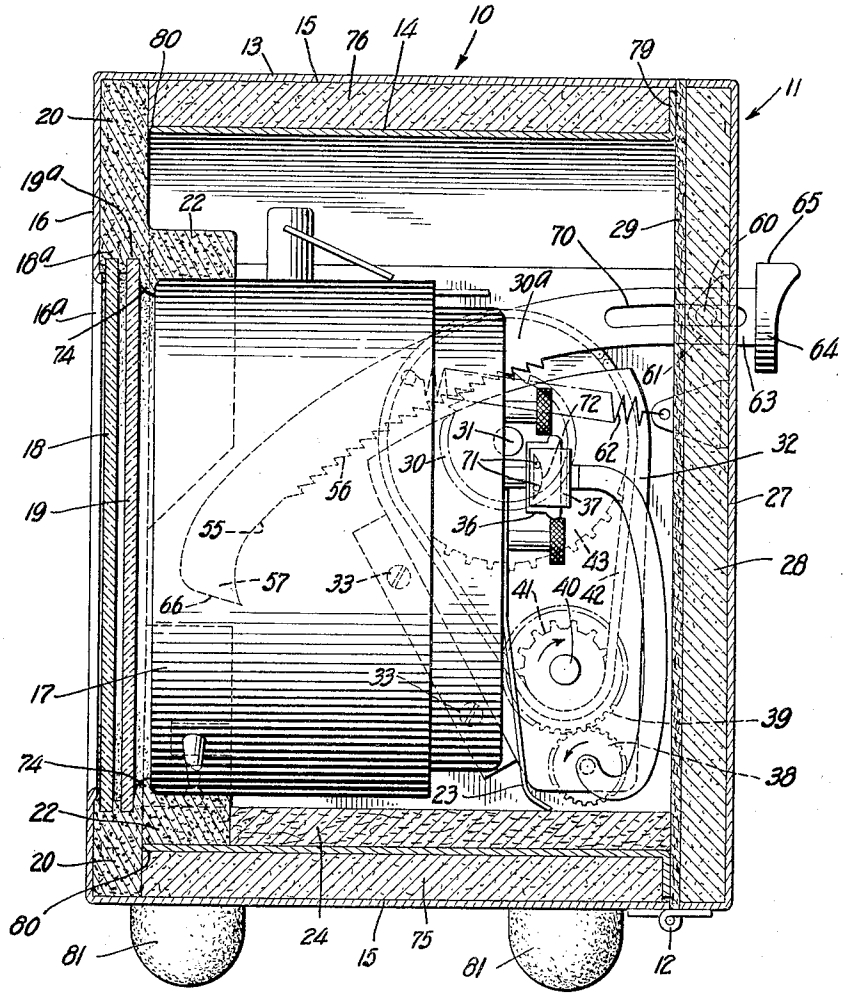
May 2, 1933. J. WALDHEIM 1,907,282

MEANS TO CONTROL THE SOUND OF AN ALARM

Filed Sept. 10, 1929 4 Sheets-Sheet 1

Fig. 1.



