exterior of the casing, and means to prevent leakage of sound through said apertures.

2. The combination of a clock including a dial and keys, a permanently closed casing therefor, a lining of sound-deadening material in said casing, and a window at the face of said clock, said window supported by said lining, said casing having apertures through which the keys extend to the exterior of the casing, said lining preventing the leakage of sound through said apertures.

3. The combination of a clock, a casing therefor including an outer shell having a front wall and a rear wall, an inner shell supported by said front wall and forming with said outer shell an air chamber, a lining of sound-deadening material in said inner shell to support said clock, and means for detachably securing one of said walls to the outer shell.

4. The combination of a cylindrical clock having a key, a casing therefor including an outer shell, an inner cylindrical shell into which the clock may be placed, a detachable plate on said outer shell to permit insertion of the clock into the casing, said plate having an aperture through which the key may be inserted to the clock, and means to locate the clock with respect to its axis in said inner shell to properly position it with respect to the aperture in the plate.

5. The combination of a clock, a sound-deadening casing for said clock, a key-stem on said clock, a key detachably secured to said stem, said casing having an aperture through which the key may be inserted to connect it with said stem, and means to locate the clock in the casing to register the stem with said aperture so that the key when passed through the aperture engages the stem.

6. In an alarm clock, the combination of an alarm, means to sound said alarm, a shoe engaging and extending around said alarm to dampen the sound thereof, said shoe being flexible, and means to effect a gradually increasing disengagement of said shoe from said alarm to gradually increase the sound of said alarm.

7. The combination of a bell, means to sound said bell, sound controlling means extending around and engaging the bell to control the sound thereof, and time controlled means to disengage the sound controlling means locally at successive positions from the bell to gradually increase the sound of said bell while the bell sounding means is operating.

8. The combination of a clock, an alarm for said clock, alarm sounding means, alarm damping means, alarm winding means, and means operable by said alarm winding means to move said damping means into engagement with said alarm, time controlled means to release said winding means, and means to sound the alarm upon the release of the winding means, said winding means being also effective to actuate the alarm damping means to gradually disengage it from the alarm to condition the alarm to emit sound of increasing intensity while the alarm sounding means is operating.

9. The combination of a clock, an alarm for said clock, alarm sounding means, an alarm winding key, a pinion on said key, a rack operable by said pinion, and alarm damping means connected to and operable

by said rack to render the damping means effective by the rotation of said key in one direction, said alarm damping means being also operable by the rack by a rotation of said key in the opposite direction to slowly decrease the extent of engagement of the damping means with the alarm to gradually increase the intensity of the sound while the alarm sounding means is operating.

10. The combination of a clock, an alarm for said clock, alarm damping means in contact with the alarm, alarm winding means, and means operable by said alarm winding means to operate said damping means to gradually decrease the extent of contact with the alarm, said operable means being constructed to become disconnected from the winding means so that the operation of the winding means may continue after the damping means has been fully operated, the alarm damping means including a resilient member which is effective to connect said operable means with said winding means when the latter is rotated in opposite directions.

11. The combination of an alarm, alarm operating means, said means including a shaft by which it may be energized, alarm damping means in engagement with said alarm, a gear on said shaft, a rack to be driven by said gear, and means connecting said rack with the damping means so that the latter may be operated slowly to increase the extent of disengagement from the alarm to gradually increase the sound of the alarm.

12. A clock including in combination an alarm, alarm sounding means, alarm winding means, means to control the sound of the alarm, means operable by the winding means to actuate the sound controlling means to render it effective or ineffective, the winding means having a pinion connected thereto and operable in opposite directions, the operable means including a rack operable by the pinion, the rack being arranged to move out of mesh with the pinion after the latter has moved through a predetermined angular distance in either direction so that the movement of the pinion may subsequenly continue freely with the alarm winding means after the sound controlling means has been operated.

13. The combination with a clock including clock work and a dial supported within a closed case having a window at the dial, a rear wall, and keys extending through said casing, of a sound deadening case for said clock, the latter case comprising a shell, a lining of sound deadening material therein, the clock casing fitting into said lining, a window pane at the face of the clock and supported by the lining to insulate it from the shell and the clock casing, a lining member of insulating material at the rear wall of the clock case, and a detachable rear wall secured to said shell to hold said lining member against the rear wall of the clock case, said detachable plate and said lining member having apertures through which said keys extend to the exterior of the sound deadening case.

14. The combination with a clock including a casing, and clock work therein, of a sound deadening casing comprising a body part, and a detachable plate thereon to permit the insertion of the clock into the sound deadening casing, said plate having apertures therein, and keys extending from the clock through the apertures to the exterior of the clock.

15. The combination with a clock including a shell, a face, and clock work in said shell, of a sound deadening casing including a shell comprising a body part, and a detachable back thereon for the insertion of the clock, sound deadening lining in said body part to surround the clock, a piece of sound deadening lining between the back of the clock and the back of the second mentioned shell, said piece of lining and the detachable back having apertures through which the keys extend from the clock to the exterior of the sound deadening casing, the body part having an opening at the face of the clock, and a transparent closure for said aperture.

16. The combination of a clock having a face, a closed sound deadening casing for said clock, said casing comprising a body part in which the clock is supported, and a closure therefor at one end thereof, a window in said body part and at the face of said clock, an alarm on the exterior of said closure, mechanism in said clock and extending through said closure to said alarm to sound the latter, winding means in said clock for said mechanism, and a key extending from said winding means through an aperture in said closure to the exterior of said casing.

