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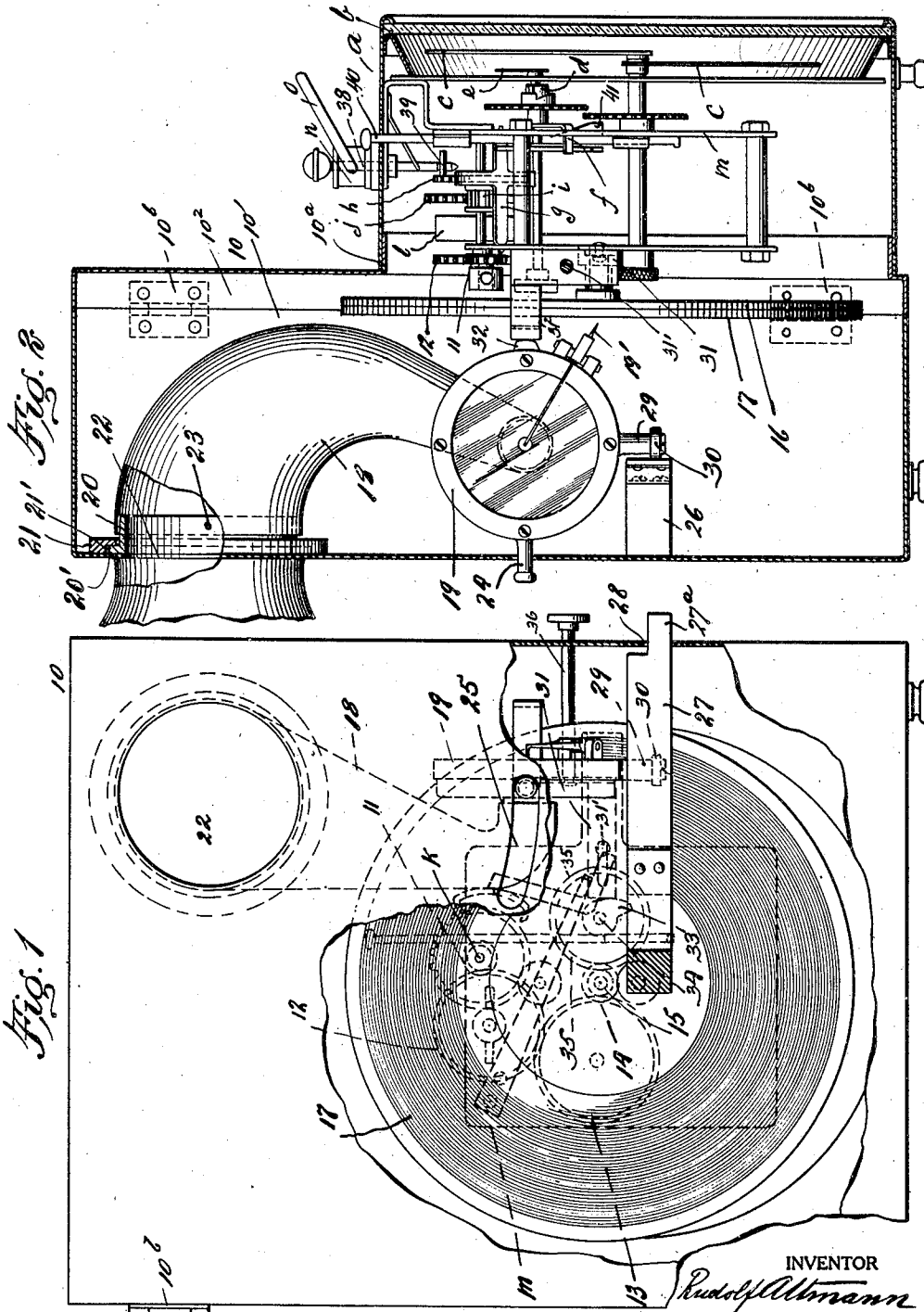
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SOUND REPRODUCING MECHANISM