INVENTOR

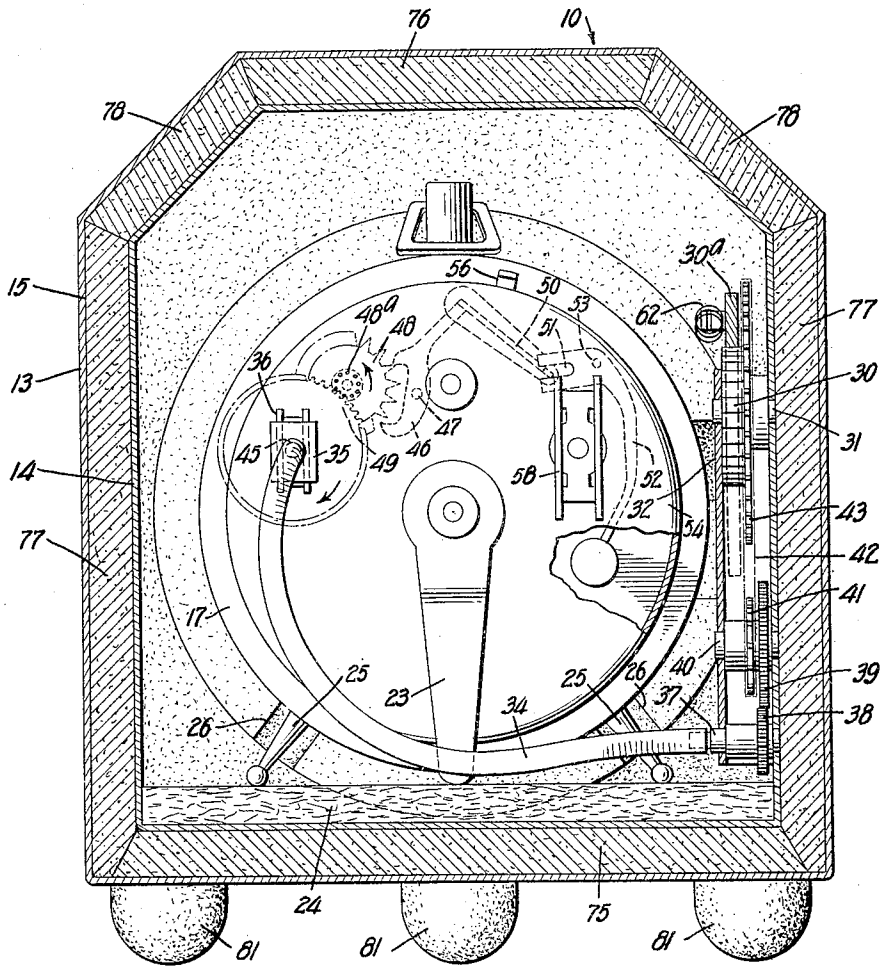
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MEANS TO CONTROL THE SOUND OF AN ALARM

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Fig. 2.



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Fig. 3.

