

June 16, 1931.

A. D. JONES ET AL
PHONOGRAPH AND THE LIKE

1,809,901

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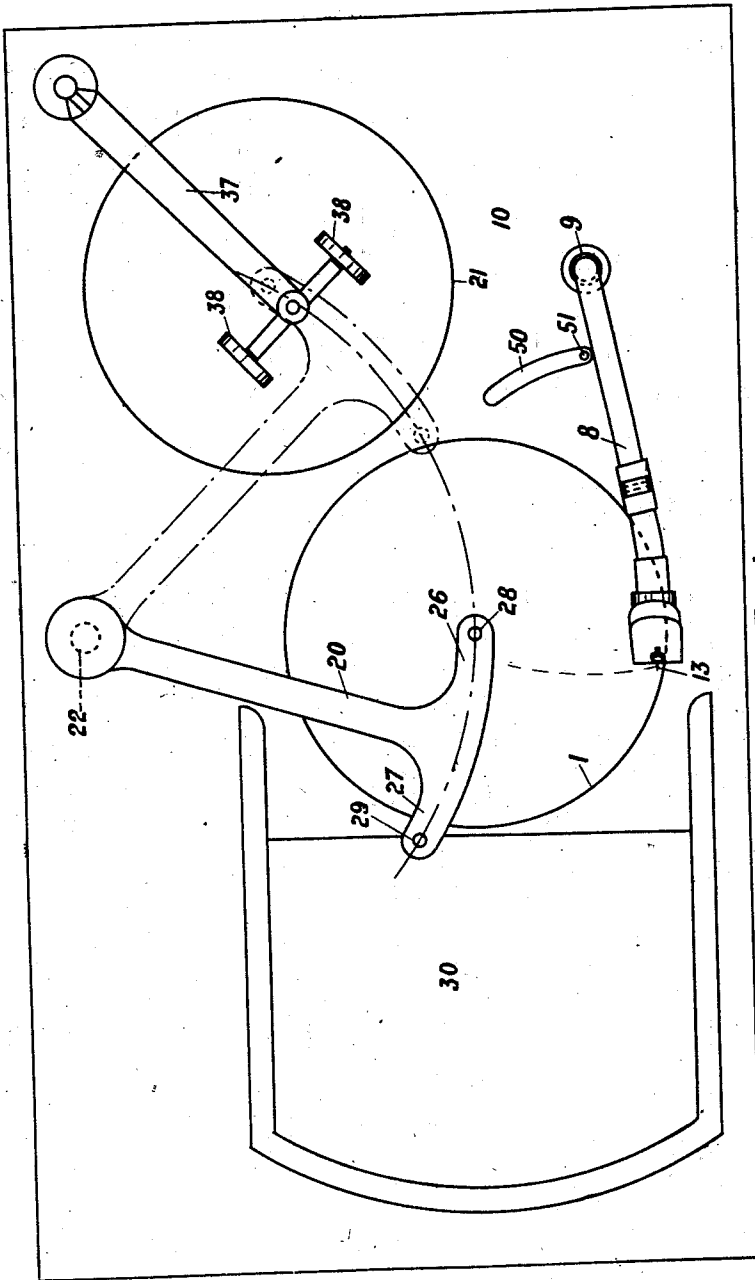


FIG. 1.

