

Description

The invention relates to a record player having a turntable, a pick-up arm having a pick-up arm base and a control device for the pick-up arm, comprising a command disc, and means for rotating said command disc, a drive element which can be driven by said command disc, and carries a control element, a guide element connected to said drive element and being pivotable between an inoperative first stable position and an operative second stable position, said guide element being in said first position during a first movement of the drive element, and in the second position during at least part of a return movement of said drive element opposite said first movement, a coupling element on said pick-up arm base, said guide element being engageable with said coupling element to guide the pick-up arm towards the turntable when said guide element is in said second position only, an abutment arranged on said pick-up arm base, a pivotal selection member having first and second positioning surfaces, arranged such that such surfaces are selectively cooperable with said abutment to position the pick-up arm selectively in a first or second position above the turntable, a stop against which said guide element abuts at the end of said first movement, abutment with said stop pivoting said guide element to the second position, means for pivoting said guide element out of said second position so as to disengage said guide element from said coupling element, during said return movement of the drive element after said abutment abuts the selected one of said positioning surfaces, said control element pivots said selection member to an inoperative position to move the selected positioning surface out of the path of the abutment on the pick-up arm base after the guide element has been disengaged from the coupling element.

Such a record player is known from GB-A-2.047.941. In this known record player, each time after completing the pick-up arm return operation in the stopping mode of the player a latch member is pivoted to disengage from the coupling element on the pick-up arm base when the drive element advances to return to the home position. The pivotal movements of the latch member are obtained by means of an entire additional set of elements, comprising a reset plate and a connecting rod. Thus by means of a complex combination of elements it is ensured that the pick-up arm stays at the rest position even when the drive element returns to its home position. This complex structure is rather bulky and has an uncertain reliability.

It is the object of the invention to construct the control device of a record player defined in the opening paragraph such that in the stopping mode of the player the guide element, cooperating with the pick-up arm base arm, is pivoted to its inoperative position in response to the position of the selection member.

To this end the invention is characterized in that the pivotal selection member has a further surface, said guide element abuts said further surface and pivots to said first position immediately after the start of the return movement of the drive element when the selection member is in the inoperative position.

This results in a control device by means of which in the stopping mode the position of the selection member itself causes the guide element, which has just been moved from the first to the second positions as the drive element approached the end of the first movement, to be immediately pivoted back to the first position after the start of the return movement of the drive element.

Since the selection member is in the inoperative position when the player is started, the pick-up arm cannot be moved and remains in the rest position as long as the selection member is not pivoted to one of its two operating positions. As a result of this, the pick-up arm can be pivoted towards the turntable only if the operator moves a size selection lever to either direction from an inoperative position, after the player has been started. The parts, used for this function of the control device, can be of simple construction and can have a minimal mounting height, there minimizing the height of the record player in accordance with the invention.

A preferred embodiment of the invention is characterized in that said further surface is constituted by a free end of a tongue, adjacent said first and second positioning surfaces. Thus, at the completion of playing, the guide element will be passing under the tongue and will be set from the second position back to the first position immediately after the start of the return stroke of the drive element.

In this respect another preferred embodiment of the invention is characterized in that said first positioning surface is disposed to one side of said tongue, and the second positioning surface is disposed to the opposite side of said tongue. As a result of the location of the tongue between the first and the second positioning surface the inoperative position of the selection member can be an intermediate position between the two operative positions. As a result of this, the selection member need only be moved over a short distance from the inoperative position to the relevant operative position.

Another preferred embodiment of the invention is characterized in that the control element is pivotally connected to the drive element and during at least a part of the return movement of the drive element is in an operative position in which the selection member is positioned into the inoperative position. Thus, each time after the pick-up arm has been set down the selection member is again in the inoperative position, so that in the case of re-starting the selection member should first be reset to one of the two operative positions before the pick-up arm can be actuated again. In this respect another preferred

embodiment of the invention is characterized in that during said part of the return movement of the drive element the control element moves between two convergent guide walls of the drive element, the control element setting the selection member to the inoperative position at the end of the movement between the guide walls.

In this respect a further preferred embodiment is characterized in that at the beginning of the forward movement of the drive element the control element is disengaged from the selection member and is spaced from that side of the selection member in which the two convergent guide walls of the selection member terminate. This ensures that at the start of the rotation of the turntable and the movement of the drive element, the control element is still disengaged from the selection member, so that the movement of the selection member to one of the operative positions can proceed without being obstructed by the control element.

A further preferred embodiment of the invention is characterized in that the drive element is pivotable about an axis which at least substantially coincides with the pivotal axis of the pick-up arm, whilst the surfaces are situated on a portion of the selection member, which portion is curved substantially concentrically with the pick-up arm axis, the first and the second positioning surfaces are situated at the smaller distance and a larger distance respectively from the pivotal axis of the pick-up arm than the further surface. Thus, the control device can be of a compact construction, parts of the drive element and the selection member being disposed concentrically with the pivotal axis of the pick-up arm. This construction enables the record player to be compact without thereby adversely affecting a correct automatic operation of the control device.

Embodiments of the invention will now be described in more detail, by way of example, with reference to the drawings. In the drawings:

Fig. 1 is a plan view of a record player in accordance with the invention;

Fig. 2 is a perspective underneath view of the control device of a record player according to a first embodiment of the invention in the rest position;

Fig. 3 is a view similar to Fig. 1 showing the control device of Fig. 2 at an early stage in its operation when the drive element is moving forward;

Fig. 4 is a view similar to Fig. 2 showing the control device at a stage when the drive element has almost reached the end of its forward movement and the guide element has engaged with the coupling element;

Fig. 5 is a view similar to Fig. 2 showing the control device at a stage when the drive element is performing a return movement and the pick-up arm is positioned above the turntable;

Fig. 6 is a schematic perspective view of a

second embodiment of the invention showing the control device in the rest position;

Fig. 7 shows a part of the control device of Fig. 6 on a larger scale;

Fig. 8 shows another part of the control device of Fig. 6 on a larger scale;

Fig. 9 is a view similar to Fig. 6, showing the drive element during its forward movement and the selection member in an operative position;

Fig. 10 is a view similar to Fig. 6, showing the drive element at the end of its forward movement, when the guide element is pivoted to the operative position;

Fig. 11 is a perspective view of a part of the control device of Fig. 10 on a larger scale;

Fig. 12 is a view similar to Fig. 6 showing the situation in which the pick-up arm is positioned above the turntable;

Fig. 13 is a section view of a part of the control device taken on lines XIII—XIII in Fig. 12 and drawn to a larger scale;

Fig. 14 is a sectional view similar to Fig. 13 showing the guide element pivoted out of the operative position;

Fig. 15 is a view similar to Fig. 6 showing the drive element during its return movement from the position shown in Fig. 12;

Fig. 16 is a view similar to Fig. 6 showing the selection member pivoted to an inoperative position;

Fig. 17 is a perspective view of a third embodiment of the invention.