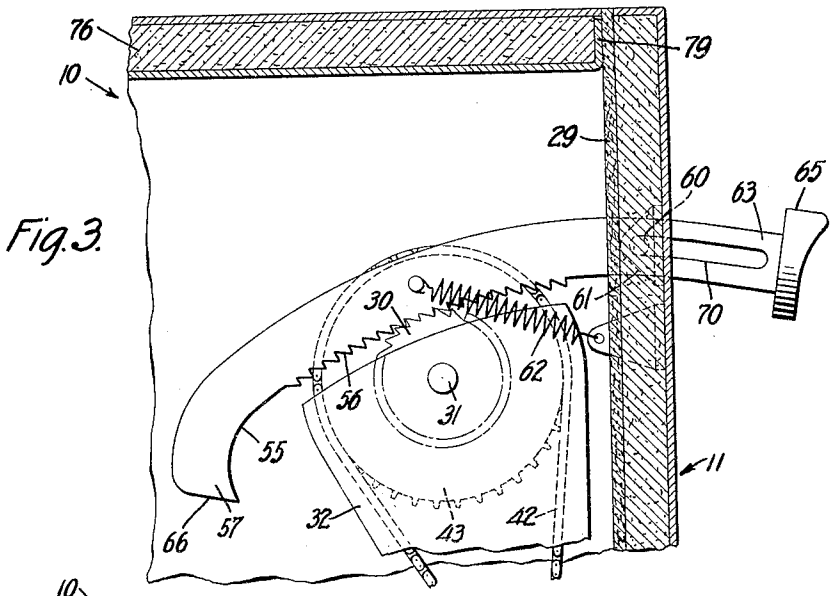
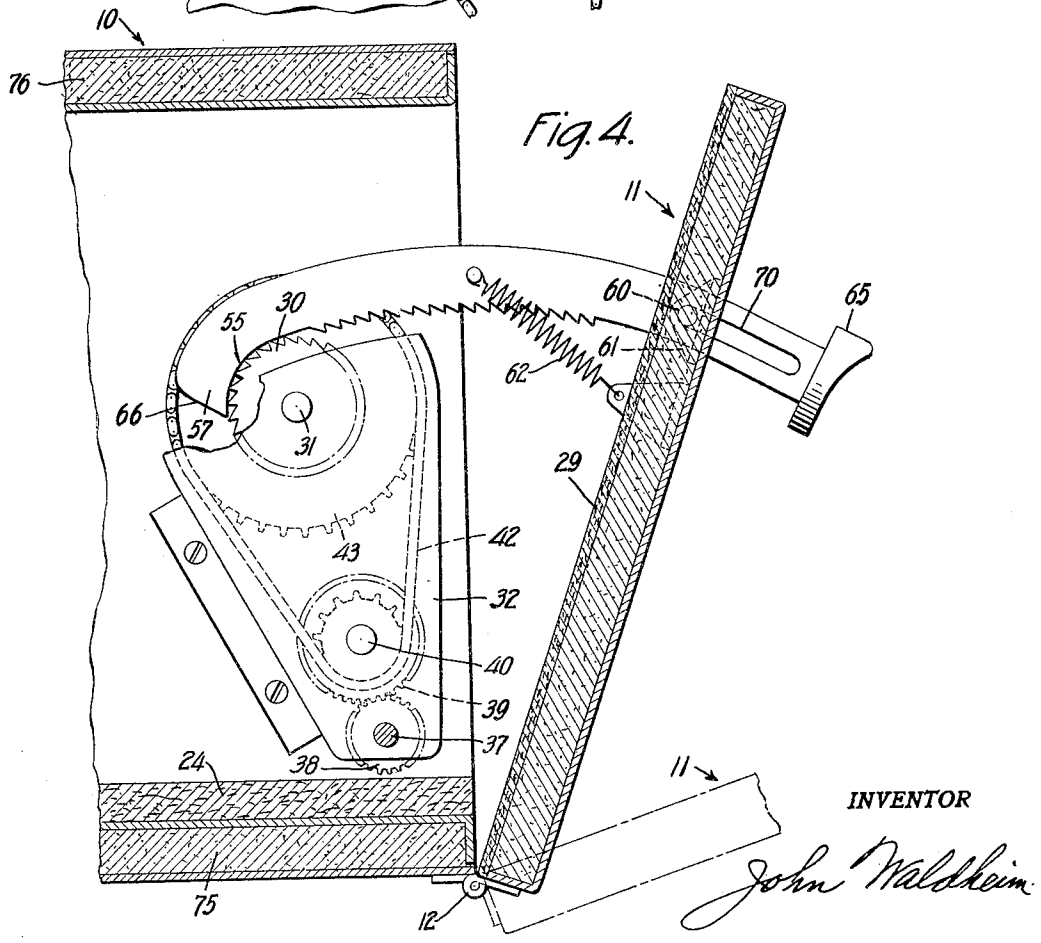


Fig. 4.