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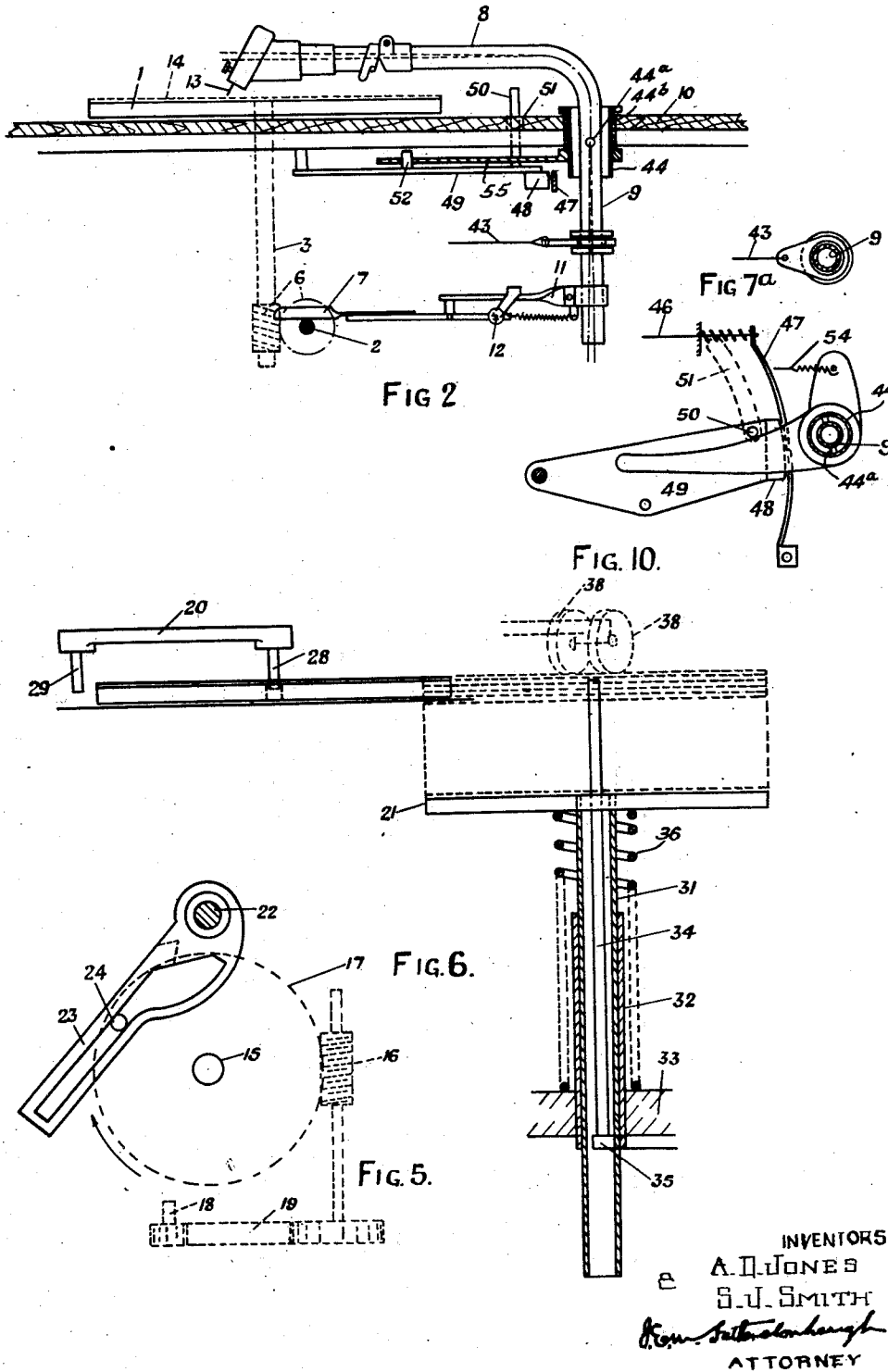
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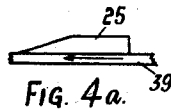
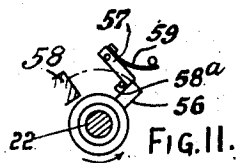
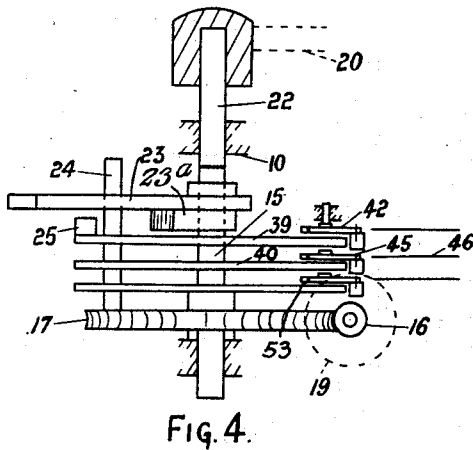
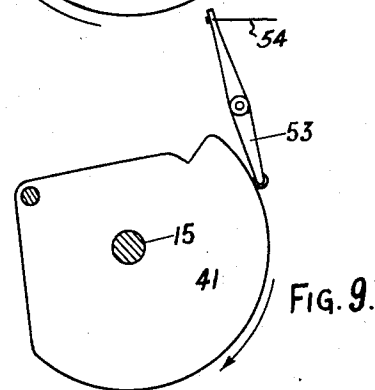
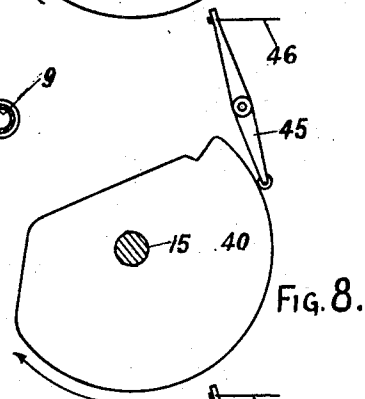
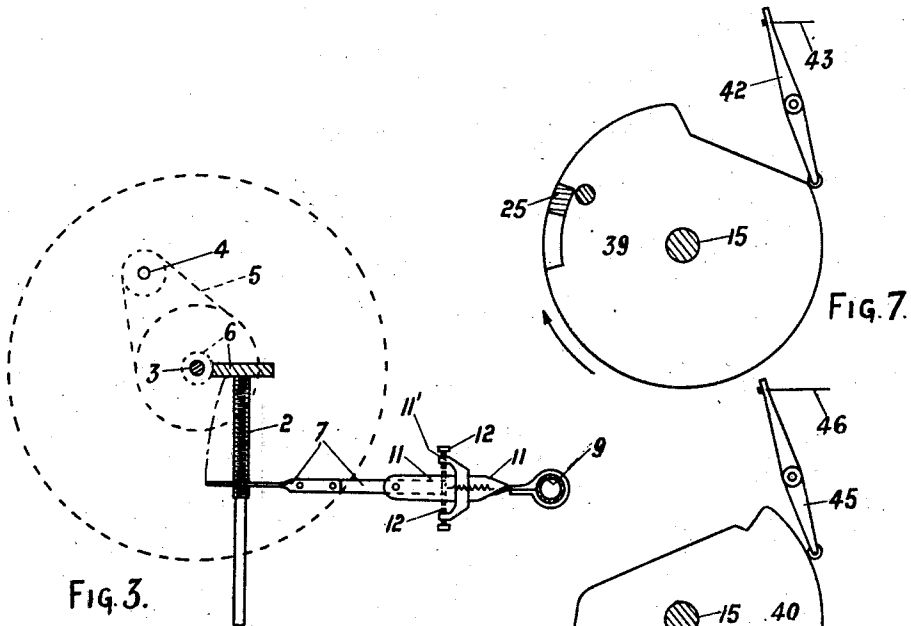
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3 Sheets-Sheet 3