The record player shown in Fig. 1 comprises a deck 1 on which a turntable 2 is mounted for rotation by means of a turntable shaft 3. The turntable 2 is driven by a central drive motor, not shown. The upper side of the deck 1 carries a pick-up arm 4, provided with a pick-up head 4a for playing a record on the turntable 2 by means of a stylus. The pick-up arm 4 is pivotable up and down relative to the deck 1 about a horizontal pivot spindle 4b and is pivotable laterally about a vertical pivot spindle 4c (see Fig. 2). An arcuate lift support 5 is arranged underneath the arm 4 and is situated on the upper end of a lift spindle 6 which is movably guided in the deck 1. The arm 4 can be retained in a rest position by means of a clip 7 provided on an arm rest 8. The deck 1 further carries a number of actuating buttons including a diameter-selection button 9 and a start button 10. In a manner not shown, the diameter-selection button is also coupled to a change-over device for the drive in order to switch the speed at which the turntable 2 is driven between 33 $\frac{1}{3}$ and 45 revolutions per minute.

Arranged underneath the deck 1 (see Fig. 2) are a gear wheel 11 which is rigidly connected to the turntable shaft 3 and a command disc 12 which is rotatable through 360° about an axis 12a which extends parallel to the shaft 3. The command disc is provided with teeth 13 which mesh with the gear wheel 11 during the movement of the pick-up arm 4 towards and away from the turntable 2 by means of a control

device to be described hereinafter. In the rest position and when a record is being played the gear wheel 11 faces an untoothed portion 14 of the periphery of the command disc 12 so that the gear wheel 11 cannot drive the disc 12. The command disc 12 carries eccentrically a spindle 15 which extends parallel to the turntable shaft 3 and about which a drive element comprising a driving rod 16 is pivotable at one end so that the rod 16 can be reciprocated by rotating the disc 12. Near its end which is remote from the spindle 15 the rod 16 is provided with a guideway 16a on which the lower end of the lift spindle 6 engages.

On its upper side the command disc 12 has a raised cylindrical rim 17 with an outwardly protruding portion which forms a cam surface 18 and a re-entrant portion which forms a recess 19 in the outer surface of the rim. In the rest position shown in Fig. 2 a hook portion 20 of a switching member 21 which is pivotable intermediate its ends about a spindle 22 engages in the recess 19, a spring 23 tending to pivot the member 21 in the direction indicated by the arrow A, so that the hook portion 20 occupies a stable position in the recess. The member 21 carries an electrical switch 24 which is connected to the drive motor by wires 25. In the rest position shown in Fig. 2 the switch is positioned against a projection 24a which is controlled by the pick-up arm 4, the arm 4 keeping the switch 24 open via the projection 24a and thus keeping the drive motor switched off in the rest position.

At its periphery the command disc 12 is provided with an arcuate guide rim 26 which extends through an arc of approximately 150° and which has a re-entrant portion which forms a recess 27 in the outer surface of the rim. In the situation shown in Fig. 2 a rounded protrusion 28 on a pivotable selection member 29 engages in the recess 27. The member 29 is pivotable intermediate its ends about the spindle 22, a spring 30 tending to pivot the member 29 in the direction indicated by the arrow B, so that the protrusion 28 is firmly retained in the recess 27 in the rest position. The member 29 further comprises two positioning surfaces 31 and 32 (see Fig. 3) for positioning the pick-up arm 4 in a manner to be described hereinafter when a stylus carried by the pick-up head 4a is set down on a record on the turntable 2. In addition, the member 29 comprises a projection 33 which in the position shown in Fig. 2 is situated close to an abutment 34 on a starting member 35. In this position the projection 33 is situated directly opposite the abutment 34. The member 35 is pivotable about a spindle 36 and is connected to the start button 10 by means of an actuating rod 37. The member 35 further comprises a latching hook 38 which is clear of a shoulder 39 on the switching member 21 in the position shown in Fig. 2. A spring 40 tends to pivot the member about the spindle 36 in the direction indicated by the arrow C, a stop, not shown, limiting the pivotal movement of the member 35 in this direction in the position shown.

On its end which is near the protrusion 28 the

selection member 29 carries an element 41 which can cooperate with an actuating element constituted by the end portion of an actuating rod 42 which is connected to the diameter-selection button 9.

Above the deck 1 the pick-up arm 4 is connected to a rotatable base 43 of the arm so as to be pivotable about the spindle 4b. The base 43 comprises a circular disc 43a (see Figs. 1 and 2) fixed on a support 43b. The disc 43a also carries the projection 24a. At the end which is remote from the disc 43a the support 43b comprises a pivot 44, which is journaled in a supporting member 45 secured to the underside of the deck 1. A bearing, not shown, for the disc 43a on the deck 1 in conjunction with the pivot 44 define the pivot axis 4c of the pick-up arm 4. The supporting member 45 is provided with a fixed reset surface 47.

At its end which is remote from the spindle 15 the drive rod 16 carries a guide element 48 which is pivotable relative to the rod 16 about a spindle 52 which extends substantially parallel to the turntable shaft 3. The guide element 48 is provided with a hook-shaped portion 49 and with a pin 50 which is guided in an arcuate slot 51 in the drive rod 16. An over-centre spring, not shown, always engages in one or the other of two recesses, not shown, in a wall of the guide element 48, so that this element is stably retained in one or the other of two positions. In one of these positions the hook-shaped portion 49 of the element 48 is situated in the path of movement of a coupling element 53 arranged on the support 43b of the pick-up arm base 43.

The pick-up arm base 43 carries a resilient stop 54 whereby the pick-up arm 4 is returned to the arm rest 8 by means of an edge portion 55 on the drive rod 16.