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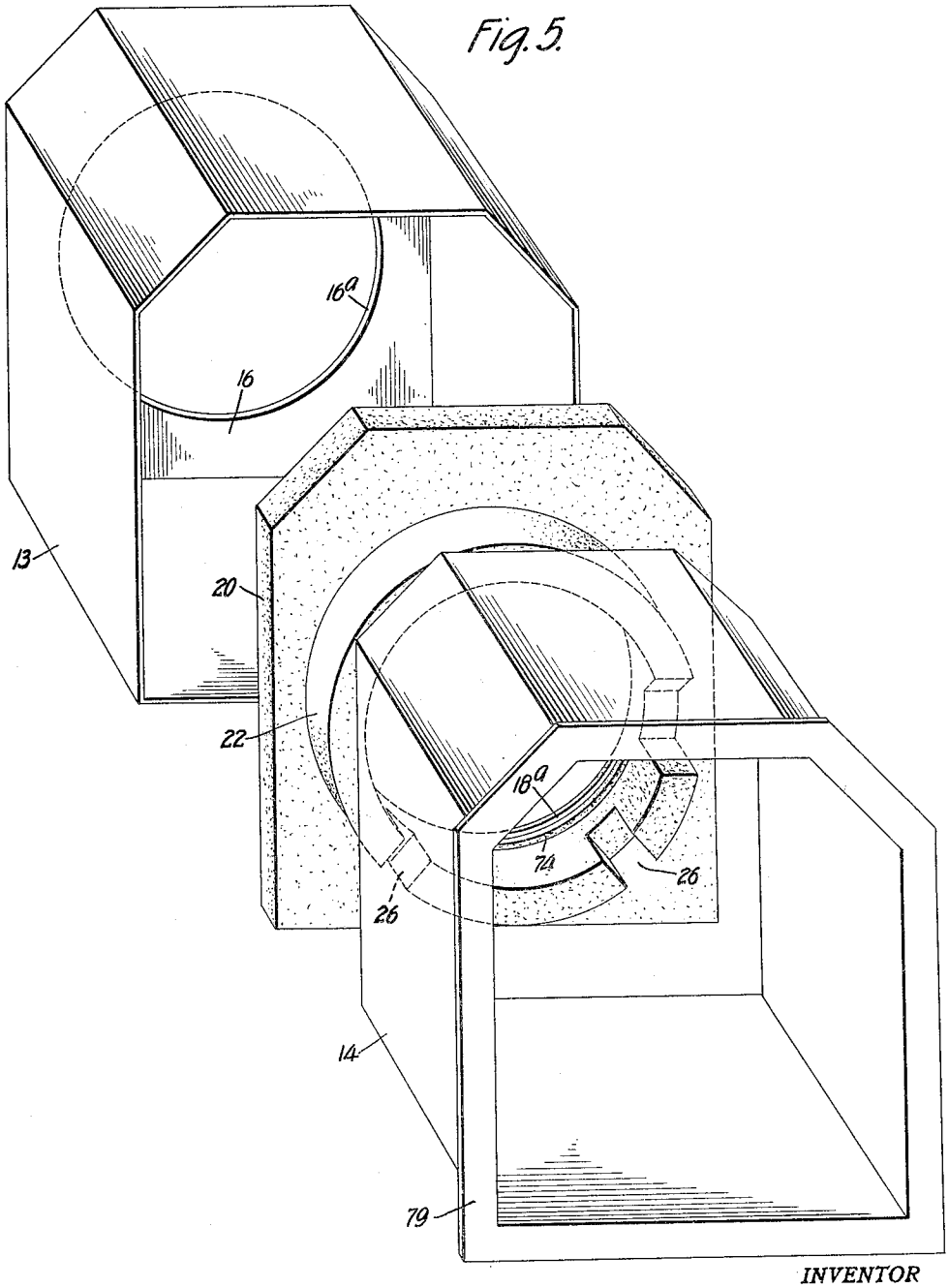
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MEANS TO CONTROL THE SOUND OF AN ALARM

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Fig. 5.



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UNITED STATES PATENT OFFICE

JOHN WALDHEIM, OF ELIZABETH, NEW JERSEY

MEANS TO CONTROL THE SOUND OF AN ALARM

Application filed September 10, 1929. Serial No. 391,590.

This invention relates to means to deaden the sound of an alarm and to automatically increase the sound thereof as it continues.

Alarms, such, for example, as are used on clocks to awaken a sleeping person, have a nerve racking effect because the full volume of sound of the alarm suddenly breaks upon him with the result that he is aroused suddenly, with a scare, instead of awakening gradually.

An object of this invention is to automatically control the sound of the alarm so that the sleeper is awakened gradually and without injury to his nervous system.

In carrying out the invention I provide means normally effective to deaden the sound of the alarm and means whereby the sound deadening is gradually and automatically rendered ineffective to accordingly increase the sound of the alarm, as the sounding continues, thus giving the same effect of sound that a sounding alarm clock would give to a person to whom the clock is being carried slowly from a distance. In other words, the device of my invention automatically controls the sound of the alarm so that it is first heard very faintly, then gradually increases as the sounding of the alarm continues until the full volume of sound is heard.