17. A clock including an alarm, alarm sounding means, means including a shaft whereby the alarm sounding means may be wound, said shaft being rotatable in one direction while the winding takes place and rotatable in the opposite direction during the operation of the alarm sounding means, a pinion on said shaft, a rack operable by said pinion, sound controlling means for said alarm and operable by said rack, said rack being adapted to run out of mesh with the pinion to permit a further rotation of the pinion independently of the rack, and means tending to rotate said rack in a reverse direction so as to insure meshing of the rack with the pinion when the rotation of the latter is reversed, said last mentioned means being adapted to rotate the rack in opposite positions from its two extreme positions.

18. A clock including an alarm, alarm sounding means, means including a shaft whereby the alarm sounding means may be wound, said shaft being rotatable in one direction while the winding takes place and

rotatable in the opposite direction during the operation of the alarm sounding means, a pinion on said shaft, a rack operable by said pinion, sound controlling means for said alarm and operable by said rack, said rack being adapted to run out of mesh with the pinion to permit a further rotation of the pinion independently of the rack while the alarm continues sounding, and means tending to rotate said rack in a reverse direction so as to insure meshing of the rack with the pinion when the rotation of the latter is reversed.

19. A clock including an alarm, alarm sounding means, means including a shaft whereby the alarm sounding means may be wound, said shaft being rotatable in one direction while the winding takes place and rotatable in the opposite direction during the operation of the alarm sounding means, a pinion on said shaft, a rack operable by said pinion, a damper to engage said alarm, a resilient element to actuate said damper, and means whereby the resilient element is connected to said rack, said rack being effective to disengage the damper from the alarm through the medium of the resilient element to increase the sound of the alarm, said rack being adapted to run out of mesh with the pinion to permit a further rotation of the pinion independently of the rack while the alarm is sounding, said resilient element being effective to cause the rack to mesh with said pinion upon a reverse rotation of the latter.

20. The combination with an alarm including a bell, means to sound said bell, means to operate the sounding means, means to wind the operating means, means to alter the sound of the bell, and means operable by the alarm winding means while moving in one direction to change setting of the sound altering means, the operable means being actuated also by the movement of the alarm winding means in a reverse direction to set the sound altering means back to its original position.

21. The combination with an alarm including a bell, means to sound said bell, means to operate the sounding means, means to wind the operating means, means to alter the sound of the bell, and means operable by the alarm winding means while moving in one direction to change the setting of the sound altering means, the operable means being actuated also by the movement of the alarm winding means in a reverse direction to set the sound altering means back to its original position, the operable means including mechanism whereby the winding means may continue independently while the sound altering means remains in its changed position.

22. In an alarm clock, the combination of an alarm, alarm sounding means, alarm winding means including a shaft rotatable in opposite directions, and means driven by said shaft while rotating in one direction to alter the sound of the alarm, the last mentioned means being driven by said shaft while rotating in the opposite direction to set it back to its original position.

23. In an alarm clock, the combination of a bell, means to sound said bell, means to wind the operating means, means to alter the sound of the bell, and means to change the setting of the sound altering means, the changing means including two cooperating elements actuable by the operation of the winding means while moving in one direction for changing the setting of the sound altering means and while moving in the opposite direction for reversing the setting of the sound altering means, one of said cooperating elements being a mutilated gear whereby the driving connection between the elements will be interrupted in both directions of its operation.

24. In a clock, the combination of an alarm including two cooperating members namely a bell and a striker therefor, means associated with one of said members to alter the sound of the alarm, alarm winding means including a shaft rotatable in opposite directions, and means driven by said shaft while rotating in one direction to change the position of the means associated with the alarm member to thus alter the sound of the alarm, said means being also driven by said shaft while rotating in the opposite direction to effect a reverse setting of the means associated with said alarm member.

25. In an alarm clock, the combination of an alarm, means to sound the alarm, means engaging said alarm to dampen the sound thereof, and alarm winding means to effect a gradually increasing disengagement of the dampening means from the alarm to gradually increase the sound of the alarm, and whereby the dampening means may be restored to normal against said bell.

26. In a clock, the combination of an alarm including a single bell, alarm sounding means, operating means for the sounding means, winding means for the operating means, said winding means including a shaft, a key to rotate said shaft in one direction, said shaft being rotatable in the opposite direction by said operating means, an operable element, a member on said shaft to drive said element in opposite directions according to the direction of rotation of said shaft, and means to alter the sound of the alarm, the alarm sound altering means being settable from its normal position by said element while the shaft is rotated in one direction by the operating means to thus increase the sound of the alarm, said element being effective to restore the sound altering means while said element is being actuated

by said member upon the rotation of the shaft in a reverse direction by said key to wind said operating means.

27. In a clock, the combination of an alarm including two member elements, namely a bell and striker therefor, means cooperating with one of said members to alter the sound of the alarm, an alarm winding spindle, means operable by said spindle to actuate the sound altering means to change the setting of the sound altering means, and which is adapted to run out of cooperation with the spindle to permit the latter to continue to rotate after the position of the sound altering means has been changed, and means to effect a reconnection of the operable means with the spindle upon a reverse rotation of the latter to effect a resetting of the sound altering means.

In witness whereof I have hereunto affixed my signature.

JOHN WALDHEIM.