Further parts of the control device of the record player in accordance with the invention will be described in the following description of the operation of the record player.

First, the clip 7 is removed from the pick-up arm 4 so that the arm lies freely on the arm rest 8. Depending on whether the diameter-selection button 9 is depressed or not, a selection is made of the desired speed of the turntable 2 (33⅓ or 45 revolutions per minute) and the diameter of the record to be played (30 or 17 cm). When subsequently the start button 10 is pressed the starting cycle of the player begins. The starting cycle proceeds as follows:

a) The position of the end of the rod 42 depends on whether or not the button 9 has been depressed.

b) Upon depression of the button 10 the starting member 35 is pivoted in a direction opposite to that indicated by the arrow C against the force of the spring 40, so that the latching hook 38 on the member 35 is pressed against the switching member 21 to rotate this member in a direction opposite to that indicated by the arrow A to a position in which the portion 20 of the member 21 is disengaged from the recess 19 so that the

command disc 12 is free to rotate. The switching member 21 is latched in this position by the latching hook 38 engaging behind the shoulder 39 on the switching member. Owing to the pivotal movement of the member 21 the switch 24 is now clear of the projection 24a on the pick-up arm base 43, as a result of which the motor is started and the turntable 2 together with the turntable 3 and the gear wheel 11 begin to rotate.

c) During depression of the button 10 the starting member 35 has slightly rotated the command disc 2, in a manner not shown, in the direction indicated by the arrow D, so that the gear wheel 11 meshes with the teeth 13, the disc 12 is driven and continues to rotate in the direction indicated by the arrow D. As a result of this, the rounded protrusion 28 on the selection member 29 is displaced from the recess 27 and subsequently slides on the outer surface of the guide rim 26, causing the member 29 to be pivoted in a direction opposite to that indicated by the arrow B.

d) The drive rod 16 and with it the guide element 48 now begin to move to the left as indicated by the arrow E (see Fig. 3). When the end of the guide rim 26 reaches the protrusion 28 the selection member 29 is pivoted back by the spring 30 in the direction indicated by the arrow B (see Fig. 4). This movement of the member 29 is not impeded by the abutment 34 on the starting member 35, because the abutment 34 is now situated to one side of the projection 33 on the member 29 owing to the pivotal movement of the member 35. The movement of the member 29 brings stop 56 in the form of a hook-shaped projection on the end of the member 29 into the path of movement of the guide element 48. As a result of the movement of the drive rod 16 in the direction indicated by the arrow E the guide element 48 contacts the stop 56 during the last stage of the travel of the rod 16 and is pivoted about the spindle 52 as is indicated by the arrow F and the pin 50 assumes a different operative position in the slot 51. The selection member 29 has now pivoted in the direction of the arrow B far enough for the element 41 to abut the end of the rod 42. Thus, this position of the member 29 depends on the setting of the button 9.

e) Owing to the pivotal movement of the guide element 48 the hook-shaped portion 49 of this element is situated behind the coupling element 53 at the end of the movement of the drive rod 16 in the direction of the arrow E, with the result that the portion 49 rotates the pick-up arm base 43 and the pick-up arm 4 to move back with the rod 16 in a direction opposite to that indicated by the arrow E. In the meantime the arm 4 has been lifted to the raised position because at the side of the rod 16 facing the frame 1 the guideway 16a rises gradually in the direction of the arrow E and the lift spindle 6 is lifted by the guideway 16a at the end of the movement of the rod 16.

f) The pick-up arm base 43 carries an abutment 57 (see Fig. 2) which, during the movement of the base 43 in the present stage of the starting cycle

abuts one of the positioning surfaces 31 and 32 on the selection member 29 depending on the position of the member 29 as determined by the button 9. The positioning surface 31 is operative when the button 9 is set to a 30-cm diameter record and the surface 32 is operative when the button is set to a record of 17 cm diameter. The pick-up arm base 43 is now held between the hook-shaped portion 49 of the guide element 48 and the positioning surface 31 or 32, so that a stable position of the arm 4 above the turntable is obtained. In this way the moving mass of the pick up arm 4 is arrested effectively, whilst during positioning of the pick-up arm 4 above the turntable shocks or vibrations to which the record player is subjected have no adverse effect on the position of the pick-up arm. Fig. 5 shows the position of the abutment 57 against the positioning surface 31 when the button 9 is set to a record of 30 cm diameter.

g) During the return movement of the rod 16 the abutment 57 remains briefly in abutment with the positioning surface 31 or 32 and the hook-shaped portion 49 of the guide element 48 can slide away from behind the coupling element 53 and thus become disengaged from this element 53. Immediately after this the protrusion 28 on the selection member 29 is engaged by a cam surface 26a at the beginning of the guide rim 26 and the member 29 is thereby pivoted to move the positioning surface 31 and 32 away from the abutment 57 so that the pick-up arm base 43 and therefore the pick-up arm 4 are released. At this instant the arm 4 is still situated on the lift support 5.

h) The further movement of the rod 16 in the direction opposite to that indicated by the arrow E brings the pin 50 against the reset surface 47 at the end of the travel of the rod 16. As a result of this, the surface 47 causes the guide element 48 to be pivoted back about the spindle 52 into the inoperative initial position, so that the element 48 again occupies the stable initial position shown in Fig. 2.

i) The hook portion 20 of the switching member 21 is now engaged by the cam surface 18 on the command disc 12 and the member 21 is thereby pivoted in a direction opposite to that indicated by the arrow A to become disengaged from the latching hook 38. Under the influence of the spring 40 the starting member 35 moves back in the direction indicated by the arrow C to the position shown in Fig. 2 and the abutment 34 is again situated directly opposite the projection 33 on the selection member 29.

j) Subsequently, the protrusion 28 on the selection member 29 engages in the recess 27 in the guide rim 26, the hook portion 20 of the switching member 21 engages in the recess 19 in the rim 19 on the command disc 12 and the command disc rotates until the untoothed portion 14 is again situated opposite the gear wheel 11, so that the disc 12 stops. In the meantime during the final stage of the travel of the rod 16 the lift spindle 6 of the pick-up arm 4 has moved downwards

together with the support 5 so that the arm 4 has been moved towards the record on the turntable and playing may commence. The arm 4 is then no longer obstructed by the guide element 48 or the selection member 29.