In one form of the invention herein illustrated, I provide a sound deadening cabinet, which may be similar to the one shown in my application No. 169,197, filed February 18, 1927, to enclose the clock. The cabinet is provided with a door which is normally closed, but which is automatically and slowly opened by means connected to the alarm winding key to let the sound of the alarm out and thus gradually increase the sound of the alarm.

A feature of the invention relates to means including a flexible shaft connected to the actuating mechanism of the alarm sounding means to open the door of the cabinet.

Another feature of the invention relates to means including a rack and pinion, connected to the alarm actuating mechanism, to open the door; provision being made for the pinion to run out of mesh with the rack so that the alarm actuating mechanism may continue after the door is arrested ajar by a suitable stop. A finger piece is provided to release the door from its position ajar so that the door may be opened further to give access to the keys of the clock.

Other features and advantages will hereinafter appear.

Figure 1 is a side view, in section, of the cabinet showing the clock therein;

Figure 2 is a rear view, in section, of the cabinet;

Figure 3 is a fragmentary sectional side view showing the position of parts when the door is about to open;

Figure 4 is a view similar to Figure 3 showing the door ajar; and

Figure 5 is a perspective view of the parts composing the body of the cabinet.

Similar reference characters represent similar parts throughout the specification.

The cabinet includes a sound deadening body 10 and a sound deadening door 11 supported thereon by hinges 12. The body part includes an outer sheet metal shell 13 and an inner sheet metal shell 14 and a sound deadening lining 15 of cork or other suitable material placed between said shells.

The front wall 16 is provided with a window or sight opening 16^a through which the face of a clock 17 within the cabinet may be observed. The sight opening 16^a is closed by two panes of glass 18 and 19 supported in grooves 18^a and 19^a of a plate 20 of sound deadening material such as rubber.

The clock herein illustrated is known as the Westclox (sleep meter) and may be held in the cabinet by an annular flange 22, on the plate 20, into which flange the clock fits snugly. At the rear the clock is provided with a foot 23 which sets on a pad 24 of insulating material forming the floor of the cabinet. The clock is also provided with feet 25 at the front, said feet extending through slots 26 in the flange 22.

The door 11 includes a pan-shaped, sheet metal shell or portion 27 which is filled with a sheet 28 of sound deadening material such as cork. The face of said sheet 28 may be covered with a piece of felt 29 to engage the

rear edge of the body part 10 of the inner shell to prevent leakage of sound from the cabinet when the door is closed.

While the alarm is sounding the door is automatically opened by means including a rack 30^a engaging a pinion 30 supported on a shaft 31; the shaft being mounted on the side wall of the inner shell 14 and a bracket plate 32 secured to said shell by screws 33. The pinion 30 is driven through the medium of a flexible shaft 34 detachably connected by a clip 35 to the alarm winding key 36, which rotates in a clockwise direction (Fig. 2) while the alarm is sounding. The flexible shaft 34 is connected to drive a shaft 37 which is also supported by the wall of the inner shell and the bracket 32. Secured to the shaft 37 is a pinion 38 which drives an intermediate gear 39 on a shaft 40. Secured to the gear 39 is a sprocket 41 which, by means of a chain 42, drives a sprocket 43 secured to the pinion 30. Thus the pinion 30 is rotated in a clockwise direction in Figure 1 when the alarm is sounding. As a result a gear element rack 30^a, connected to the door 11, is moved rearwardly to swing said door open about the hinge 12.

A shaft 45 to which the key 36 is attached has connected thereto a spring (not shown) for operating the alarm sounding mechanism. The alarm sounding mechanism includes an oscillating element 46 pivoted at 47 which is driven by a toothed wheel 48 through the medium of a pinion 48^a driven by a gear 49 on the shaft 45. The oscillating element 46 has an arm 50 extending into a slot 51 of a hammer lever 52 to vibrate the latter about a pivot 53 and strike the gong 54. It is well understood that the hammer and connected parts serve also as a retarding means to prevent the alarm mechanism from running down too quickly.