Filed April 7, 1925

2 Sheets-Sheet 1



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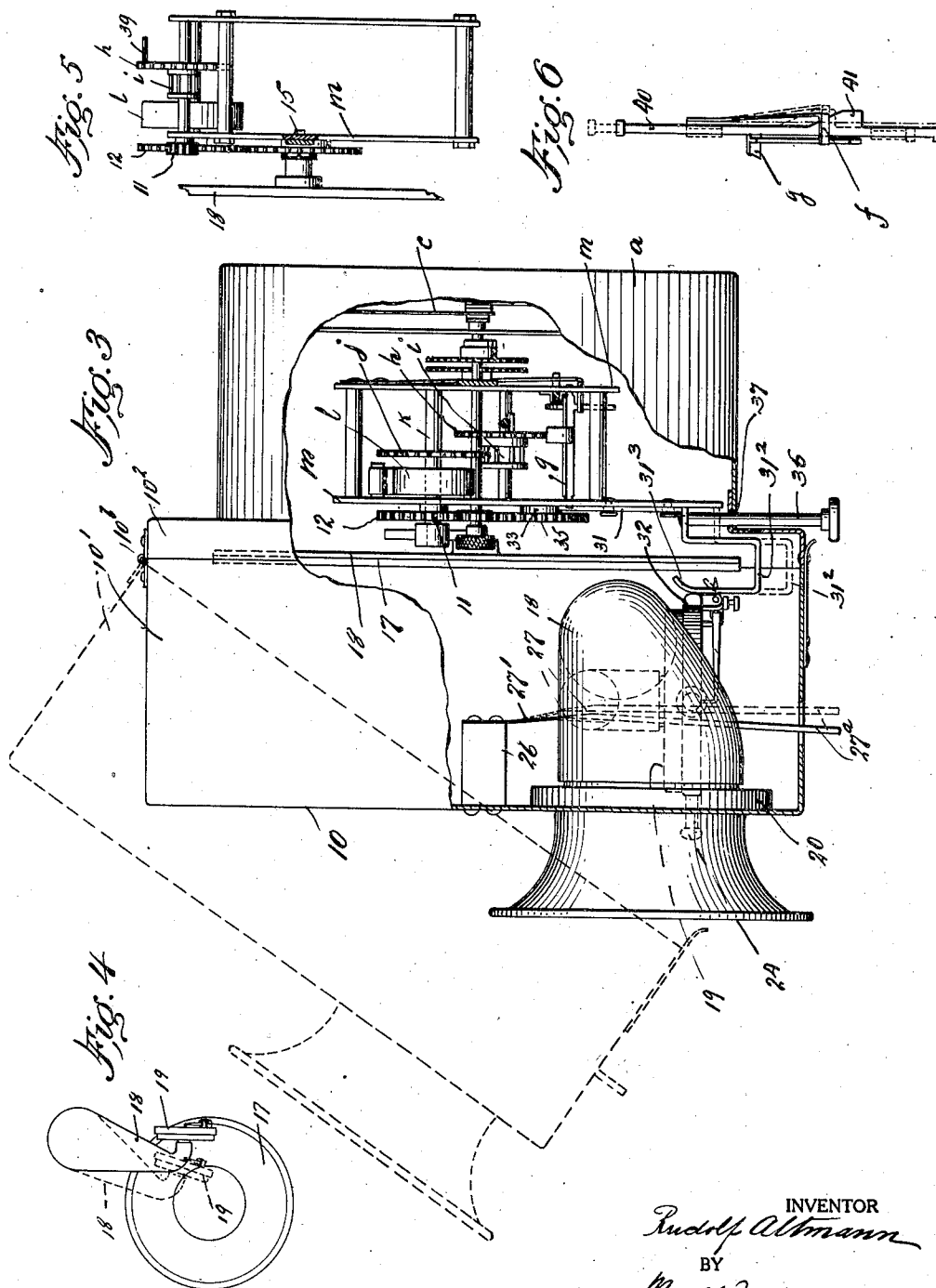
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

RUDOLF ALTMANN, OF BROOKLYN, NEW YORK.

SOUND-REPRODUCING MECHANISM.

Application filed April 7, 1925. Serial No. 21,275.

This invention relates to sound reproducing apparatus and has for its main object to provide a construction, that can be easily applied to an alarm clock, so that instead of the ordinary bell alarm a record will be operated.

With this and other objects in view, my invention consists in the construction, combination and arrangement of parts as will be hereinafter more fully described and defined in the appended claims.

In the accompanying drawing in which similar reference characters denote corresponding parts, Fig. 1 is a rear view of the apparatus with the rear wall partly broken away to show the mechanism therein; Fig. 2 a central vertical section of the apparatus; Fig. 3 a top plan view thereof with the wall broken out showing the clock and sound reproducing mechanism; Fig. 4 a diagrammatic view of the sound reproducing mechanism illustrating the suspension and movements of the tone arm; Fig. 5 a side view of the motion transmitting mechanism for the record and Fig. 6 a detail view of the escapement release mechanism.

a denotes the usual cylindrical casing of the time clock, b the front glass wall thereof, c the time pointers, d the time controlled clutch spindle carrying the alarm pointer e , f the stop used in connection with the alarm escapement g and operated as usual from the clutch spindle d . The escapement is of ordinary construction, except that the clapper, which, in ordinary alarm clocks, is carried by it, is omitted. This escapement, as usual, cooperates with the ratchet wheel h , which, through a pinion i , meshes with the gear j fixed on the spindle k actuated from the alarm operating spring l .