The stop cycle, which can be initiated by moving the arm 4 towards the centre of the turntable, but which may also be initiated by depressing a further actuating button 58 (see Fig. 1), includes the following movements of the control device:

a) At the end of the movement of the pick-up arm 4 over the record the pick-up arm base 43 is coupled to the command disc 12 by means of a rod 59. As a result of this coupling the disc 12 is subsequently rotated slightly in the direction indicated by the arrow D, so that the gear wheel 11 again meshes with the teeth 13 on the disc 12, and the gear wheel 11 causes the disc 12 to rotate further in the direction indicated by the arrow D. In a manner not shown this rotation can also be obtained by pressing the button 58. This leads to a movement of one of members 21 and 29 as already described in the foregoing for the position of the control device as shown in Fig. 3. As a result of the movement of the rod 16 in the direction indicated by the arrow E the arm 4 is lifted immediately after the disc 12 has begun to rotate.

b) The edge portion 55 of the drive rod 16 now acts against the stop 54 so that the pick-up arm base 43 is moved back and the pick-up arm 4 is returned to the arm rest 8. When the protrusion 28 on the selection member 29 has become disengaged from the guide rim 26 on the command disc 12, the member 29 is pivoted about the spindle 22 by the spring 30 to an operative position which is determined by the engagement of the projection 33 on the member 29 with the abutment 34 on the starting member 35. It is then important that the abutment 34 is situated exactly opposite the projection 33 at the end of the starting cycle. This ensures that during the stop cycle the member 29 cannot affect the position of the guide element 48 by means of the stop 56, so that the guide element remains in the inoperative position and the positioning surfaces 31 and 32 on the member 29 remain outside the path of movement of the abutment 57, on the pick-up arm base 43. At the end of the return movement of the rod 16 in the direction opposite to that indicated by the arrow E the pick-up arm 4 is again lowered onto the arm rest 8.

c) At the end of the stop cycle the situation shown in Fig. 2 again obtains, in which the switch 24 on the member 21 is pressed against the projection 24a on the pick-up arm base 43, which projection has been appropriately positioned in the meantime, and the drive motor stops.

The control device for controlling the pick-up arm 4 as described in the foregoing has the advantage that it requires comparatively few parts having only a small mounting height, so that the record player in accordance with the invention can be accommodated in a comparatively low housing.

The embodiment shown in Figs. 6—16 com-

prises a command disc 60 which in the situation shown in Fig. 6 is latched in a manner not shown, but in the situation shown in Figs. 9, 10, 12, 15 and 16 rotates in the direction indicated by the arrow P. The command disc 60 is connected to a reciprocable rod 61 which is pivotally connected to a drive element 62 which comprises a plate which is shaped as a sector of a circle and the arcuate edge of which faces the command disc 60. In the present embodiment the drive element 62 is pivotable about the vertical pivotal axis 4c of the pick-up arm 4, which is mounted on a pick-up arm base 63. In the same way as the pick-up arm base 43 in the first embodiment the pick-up arm base 63 extends both above and below the deck (not shown) of the record player. Like the first embodiment the present embodiment comprises a lift support 5 with a lift spindle 6. The lift spindle 6 can be controlled by means of a guideway 62a on the drive element 62, which guideway is formed as a torque which is bent obliquely downwards from the drive element. The pick-up arm base 63 comprises an arm 63a on which an abutment 64 is formed (see also Figs. 8 and 13), which abutment in the manner shown in Fig. 11, is pivotable about a pivotal axis (not shown) which extends substantially radially of the pivotal axis 4c. The drive element 62 is further provided with a pin 65 which serves for returning the pick-up arm 4 to the rest position.

A selection member 66 is arranged on the deck, so as to be pivotable about a pivotal axis 67. The selection member 66 comprises a terminally tapered central actuating portion 66a which can be actuated selectively by means of an actuation portion 68a or 69a of a spring-loaded actuating button 68 or 69. As is shown in, for example, Fig. 9 depression of the actuating button 68 results in the selection member 66 being pivoted about the pivotal axis 67 in the direction indicated by the arrow Q, whilst depression of the other actuating button 69 results in the selection member 66 being pivoted in a direction opposite to that indicated by the arrow Q. In a manner to be described hereinafter, depression of the button 68 results in the pick-up arm 4 being moved towards the turntable to a position corresponding to a 30-cm diameter record; depression of the actuating button 69 positions the pick-up arm 4 above the lead-in groove of a 17-cm diameter record.

The selection member 66 comprises an arcuate portion 66b which comprises a flat tongue 70 which extends towards the arm 63a and which, intermediate its ends and at its proximal end respectively, adjoins positioning surfaces 71 and 72. The positioning surface 71 is situated on that side of the portion 66b of the selection member which faces the pick-up arm base 73 and the positioning surface 72 is situated on the opposite side of the portion 66b. Like the positioning surfaces 31 and 32 in the previous embodiment the present positioning surfaces can be brought selectively into an operative position in the path described by the abutment 64 when the pick-up arm 4 is moved towards the turntable.

In the portion 66b of the selection member 66 an opening 73 is formed whose dimension measured radially of the pivotal axis 4c increases in a clockwise direction about the axis 4c as viewed in the drawings. The opening 73 terminates in two converging walls 74a and 74b, the ends of the walls being spaced at a distance from each other such as to allow the passage between them of a pin 75 which is pivotally connected to the drive element 62 (see Fig. 7). In view of the situation shown in Fig. 9 the pin 75 is connected to the drive element 62 so as to be pivotable about a horizontal pivotal axis 76 (Fig. 1). In the position shown in Fig. 6 the pin 75 is situated in an opening 77 in the selection member 66, which opening adjoins the opening 73. The opening 77 is so formed that upon actuation of one of the actuating buttons 68 the movement of the selection member 66 is not impeded.

The drive element 62 further carries a guide element 78 which is pivotable about a spindle 79 which extends substantially radially of the pivotal axis 4c. The guide element 78 has two mutually perpendicular edge portions, against one or the other of which a blade spring 80 bears with an over-centre action to retain the guide element 78 stably in one or the other of two positions (compare Fig. 6 and Fig. 13). In order to ensure that in the position shown in Fig. 13 the pick-up arm base 63 is retained correctly during the movement of the pick-up arm base 63a the guide element 78 is provided with a stepped edge portion 78a. In a manner as shown in Fig. 11 the guide element 78 can abut a stop 81 at the end of the forward movement of the drive element 62, which stop is secured to the frame in a manner not shown.