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ALFRED DUKINFELD JONES AND STANLEY JAMES SMITH, OF GLASGOW, SCOTLAND
PHONOGRAPH AND THE LIKE

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This invention has reference to improvements in and relating to phonographs and the like of the type in which flat or disc records are used and has for an object the provision of improved means for automatically changing records which may be of different diameters.

Mechanism, in accordance with the invention, for automatically changing the records comprises a change-arm which is moved from a position holding a record on the turn-table of the machine to a position engaging the top record of a pile of records in a record magazine and then is moved back again to the first position, thereby moving the first record from the turn-table into a record receptacle and the top record from the magazine onto the turn-table. In order that this change of records may take place, the tone-arm, which carries the sound box and needle or other pick-up, is raised from a position in which the needle engages the innermost portion of the sound groove of the first record on the turn-table and is swung outwards radially to the record and then lowered to a position in which the needle engages the outermost portion of the new record which has been transferred to the turn-table.

The turn-table of the machine is rotated continuously. It may be by means of a motor or the like and the needle or other pick-up travels in the sound groove inwards radially to the record all in the usual manner.

The invention is illustrated by the accompanying diagrammatic drawings in which Fig. 1 is a plan view of the machine casing. Fig. 2 is an elevation illustrating the turn-table, tone arm and associated parts. Fig. 3 is a plan view illustrating part of the mechanism illustrated by Fig. 2. Fig. 4 is an elevation, looking from the bottom of Fig. 5, illustrating the change arm pillar and associated cams. Fig. 4^a is an elevation of part of the lifting cam for the change arm. Fig. 5 is a plan illustrating the change arm rocking lever and driving mechanism. Fig. 6 is a part sectional elevation illustrating the record magazine. Figs. 7, 8 and 9 are plan views illustrating the upper, intermediate and lower cams. Fig. 7^a is a plan illustrating the

connection to the change arm pillar from the upper cam. Fig. 10 is a plan illustrating the brake strap and shoe for the change arm. Fig. 11 is a plan illustrating the detent for the lower end of the change arm pillar.