Thus far the construction is the same as with the usual alarm clock, the clapper and bell being omitted.

The rear wall of the casing a is also omitted and the latter is suitably fixed to a cylindrical flange 10^a of a casing 10 of rectangular shape composed of two sections $10'$, 10^b , which are suitably hinged together, as at 10^c , to permit the opening of the casing for winding up the clock, making repairs and for the exchange of records of the sound reproducing mechanism hereinafter more fully described. The spindle k actuated from the alarm operating spring l , under the control of the escapement g , is somewhat extended rearwardly through the rear wall of

the frame m of the time clock mechanism and carries a pinion 11, which meshes with an idler 12 suitably supported on the rear wall of the frame m . This idler again through an intermediate gear 13 meshes with a pinion 14 fixed on a central horizontal spindle 15 rotatively supported in the wall of the frame m and projecting from the rear face thereof a short distance into the casing 10. This central spindle 15 serves to removably support a turn-table 16 and a record disc 17 of the usual construction. The turn-table and record disc will, as will be understood, be set in rotation through the action of the spring coil 7 of the alarm mechanism upon the release of the escapement g , when the stop f , at the proper time, releases said escapement. In the section $10'$ of the casing 10, I provide the tone arm 18 carrying the usual sound box 19. This tone arm is suspended with its rear wider end from the rear wall of the casing 10 to be capable of swinging in two planes, to wit: in a vertical plane parallel to the record disc and a vertical plane perpendicular to said disc. The axis for the first named swinging movement of the tone arm is located about vertically above one end of the horizontal diameter of the record disc and the axis for the second movement slightly behind and above the center of gravity of the tone arm and sound box. The distance from the axis of the first named swinging movement to the needle $19'$ of the sound box or the length of the lever arm is so admeasured that normally the needle $19'$ will be about in range with or slightly above or below the center of the rim of the record disc and the circular arc described by the needle, when travelling through the ridges of and across the disc 17 constituting the record, will be as flat as possible, so that very little force will be required to swing the tone arm across the disc in the direction from the rim toward the center thereof.

In the present example, the wide rear end of the tone arm is mounted on a cylindrical sleeve 20, which, at its rear end, is formed with an annular flange $20'$ rotatively borne in a groove $21'$ of a ring 21 suitably fixed to the rear wall of the casing 10 around a circular opening 22 provided in an upper corner of said wall. The portion of the sleeve 20 on which the tone arm is mounted by means of a horizontal cross pin 23 is slightly smaller in diameter than the diameter of the

tone arm at its upper or rear end, so as to afford a small play or a slight swinging movement around said pin in a plane perpendicular to the record disc 17. By such suspension the tone arm, will normally tend to extend in a vertical plane with the needle 19' of the sound box directly opposite the rim of but slightly raised from the record disc or of the record itself.

The sound box may be provided with a rearwardly extending grasp or pin 24 projecting through a circularly curved recess or slot 25 of the rear wall of the casing 10, and whereby the tone arm may be manually adjusted to bring it from the rim of the record disc to the starting ridge of the record or to shift it from operative position whenever desired.

Fixed to and projecting inwardly from the rear wall of the casing 10 at a suitable place below the center of the record disc, is a bracket 26 to which is fixed a resilient horizontal guide 27, such as a spring leaf, whose free end is formed to a grasp 27^a and projects through a slot 28 provided in the opposite side wall of the casing 10. Near its fixed end, this bar is made to slant rearwardly, as at 27'. Projecting downwardly from the sound box, is a pin or the like 29 carrying a roller 30, which is adapted to constantly bear on the guide 27. The latter normally is adapted to press against the roller and to thereby hold the sound box projected forwardly, so that its needle 19' will be held against the record plate with a very slight pressure, a pressure just sufficient to cause the needle to follow the undulations of the record, but not enough to prevent it from rising from contact with the record, while in operation. The slanting portion 27' of the spring guide, however, will permit the sound box, when arriving at the end portion of the record, to swing back with the tone arm into its normal position in which its needle 19' will be out of contact with the record. In this position, the sound box will remain, after the needle has reached the end position on the record disc, until the user, by means of the grasp 27^a, bends the guide 27 slightly rearwardly sufficiently to permit the roller to pass from the slanting portion 27' onto the main portion of the guide and to roll over it, under the gravity action of the tone arm, which will now be permitted to swing back into normal position. In order that the needle 19' be out of contact with the record disc, when the latter is not in operation, or at least until after starting the record, the latter has assumed sufficient speed, I provide the following mechanism:

Slidably supported, as at 31', on the rear wall of the frame *m*, is a horizontal bar 31, which extends from the center toward the rim across the rear face of the turn-table.