In the second embodiment the record player with control device operates as follows:

When, for example, the actuating button 68 is depressed the selection member 66, as already stated, is pivoted in the direction indicated by the arrow Q in Fig. 9, so that the positioning surface 71 is moved to the operative position. Depression of a start button, not shown, results in the command disc 60 being rotated in the direction indicated by the arrow P in the same way as in the first embodiment, so that the drive element 62 is pivoted about the pivotal axis 4c in the direction indicated by the arrow R in Fig. 9. As a result of this, the lift support 5 is moved upwards and the pick-up arm 4 is lifted off the arm rest 8 (Fig. 1). The pivotal movement of the drive element 62 also results in the pin 75 being disengaged from the opening 77, the pivotal arrangement of the pin 75 as shown in Fig. 9 enabling the pin to be pivoted to a horizontal position when it leaves the opening 77 and, subsequently, as it reaches the opening 73 (Fig. 10) to be pivoted back into the vertical position under the influence of a spring, not shown. As the movement of the drive element 62 in the direction indicated by the arrow R continues, the guide element 78 passes to the right (as viewed in the drawings) of the positioning surface 71 on the selection member 66 and abuts the stop 81, as shown in Fig. 11, at the end

of the forward movement of the drive element 62. In this respect it is important that the abutment 64 on the arm 63a of the pick-up arm base 63 can move past the positioning surface 71. This is possible as a result of the pivotal mounting of the abutment 64 on the arm 63a. By abutment with the stop 81 the guide element 78 is pivoted from the inoperative position to the operative position. During the subsequent return movement of the drive element 62, as indicated by the arrow S in Fig. 12, the pin 75 moves through the opening 73 in the selection member 66, the latter being retained in the position which it occupied before depression of the button 68. During this return movement of the drive element 62 the guide element 78 is pressed against a coupling element 63b formed by a bent edge portion of the arm 63a of the pick-up arm base 63. During this stage of the movement of the drive element 62 the guide element 78 rotates the pick-up arm base 63 to move the pick-up arm 4 towards the turntable 2 (Fig. 1). Owing to the stepped shape of its edge portion 78a the guide element 78 is also pressed against the abutment 64 on the arm 63a. The situation shown in Figs. 12 and 13 is then reached, in which the abutment 64 abuts the positioning surface 71 so that the pick-up arm is positioned above the turntable in the position required for playing a record of 30-cm diameter. In the same way as in the preceding embodiment the pick-up arm 4 is now in a stable position and owing to the presence of the guideway 62a the arm is still lifted. As the movement of the drive element 62 in the direction indicated by the arrow S continues the guide element 78, due to its engagement with the coupling element 63b and the abutment 64, is pivoted in the direction indicated by the arrow T in Fig. 14 from the operative position into the inoperative position as shown in Fig. 15, in which position it is firmly retained by the blade spring 80. At this instant the abutment 64 is still in abutment with the positioning surface 71 on the selection member 66. Further rotation of the command disc 60 to the position shown in Fig. 16 results in the pin 75 being moved between the converging walls 74a and 74b of the opening 73 in the selection member 66 and, by cooperation with, in this case, the wall 74b pivoting the selection member 66 back to the centre position in a direction opposite to that indicated by the arrow Q at the end of the return movement of the drive element 62. Consequently, the abutment 64 is disengaged from the positioning surface 71 and the lift spindle 6 is guided in a downward direction by the guideway 62a, so that the arm 4 is lowered onto the turntable. At this instant the pin 75 has again engaged in the opening 77 and occupies the position shown in Fig. 6, whilst in the same way as in the first embodiment the disc 60 is stopped by the disengagement of a drive wheel, not shown. The record can now be played. The pick-up arm base 63 with the abutment 64 is then not impeded by the positioning surfaces 71 and 72, because the selection member 66 has been set to the centre position by the action of the pin 75.

When the end of the record is reached, or upon actuation of the actuating button 58 (Fig. 1), the command disc 60 is started again and begins to rotate in the direction indicated by the arrow P. The drive element 62 is then pivoted about the axis 4c in the direction indicated by the arrow R, the lift support 5 being lifted again so that the pick-up arm 4 is also lifted. For returning the pick-up arm 4 from the turntable to the arm rest 8 the pin 75 on the drive element 62 pushes back the arm 63a of the pick-up arm base 63. It is then an advantage that even if at this instant the selection member 66 is positioned by reactivation of the actuating button 68, the pin 75 can yet move into the opening 73 because of the pivotal arrangement (compare Fig. 9). Moreover, it is important that the abutment 64 can move past the positioning surface 71 because, as is shown in Fig. 11, the abutment can pivot relative to the arm 63a. During the return movement the guide element 78 cannot influence the arm base 63 because the guide element is still situated underneath the portion 66b of the selection member 66. The guide element abuts with the stop 81 only at the end of the movement as shown in Fig. 11. If the button 68 is depressed the guide element pivots from the inoperative position to the operative position, so that the pick-up arm 4 can again be moved towards the turntable. However, if the selection member 66 is still in the centre position because the actuating button 68 is not actuated at this instant, the guide element slides along the underside of the tongue 70, so that after having been pivoted to the operative position by the stop 81 the guide element abuts with the free end of the tongue 70 immediately after the return movement of the drive element 62, thereby causing the guide element 78 to be pivoted back directly to the inoperative position, as a result of which the guide element cannot influence the position of the coupling element 63b on the arm 63a of the pick-up arm base 63 during pivotal return movement of the drive element 72. The pick-up arm 4 then remains on the arm rest 8 and the playing cycle is not repeated.