According to the invention there is located preferably under the turn-table 1, a screw-threaded spindle 2 which is rotated continuously by any suitable means from the turn-table driving means. Desirably and as illustrated by Figs. 2 and 3 the turn-table spindle 3 is driven from a motor spindle 4 by means of a belt drive 5 and drives the spindle 2 by means of worm and worm wheel gearing 6. A member 7 (Figs. 2 and 3) which engages the screw of the spindle 2 is pivoted or suspended adjacent to the said spindle. The pitch of the screw and the speed of rotation of the spindle are such that the member 7 which engages the screw and which is connected to the tone-arm 8 move together at the same speed and in the same direction. Conveniently the member 7 is located directly under the tone-arm 8 and is constituted by a blade 7 the edge of which is spring pressed into the thread groove. The pivot or pillar member 9 of the tone-arm 8 which penetrates the machine framework or casing 10 adjacent to the turn-table 1 is provided with an arm 11 which extends towards the spindle 2 under the turn-table 1. This arm 11 carries a contact or contacts, desirably a pair of contact pins 12 carried, it may be, by a fork portion 11' of the arm 11. Adjacent to the contact or between the pair of contact pins 12 the pivoted or suspended screw engaging member 7 is located. The pair of contacts are in the circuit of a relay operating the switch of a second motor which drives the record-changing mechanism. The position of the member 7 between the contacts 12 is maintained as the tone-arm 8 and therefore the arm 11 carrying the contacts 12 move at the same speed as the member 7. When the needle or stylus or other pick-up 13 reaches the inner end of the sound groove of the record 14 the tone-arm 8, and therefore the contacts 12, and the member 7 get out-of-step with the result that said member 7 contacts with one or other of the contact

pins 12 and closes the circuit, thereby starting the record changing motor. The record changing motor drives a spindle 15 (Figs. 4 and 5). It may be by means of worm and worm wheel gearing 16 and 17, the record-changing motor spindle 18 driving the worm 16 by means of the belt or other drive 19. The record change-arm 20 which moves or swings between the turn-table 1 and the record magazine 21 is provided with a spindle or pivot pillar 22 which penetrates the frame-work 10 of the machine between the turn-table 1 and magazine 21. The lower end of this pillar is fitted with a slotted arm 23 which is engaged by a pin 24 entering the slot of said arm. This pin is carried by a member mounted on the spindle 15, conveniently the worm wheel 17 through which the spindle 15 is driven. The rotation or circular movement of the pin 24 with the spindle 15 imparts a rocking movement to the pillar 22, the pin 24 sliding in the slot in said arm 23. The slotted member 23 is associated with a cam 25 mounted on the cam disk 39 (Figs. 4* and 7) rotated by the spindle 15 so that a lifting and lowering movement is imparted at the desired times to the arm 23 and therefore to the change-arm pillar 22 and change-arm 20. The lifting of the pillar 22 is effected by the contact, at times, of the cam 25 with an arm 23* fixed to said pillar, and when said cam passes said arm the pillar is lowered by gravity. The free end of the change-arm may be provided with two arms 26 and 27 each of which may be provided with a downwardly projecting pin 28 and 29. The pin 28 is adapted to enter the usual center hole in the record 14 on the turn-table 1 to hold said record in position during the rotation of the turn-table with the record-changing mechanism and therefore the change-arm stationary. The movement imparted to the change-arm 20 is such that the said pin 28 is first lifted out of the hole in the record on the turn-table 1, the change-arm 20 is then swung over the magazine 21 and the pin 28 engaged in the hole in the top record in the magazine. The change-arm 20 is then swung back and drags the top record from the magazine over onto the turn-table 1. The pin 29 of the change-arm 20 engages the edge of the first record and pushes said first record off the turn-table 1 into a record receptacle or recess 30 suitably located at the side of the turn-table 1. In order that the rotary movement of the change-arm pillar 22 may be limited the pillar is provided with an arm 56 (Fig. 11) which, when the pillar 22 is raised by the cam 25, rides over the detent pawl 57 and moves into position against a stop 58. Return rotary movement of the arm 56 moves the detent pawl 57 against the pressure of the spring 59. The movement of the spring-pressed pawl 57 is limited by a pin 58* which is below the level of the arm 56. The record magazine is conveniently constituted by a platform or table 21 (Figs. 1, 6 and 10) capable of vertical movement. The platform 21 may be provided with a central downwardly projecting tubular stem 31 adapted to slide through an outer tube 32 carried by a bracket 33 secured to the undersurface of the top of the machine casing 10. A rod 34 the upper end of which passes through the holes in the records is located within the stem 31 and may be carried by a bracket 35 located under the outer tube 32, the end of said bracket 35 passing through a slot in the stem 31 thereby preventing rotation of the stem and platform but permitting vertical movement of the stem and platform. A spring 36 mounted on the stem 31, between the upper end of the outer tube or as shown the upper surface of the bracket 33 and the undersurface of the platform 21 maintains the platform normally in the "up" position with the top record positioned for transfer to the turn-table. An arm 37 pivotally mounted at the side of the platform 21 extends over the records in the magazine. The free end of this arm 37 may be provided with rollers 38 which rest and press slightly upon the top record.