Thus it will be understood, because the door opening means is connected to the alarm winding shaft while the door is being opened, that the door is under the control of a governor or retarding means to effect a gradual opening thereof to thus gradually increase the sound of the alarm.

By an inspection of Figures 1 and 4 it will be understood that the rack pinion 30 rotates at a considerably slower speed than the driving pinion 38 due to the reduction gearing connecting said pinions with each other. Consequently the door, which is connected to the pinion 30 through the medium of the rack 30^a, opens slowly to gradually awaken the sleeping person.

The door does not continue opening during the whole period of alarm sounding but is arrested ajar before the alarm stops sounding. Accordingly, provision is made to permit the door opening pinion 30 to rotate freely after the rack 30^a is stopped. To this end the rack 30^a is provided with a blank portion 55 beyond the teeth 56 where the pinion 30 may rotate freely after the rack proper has run out of mesh with said pinion. Thus the pinion is free to rotate, while the alarm continues sounding, after the door has been arrested ajar by a stop 57 engaging the pinion 30.

The door may be swung shut from its position ajar without disengaging the rack from the pinion. It is for this purpose that the rack teeth and teeth 56 of the pinion 30 are provided with sloping faces so that the rack teeth slide freely over those of the pinion.

Before the door is closed from its position ajar (Fig. 4) it may be completely opened to give access to the alarm winding key 36. the alarm stop lever 56 and the clock winding key 58. To completely open the door, for winding the clock, the rack 30^a is first swung about its pivot 60 on a bracket 61 secured to the shell 27 of the door, to lift the stop 57 clear of the pinion 30 against the action of a spring 62, after which the door is swung rearwardly to its completely open position. To manipulate the rack 30^a, in order to disengage the stop 57 from the pinion, it is provided with an arm 63, extending through a slot in the door shell 27, said arm being provided with a finger piece 64 which may be pressed downwardly by engaging the top surface 65.

When the door is closed from any position in which the stop 57 is beyond the pinion 30 a cam 66 at the forward end of the rack engages the pinion 30 to lift the stop 57 over said pinion. The stop 57 may also be held clear of the pinion 30, when closing the door, by holding that end of the rack raised, against the action of the spring 62, by means of the finger piece 64.

The flexible shaft 34 may be composed entirely or partly of a helical spring which may be utilized to insure tight closing of the door 11 against the body of the cabinet. To permit the spring shaft 34 to be wound the rack 30^a is provided with a slot 70 so that the rack may be moved inwardly from the position in Figure 3: the teeth of the rack riding over those of the pinion. Upon the release of the rack, spring 62 draws the rack rearwardly to rotate the pinion 30 in a clockwise direction to thus wind the spring shaft 34 until the forces of the spring 62 and the spring shaft 34 balance each other as in Figure 1, thus effecting a tight closing of the door.

Thus when the alarm starts sounding it continues for a time while the door remains closed, until the end of the slot 70 engages the pivot stud 60 as in Fig. 3. Subsequently the door starts opening to let the sound of the alarm out of the cabinet. This opening of the door is effected gradually under the influence of the governor including the wheel 48 and rocker 46.

The clip 37 is composed of resilient mate-

rial and is provided with projections 71 extending into one or more slots 72 in the alarm winding key 36. With this arrangement the flexible shaft, to which the clip is attached, may readily be attached to or detached from the alarm winding key.

Should it be desired to remove the clock from the case at any time the rack 30^a, may first be released from the pinion 30 by pressing downwardly on the finger piece 64 until the arm 63 of the rack is arrested in the bottom end of the slot through which it extends in the door shell 27. The door may then be swung completely open. Subsequently the flexible shaft 34 may be detached from the clock by sliding the clip 37 from the key 35, and the clock may then be drawn rearwardly from the flange 22 and out of the cabinet. It will be noticed, by an inspection of Figure 2 that the gearing from the rack pinion 38 to the rack 30^a is comparatively flat and does not occupy much space in the cabinet, and that the flexible shaft 34 is connected to said gearing near the lower part of the cabinet. Thus said gearing and said shaft do not interfere with the removal of the clock from the cabinet. When the clock is put back into the cabinet it is kept from touching the window pane 19 by a rib 74 on the flange 22.