The embodiment shown in Fig. 17 is a variant of the preceding embodiment and comprises a drive element 82 driven by means of a command disc, not shown, via a rod 83. Like the drive element 62 the drive element 82 is pivotable about the pivotal axis 4c of a pick-up arm base 84, a lift spindle 6 and a lift support 5 connected thereto being moved upwards and downwards by means of a guideway 82a. A pick-up arm base 84 is provided with an arm 84a carrying a pivotable abutment 85 and a coupling element 84b. Similarly, there is provided a pivotable pin 86 and a guide element 87 is pivotally connected to the drive element 82. The deck, not shown, carries a selection member 89 which is pivotable about an axis 88 and which comprises three positioning surfaces 90, 91 and 92 and a tongue 93 at one end. For setting the disc diameter three actuating buttons 94, 95 and 96 are provided for positioning the arm above a 17 cm, a 25 cm and a 30-cm record, respectively. At their

inner ends these actuating buttons are provided with actuating elements 94a, 95a, 96a, which are situated at different radial distances from the pivotal axis 88 and which, upon depression produce different pivotal movements of the selection member 89. Thus, in the same way as in the preceding embodiment one of the positioning surfaces 90, 91 and 92 is moved into the path of the abutment 85. In the present embodiment also the arm 84a is driven after the guide element 87 has been set to the operative position by abutment with a stop 90 at the end of the forward movement of the drive element 82. During the return movement the guide element 87 drives the arm 84a via the coupling element 84b, so that in the present embodiment also the pick-up arm 4 is retained stably in the set-down position above the record. A continued return movement of the drive element 82 results in the guide element 87 being pivoted away towards the inoperative position in the present embodiment and subsequently the pin 86 moves along an oblique edge 89a of the selection member 89, thereby causing the selection member to pivot back about the axis 88, so that the initial position of the selection member is reached. During the return movement of the arm 84a a pin, not shown, then enables the guide element 87 to remain underneath the tongue 93, so that the guide element 87 cannot be reactivated if none of the buttons 94, 95 and 96 is depressed. It is to be noted that in Fig. 17 the button 94 for selection of a 17 cm diameter record is depressed. The construction shown enables the control device of the record player in accordance with the invention to be used for positioning the pick-up arm 4 in three positions above the turntable. The two embodiments shown in Figs. 6 to 16 and Fig. 17 have the same advantages as the first embodiment, namely the comparatively small number of parts and the low mounting height of the control device.

Claims

1. A record player having a turntable (2), a pick-up arm (4) having a pick-up arm base (63; 84) and a control device for the pick-up arm, comprising a command disc (60), and means (11) for rotating said command disc (60),

a drive element (62; 82) which can be driven by said command disc (60), and carries a control element (75; 86),

a guide element (78; 87) connected to said drive element (62; 82) and being pivotable between an inoperative first stable position and an operative second stable position, said guide element (78; 87) being in said first position during a first movement of the drive element (62; 82), and in the second position during at least part of a return movement of said drive element (62; 82) opposite said first movement,

a coupling element (63b; 84b) on said pick-up arm base (63; 84), said guide element (78; 87) being engageable with said coupling element (63b; 84b) to guide the pick-up arm (4) towards

When the end of the record is reached, or upon actuation of the actuating button 58 (Fig. 1), the command disc 60 is started again and begins to rotate in the direction indicated by the arrow P. The drive element 62 is then pivoted about the axis 4c in the direction indicated by the arrow R, the lift support 5 being lifted again so that the pick-up arm 4 is also lifted. For returning the pick-up arm 4 from the turntable to the arm rest 8 the pin 75 on the drive element 62 pushes back the arm 63a of the pick-up arm base 63. It is then an advantage that even if at this instant the selection member 66 is positioned by reactuation of the actuating button 68, the pin 75 can yet move into the opening 73 because of the pivotal arrangement (compare Fig. 9). Moreover, it is important that the abutment 64 can move past the positioning surface 71 because, as is shown in Fig. 11, the abutment can pivot relative to the arm 63a. During the return movement the guide element 78 cannot influence the arm base 63 because the guide element is still situated underneath the portion 66b of the selection member 66. The guide element abuts with the stop 81 only at the end of the movement as shown in Fig. 11. If the button 68 is depressed the guide element pivots from the inoperative position to the operative position, so that the pick-up arm 4 can again be moved towards the turntable. However, if the selection member 66 is still in the centre position because the actuating button 68 is not actuated at this instant, the guide element slides along the underside of the tongue 70, so that after having been pivoted to the operative position by the stop 81 the guide element abuts with the free end of the tongue 70 immediately after the return movement of the drive element 62, thereby causing the guide element 78 to be pivoted back directly to the inoperative position, as a result of which the guide element cannot influence the position of the coupling element 63b on the arm 63a of the pick-up arm base 63 during pivotal return movement of the drive element 72. The pick-up arm 4 then remains on the arm rest 8 and the playing cycle is not repeated.

The embodiment shown in Fig. 17 is a variant of the preceding embodiment and comprises a drive element 82 driven by means of a command disc, not shown, via a rod 83. Like the drive element 62 the drive element 82 is pivotable about the pivotal axis 4c of a pick-up arm base 84, a lift spindle 6 and a lift support 5 connected thereto being moved upwards and downwards by means of a guideway 82a. A pick-up arm base 84 is provided with an arm 84a carrying a pivotable abutment 85 and a coupling element 84b. Similarly, there is provided a pivotable pin 86 and a guide element 87 is pivotally connected to the drive element 82. The deck, not shown, carries a selection member 89 which is pivotable about an axis 88 and which comprises three positioning surfaces 90, 91 and 92 and a tongue 93 at one end. For setting the disc diameter three actuating buttons 94, 95 and 96 are provided for positioning the arm above a 17 cm, a 25 cm and a 30-cm record, respectively. At their

inner ends these actuating buttons are provided with actuating elements 94a, 95a, 96a, which are situated at different radial distances from the pivotal axis 88 and which, upon depression produce different pivotal movements of the selection member 89. Thus, in the same way as in the preceding embodiment one of the positioning surfaces 90, 91 and 92 is moved into the path of the abutment 85. In the present embodiment also the arm 84a is driven after the guide element 87 has been set to the operative position by abutment with a stop 90 at the end of the forward movement of the drive element 82. During the return movement the guide element 87 drives the arm 84a via the coupling element 84b, so that in the present embodiment also the pick-up arm 4 is retained stably in the set-down position above the record. A continued return movement of the drive element 82 results in the guide element 87 being pivoted away towards the inoperative position in the present embodiment and subsequently the pin 86 moves along an oblique edge 89a of the selection member 89, thereby causing the selection member to pivot back about the axis 88, so that the initial position of the selection member is reached. During the return movement of the arm 84a a pin, not shown, then enables the guide element 87 to remain underneath the tongue 93, so that the guide element 87 cannot be reactivated if none of the buttons 94, 95 and 96 is depressed. It is to be noted that in Fig. 17 the button 94 for selection of a 17 cm diameter record is depressed. The construction shown enables the control device of the record player in accordance with the invention to be used for positioning the pick-up arm 4 in three positions above the turntable. The two embodiments shown in Figs. 6 to 16 and Fig. 17 have the same advantages as the first embodiment, namely the comparatively small number of parts and the low mounting height of the control device.