The mechanism for resetting or moving the tone-arm radially outwards may comprise three cams 39, 40 and 41 (Figs. 4, 7, 8 and 9) mounted on the spindle 15. A lever constituting a follower cooperates with each cam. The lever 42 (Fig. 7) is connected to the pivot pillar 9 of the tone-arm 8 by means including a flexible connection 43 (Fig. 7*) such as a Bowden cable and a spring so that, when the lever 42 is moved in the rotation of the cam 39, the pillar 9 is rocked against the action of the spring. The pillar 9 is attached to a sleeve 44 by a pin 44*, said sleeve 44 being mounted within a bearing sleeve 44* fixed to the framework 10, thus permitting said pillar 9 to be rocked. When the pillar 9 is rocked, the tone arm and needle or other pick-up 13 are lifted off the record 14 by the cam 25. The cam 25 co-operates with the arm 23* to lift the pillar 22, at times, as hereinbefore stated. The lever 45 associated with the second cam 40 (Fig. 8) is connected by means including a flexible connection 46 such as a Bowden cable to a brake strap or shoe 47 (Fig. 10) which cooperates with a brake block 48 carried by a lever 49 having a pin 50 which projects through an arcuate slot 51 formed in the top surface of the machine casing 10. Associated with the tone-arm is a pin or projection 52 which is carried by the brake block 53 associated with the third cam 41 (Fig. 9) is connected to the tone-arm pillar 9 by means including a flexible connection 54

such as a Bowden cable and a spring so that, when the lever 53 is moved in the rotation of the cam 41, the pillar 9 is partly rotated or turned thereby swinging the tone-arm 8 from the innermost to the outermost position.

When the lever 45 associated with the second cam 40 is moved in the rotation of the cam, the brake shoe 47 is applied to the brake block 48 thereby locking the lever 49 which carries the pin 50 in the arcuate slot 51 so that the movement of the tone-arm 8 is limited by the pin 52 associated therewith contacting with the locked lever 49.

What we claim is:—

1. An automatic phonograph comprising a turn-table, a tone arm having a vertical pillar, a record support or magazine, a record change-arm secured to swing over said turn-table and magazine, a pin carried by said arm and adapted to engage in the central hole of a record of said magazine, another pin carried by said arm and adapted to push a record off the turn-table, a motor driven spindle, two cams secured on said spindle, followers co-operative with said cams and yieldingly connected to the tone-arm pillar, whereby said pillar is raised to lift the needle or other "pick-up" and is partially rotated to swing said "pick-up" from an inner to an outer position, a third cam secured on said driven spindle, a follower co-operative with said third cam and a brake device with which said follower is yieldingly connected and whereby the swinging movement of said tone-arm is limited.

2. An automatic phonograph as claimed in claim 1 in which the means for swinging the said record change-arm comprises a swinging arm attached to the change arm and having a slot, and a wheel carrying a pin working in said slot.

3. An automatic phonograph as claimed in claim 1 in which the means for swinging the said record change-arm comprises a swinging arm attached to the change arm and having a slot, and a wheel carrying a pin working in said slot, and means for limiting the swinging movements of the said record change arm.

4. An automatic phonograph as claimed in claim 1 comprising rollers arranged to rest on the top record in the magazine, and spring means for pressing the record support upward against said rollers.

In testimony whereof we have signed our names to this specification.

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