The lining 15 of sound deadening material may be composed of a bottom portion 75, a top portion 76, two side portions 77 and two inclined portions 78, all of said portions being constructed at their joints to hold each other in the cabinet against the outer shell 13. The inner shell 14 has its forward edge rounded as at 80 (Fig. 1), so that it may readily be pushed into the cabinet after the insulating portions 75, 76, 77 and 78 are placed in the outer shell. The inner shell fits tightly in the sound deadening lining and presses the lining tightly against the outer shell, thus assisting to stop vibrations of the metal due to sound. The rear end of the inner shell may be provided with a flange 79 to engage the rear ends of the insulating portions 75, 76, 77 and 78 to push them tightly against the front insulating plate 20 to hold it, and the window panes 18 and 19, in place. Said flange 79 when in place is flush with the rear edge of the outer shell 15. There is a slight clearance between its outer edge and the outer shell 15 so as to prevent sound vibration from being transmitted from the inner shell 14 to the outer shell 13. The inner shell may be, if desired, lined with felt to further assist in deadening the sound.

The cabinet may be provided with three feet 81 preferably of sound deadening material to support the cabinet.

While certain preferred embodiments of the invention have been 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, an alarm on said clock, means to sound the alarm, said alarm sounding always at full intensity, means to control the sound emitted by the alarm, and means whereby the sound controlling means may be automatically and gradually actuated to vary the intensity of sound of the alarm in a manner that it is scarcely heard when it starts sounding and is gradually increased as the sounding continues.

2. The combination of a clock, an alarm therefor, means to sound the alarm, a casing for said alarm to muffle the sound thereof, a door on said casing, and means to gradually open said door to increase the sound of the alarm as it continues.

3. The combination of a clock, an alarm on said clock, a sound deadening casing for said clock, means to sound the alarm, a door on said casing, and means actuated by the alarm sounding means to gradually open said door to increase the sound of the alarm gradually as the sounding of the alarm continues.

4. The combination of a clock, an alarm on said clock, means to sound the alarm, a key to wind the alarm sounding means, a sound deadening casing to muffle the sound of the alarm, a door on said casing, and door controlling means connected to said key to actuate said door to gradually increase the sound of the alarm as it continues.

5. The combination of an alarm, means to sound the alarm, a casing for said alarm to muffle the sound thereof, a door on said casing, means to open the door to let the sound of the alarm out of the cabinet, and means to automatically govern the movement of said door while opening.

6. The combination with an alarm clock having winding means, of a sound deadening cabinet to enclose said clock, a door on said cabinet, door opening means, and means including a flexible connection actuable by the winding means to actuate the door opening means to let the sound out of the casing.

7. The combination with an alarm clock having alarm winding means, of a sound deadening cabinet for said clock, a door on said cabinet to let the sound of the alarm out, a pinion on said cabinet, a rack on said door to engage said pinion, means to rotate the alarm winding means, and means connecting said pinion with the alarm winding means to effect a gradual opening of the door as the alarm winding means rotates during the sounding of the alarm.

8. The combination with an alarm clock having alarm winding means, of a sound deadening cabinet, a door on said cabinet, door opening means including a flexible connection operable by the alarm winding means

to open the door to let the sound of the alarm out, and resilient means to effect a tight closing of the door.

9. The combination with an alarm clock having alarm winding means, of a sound deadening cabinet for said clock, a door on said cabinet to let the sound of the alarm out, a pinion on said casing, a rack on said door to engage said pinion, means to rotate the alarm winding means, means connecting said pinion with the alarm winding means to effect a gradual opening of the door as the alarm winding means rotates, means to effect a disengagement of said rack and pinion so that the pinion may continue to rotate while the alarm continues sounding, and a stop associated with the rack to arrest the door after the disengagement of said pinion.