Claims

1. A record player having a turntable (2), a pick-up arm (4) having a pick-up arm base (63; 84) and a control device for the pick-up arm, comprising a command disc (60), and means (11) for rotating said command disc (60),

a drive element (62; 82) which can be driven by said command disc (60), and carries a control element (75; 86),

a guide element (78; 87) connected to said drive element (62; 82) and being pivotable between an inoperative first stable position and an operative second stable position, said guide element (78; 87) being in said first position during a first movement of the drive element (62; 82), and in the second position during at least part of a return movement of said drive element (62; 82) opposite said first movement,

a coupling element (63b; 84b) on said pick-up arm base (63; 84), said guide element (78; 87) being engageable with said coupling element (63b; 84b) to guide the pick-up arm (4) towards



the turntable (2) when said guide element (78; 87) is in said second position only,

an abutment (64; 85) arranged on said pick-up arm base (63; 84),

a pivotal selection member (66; 89) having first (71; 92) and second positioning (72; 91) surfaces, arranged such that such surfaces are selectively cooperable with said abutment (64; 85) to position the pick-up arm (4) selectively in a first or second position above the turntable (2),

a stop (81; 90) against which said guide element (78; 87) abuts at the end of said first movement, abutment with said stop (81; 90) pivoting said guide element (78; 87) to the second position,

means for pivoting said guide element (78; 87) out of said second position so as to disengage said guide element (78; 87) from said coupling element (63b; 84b), during said return movement of the drive element (78; 87) after said abutment (64; 85) abuts the selected one of said positioning surfaces (71, 72; 90, 91, 92), said control element

(75; 86) pivots said selection member (66; 89) to an inoperative position to move the selected positioning surface (71; 92; 72; 91) out of the path of the abutment (64; 85) on the pick-up arm base (63; 84) after the guide element (78; 87) has been disengaged from the coupling element (63b; 84b),

characterized in that the pivotal selection member (66; 89) has a further surface (70; 93), said guide element (78; 87) abuts said further surface (70; 93) and pivots to said first position immediately after the start of the return movement of the drive element (62; 82) when the selection member (66; 89) is in the inoperative position.

2. A record player as claimed in Claim 1, characterized in that said further surface is constituted by a free end of a tongue (70, 93), adjacent said first and second positioning surfaces (71, 72; 91, 92) (Fig.'s 2, 6—17).

3. A record player as claimed in Claim 2, characterized in that said first positioning surface (71) is disposed to one side of said tongue (70), and the second positioning surface (72) is disposed to the opposite side of said tongue (70) (Fig.'s 6—16).

4. A record player as claimed in anyone of the preceding Claims, characterized in that the control element (75) is pivotally connected to the drive element (62) and during at least a part of the return movement of the drive element (62) is in an operative position in which the selection member (66) is positioned into the inoperative position (Fig.'s 15, 16, 17).

5. A record player as claimed in Claim 4, characterized in that during said part of the return movement of the drive element (62) the control element (75) moves between two convergent guide walls (74a, 74b) of the drive element (62), the control element (75) setting the selection member (66) to the inoperative position at the end of the movement between the guide walls (74a, 74b) (Fig.'s 15, 16).

6. A disc-record player as claimed in Claim 5,

characterized in that at the beginning of the forward movement of the drive element (62) the control element (75) is disengaged from the selection member (66) and is spaced from that side of the selection member in which the two convergent guide walls (74a, 74b) of the selection member (75) terminate (Fig. 6).

7. A disc-record player as claimed in Claim 6, characterized in that after abutment against said side of the selection member (66) during the continued forward movement of the drive element (62) the control element (75) is pivoted into an inoperative position (Fig. 9).

8. A disc-record player as claimed in Claim 5, the selection member (66) comprising an actuating portion (66a), which is adapted to cooperate with actuating means (68, 69) for pivoting the selection member (66) to one of its operative positions, characterized in that viewed relative to the pivotal axis (67) of the selection member (66) the guide walls (74a, 74b) and the positioning surfaces (71, 72) are situated near that side of the selection member which faces the pick-up arm axis (4c) and the actuating portion (66a) situated near that side of the selection member (66) which is removed from the pick-up arm axis (4c) (Fig.'s 6, 9, 10, 11, 15, 16).

9. A disc-record player as claimed in anyone of the preceding Claims, characterized in that the drive element (62) is pivotable about an axis which at least substantially coincides with the pivotal axis (4c) of the pick-up arm (4), whilst the surfaces (70, 71, 72) are situated on a portion of the selection member (66), which portion is curved substantially concentrically with the pick-up arm axis (4c), the first and the second positioning surfaces (71, 72) are situated at the smaller distance and a larger distance respectively from the pivotal axis (4c) of the pick-up arm (4) than the further surfaces (70) (Fig.'s 6, 9, 10, 11, 15, 16).

10. A disc-record player as claimed in Claim 9, characterized in that the convergent guide walls (74a, 74b) of the selection member (66) bound a recess (73) in a further arcuate portion of the selection member (66) which portion is also curved substantially concentrically with the pick-up arm axis (4c) (Fig.'s 6, 9, 10, 11, 15, 16).