The end of said bar at the rim of the turn-table is bent, as at 31², to overlap the rims of the turn-table and record disc (Fig. 3) and its hook-shaped or overlapping end is adapted to form a stop holding the sound box in the starting position raised from the record disc. To this end, a projection 32 is provided on the sound box, which is adapted in normal position to bear against the hooked end 31² of the bar 31. The opposite end of the latter is adapted to be actuated from a cam 33 mounted on a spindle 34 driven from the pinion 15, which meshes with a relatively larger gear 35 on said spindle 34, the ratio between said pinion and gear being suitable to permit two or more full revolutions of the record disc for each revolution of the cam. Thus when the bar 31 is in operative position and the record is started, the cam 33, after say two full revolutions of the record disc, will act against said bar shifting it laterally sufficiently to release the sound box, which, by the spring guide 27, will then be brought into contact with the record. The extreme end 31² of the hooked portion 31² may be gradually curved toward the record plate, so that, as the bar 31 is shifted by the cam 33 into inoperative position, it will gradually release the sound box preventing the needle from being thrust abruptly into contact with the record. The bar 31 is provided with a grasp or pin 36, which projects through a slot 37 in the side wall of the casing, whereby said bar can be brought into operative position, after the record has been finished and before the tone arm is permitted to swing back into starting position.

In order to arrest the sound reproducing mechanism, when its operation is not desired, while the clock continues to work, I provide a slidable bolt 38, which may be suitably borne in the knob *n*, which usually carries the ring or grasp *o* of the clock. This bolt, at its inner or lower end, is adapted to cooperate with a pin 39 projecting from the ratchet wheel *h* controlled by the escapement *g*. Thus when the bolt 38 and pin 39 are in engagement, the release of the escapement *g* from its stop *f* will be ineffective and the spring *l* will remain locked.

On the other hand, if it is desired to use the sound reproducing mechanism out of time, the escapement may be released by hand by means of a pin 40 projecting through the top of the casing *a* into the clock mechanism and formed with a cam or wedge-shaped member 41, which, when the pin is shifted longitudinally, will engage the stop *f* and move it out of engagement with the escapement *g*.

It is, of course, understood that the different mechanisms and means described for the operation of the sound reproducing apparatus may be varied in many ways by

those skilled in the art. I, therefore, do not wish to limit myself to the details described and shown.

What I claim is:—

5 1. In a sound reproducing mechanism, the combination with a vertically disposed revol-
 10 oluble record disc of a tone arm suspended to swing in a vertical plane parallel to said record disc and carrying a sound box nor-
 15 mally tending to be raised from the record disc, means for positively retaining the sound box in operative position and means for holding the sound box against coming in contact with the record disc during a cer-
 20 tain number of revolutions of the latter after starting.

2. In a sound reproducing mechanism, the combination with a vertically disposed revol-
 20 oluble record disc of a tone arm suspended to swing in vertical plane parallel to said record disc and carrying a sound box nor-
 25 mally tending to be raised from the record disc, means for positively retaining the sound box in operative position and auto-
 matically controlled means for holding the sound box against coming in contact with said record disc during a certain number of revolutions of the latter after starting.

3. In a phonograph, an automatically

controlled revolving and vertically disposed 30
 record disc, a tone arm suspended to swing in a vertical plane parallel to said record disc and carrying a sound box normally tending to be raised from said record disc, a guide member engaging said sound box and adapt- 35
 ed to positively hold the needle of the latter in contact with said record, while in operation, and means for holding the sound box out of contact with the record disc dur- 40
 ing a certain number of revolutions of the latter after starting.

4. In a sound reproducing mechanism, the combination with a vertically disposed revol-
 oluble record disc, of a tone arm suspended to swing in a vertical plane parallel to said 45
 record disc and carrying a sound box normally tending to be raised from the record disc, means for positively retaining the sound box in operative position and auto-
 matically controlled cam operated means for 50
 holding the sound box against coming in contact with said record disc during a cer-
 tain number of revolutions of the latter after starting.

In testimony whereof I affix my signa- 55
 ture.

RUDOLF ALTMANN.