10. A sound deadening cabinet for an alarm clock including an outer shell open at one end, a sound deadening lining in said shell, an inner shell on the inside of said lining and slidable into the cabinet from the open end of the outer shell, and a closure for said open end.

11. A sound deadening cabinet for an alarm clock to completely enclose the clock, said cabinet including a front wall of sound deadening material, and means on said wall to frictionally embrace the forward end of the clock to hold it against accidental displacement in the cabinet, the clock being out of contact with the entire casing except where it is held by the means on the front wall.

12. A sound deadening cabinet for an alarm clock including an outer case having a sight opening at the front through which the face of the clock may be observed, sound deadening means including a front plate, side, top and bottom lining portions effective to hold the front lining plate in position, and a window pane supported by the front lining plate to close the sight opening.

13. The combination of a clock having an alarm and an escapement, a casing for said clock to deaden the ticking sound thereof, means to sound the alarm, and means to vary the condition of said casing to gradually increase the sound of the alarm as it continues sounding.

14. The combination with an alarm clock having a bell and a hammer to strike said bell, of means independent of said bell to control the sound of the alarm, and means to actuate the controlling means automatically to gradually increase the effective sound of the bell while it is being sounded.

15. The combination with a clock, of a sound deadening casing to contain said clock, said casing comprising a body part and a door, a device on said door, a member on said body part to be engaged by the device on the door to assist in holding the door shut, and a spring normally effective only to hold the device in engagement with said member, said spring being operable by the device on the door after the latter has been closed to effect a tight closing of the door.

16. The combination with a clock, of a sound deadening casing to contain said clock, said casing comprising a body part and a door, a rack, means to pivotally and slidably support the rack on said door, a co-operative element on the body part to be engaged by the rack to assist in holding the door closed, a spring to hold the rack in engagement with the co-operative element, and a finger piece whereby the rack may be slid to set the spring to effect a tight closing of the door and whereby the rack may be swung to release it from the co-operative element when the door is to be opened.

17. The combination with an alarm including a bell, and means to sound said bell, of sound muffling means for said bell and out of contact therewith, and means to automatically and gradually alter said muffling means to accordingly effect a gradual increase in the intensity of the sound of the bell.

18. The combination with a clock having escapement mechanism, and an alarm, of means to silence the ticking sound of the escapement mechanism and whereby the sound of the alarm may be controlled, and automatic means to gradually render ineffective the silencing means to accordingly increase the sound of the alarm.

19. The combination with an alarm clock having alarm winding means, of a sound deadening cabinet for said clock, a door on said casing to let the sound of the alarm out, a pinion on said casing, a rack on said door to engage said pinion, means to rotate the alarm winding means, means connecting said pinion with the alarm winding means to effect a gradual opening of the door as the alarm winding means rotates, said rack having a toothless portion which permits said pinion to continue to rotate independently of the rack while the alarm continues sounding, a stop associated with the rack to arrest the door ajar after the disengagement of said pinion from the toothed portion of the rack, and means to render the stop ineffective so that the door may be completely opened from its position ajar to give free access to the clock.

20. The combination of a clock, an alarm, means to sound said alarm, a key to wind the alarm sounding means, a sound deadening casing to muffle the sound of the alarm, a door on said casing, and door controlling means connected to said key to actuate the door to open said door to increase the sound of the alarm, said door controlling means including a device to permit the closing of the door independently of the key while the latter is at rest.

21. The combination of an alarm, means to sound the alarm, a casing for said alarm

to muffle the sound thereof, a door on said casing, means to open said door to let the sound out of the casing, and means to automatically govern the movement of said door while opening, the door opening means including a device which permits the closing of said door independently of the governing means.

22. 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, means including two cooperative elements operable by the winding means, to change the setting of the sound altering means, one of said elements being a mutilated gear element adapted to run out of engagement with its cooperative element so that the movement of the alarm winding means may continue independently of the sound altering means.

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