Patentansprüche

1. Plattenspieler mit einem Plattenteller (2), einem Tonarm (4) mit einem Tonarmträger (63; 84) und einer Steuervorrichtung für den Tonarm mit:

einer Kommandoscheibe (60) und Mitteln (11) zum Drehenlassen der genannten Kommandoscheibe (60),

einem Antriebselement (62; 82), das von der genannten Kommandoscheibe (60) angetrieben werden kann und ein Steuerelement (75; 86) aufweist,

einem mit dem genannten Antriebselement (62; 82) verbundenen und zwischen einer ersten nicht wirksamen stabilen Lage und einer wirksamen zweiten stabilen Lage schwenkbaren



Führungselement (78; 87), das sich während einer ersten Bewegung des Antriebselementes (62; 82) in der genannten ersten Lage und während wenigstens eines Teils der Rücklaufbewegung des genannten Antriebselementes (62; 82), die der genannten ersten Bewegung entgegengesetzt ist, in der zweiten Lage befindet,

einem Kupplungselement (63b; 84b) auf dem genannten Tonarmträger (63; 84), wobei das genannte Führungselement (78; 87) mit dem genannten Kupplungselement (63b; 84b) zum Führen des Tonarms (4) in Richtung des Plattentellers (2) in Zusammenwirkung gebracht werden kann, nur wenn das genannte Führungselement (78; 87) sich in der genannte zweite Lage befindet,

einem Haltenocken (64; 85) auf dem genannten Tonarmträger (63; 84),

einem schwenkbaren Wählelement (66; 89) mit einer ersten (71; 92) und einer zweiten Positionierungsfläche (72; 91), die je derart vorgesehen sind, dass diese Flächen selektiv mit dem genannten Anschlag (64; 85) zum Zusammenwirken gebracht werden können um den Tonarm (4) selektiv in eine erste oder zweite Lage über den Plattenteller (2) zu bringen,

einem Anschlag (81; 90), gegen den das genannte Führungselement (78; 87) am Ende der genannten ersten Bewegung zum Anschlag gelangt, wobei die Berührung des genannten Anschlags (81; 90) das genannte Führungselement (78; 87) in die zweite Lage schwenken lässt,

Mitteln zum aus der genannten zweiten Lage Schwenken lassen des genannten Führungselementes (78; 87) um das genannte Führungselement (78; 87) während der genannten Rücklaufbewegung des Antriebselementes (62; 82) nachdem der genannte Haltenocken (64; 85) gegen die gewählte Fläche der genannten Positionierungsflächen (71, 72; 91, 92) zum Anschlag gelangt ist, von dem genannten Kupplungselement (63b; 84b) zu entkuppeln, wobei das genannte Steuerelement (75; 86) das genannte Wählelement in eine unwirksame Lage schwenkt, damit die gewählte Positionierungsfläche (71; 92; 72; 91) aus dem Weg des Haltenockens auf dem Tonarmträger (63; 84) bewegt wird, nachdem das Führungselement (78; 87) von dem Kupplungselement (63b; 84b) entkuppelt worden ist,

dadurch gekennzeichnet, dass das schwenkbare Wählelement (66; 89) eine weitere Fläche aufweist (70; 93), gegen die das genannte Führungselement (78; 87) zum Anschlag kommt und gleich nach Beginn der Rücklaufbewegung des Antriebselementes (62; 82), wenn das Wählelement (66; 89) sich in der unwirksamen Lage befindet, in die genannte erste Lage schwenkt.

2. Plattenspieler nach Anspruch 1, dadurch gekennzeichnet, dass die genannte weitere Fläche durch ein freies Ende einer in der Nähe der genannten ersten und zweiten Positionierungsfläche (71, 72; 91, 92) liegenden Zunge (70; 93) gebildet wird (Fig. 6—17).

3. Plattenspieler nach Anspruch 2, dadurch

gekennzeichnet, dass die genannte erste Positionierungsfläche (71) auf der einen Seite der genannten Zunge (70) und die zweite Positionierungsfläche (72) auf der gegenüber liegenden Seite der genannten Zunge (70) vorgehen ist (Fig. 6—16).

4. Plattenspieler nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, dass das Steuerelement (75) mit dem Antriebselement (62) schwenkbar verbunden ist und während wenigstens eines Teils der Rücklaufbewegung des Antriebselementes (62) sich in einer wirksamen Lage befindet, in der das Wählelement (66) in eine unwirksame Lage gebracht wird (Fig. 15, 16, 17).

5. Plattenspieler nach Anspruch 4, dadurch gekennzeichnet, dass während des genannten Teils der Rücklaufbewegung des Antriebselementes (62) das Steuerelement (75) zwischen zwei konvergierende Führungswände (74a, 74b) des Antriebselementes (62) bewegt, wobei das Steuerelement (75) am Ende der Bewegung zwischen den Führungswänden (74a, 74b) das Wählelement (66) in eine unwirksame Lage bringt (Fig. 15, 16).

6. Plattenspieler nach Anspruch 5, dadurch gekennzeichnet, dass am Anfang der Vorwärtsbewegung des Antriebselementes (62) das Steuerelement (75) von dem Wählelement (66) enkuppelt und in einen Abstand von derjenigen Seite des Wählelementes gebracht wird, an der die zwei konvergierenden Führungswände (74a, 74b) des Wählelementes (75) enden (Fig. 6).

7. Plattenspieler nach Anspruch 6, dadurch gekennzeichnet, dass nach dem Anschlag gegen die genannte Seite des Wählelementes (66) während der fortgesetzten Vorwärtsbewegung des Antriebselementes (62) das Steuerelement 75 in eine unwirksame Lage geschwenkt wird (Fig. 9).

8. Plattenspieler nach Anspruch 5, wobei das Wählelement (66) einen Bedienungsteil (66a) aufweist, der mit Bedienungsmitteln (68, 69) zum Verschwenken des Wählelementes (66) in eine der wirksamen Lagen zusammenarbeiten kann, dadurch gekennzeichnet, dass in der Richtung der Schwenkachse (67) des Wählelementes (66) gesehen, die Führungswände (74a, 74b) und die Positionierungsflächen (71, 72) in der Nähe derjenigen Seite des Wählelementes liegen, die der Achse (4c) des Tonarms zugewandt ist und dass der Bedienungsteil (66a) in der Nähe derjenigen Seite des Wählelementes (66) liegt, die in einem Abstand von der Tonarmachse (4c) liegt (Fig. 6, 9, 10, 11, 15, 16).

9. Plattenspieler nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, dass das Antriebselement (62) um eine Achse schwenkbar ist, die im wesentlichen mit der Schwenkachse (4c) des Tonarms (4) zusammenfällt, während die Flächen (70, 71, 72) auf einem Teil des Wählelementes (66) vorgesehen sind, wobei dieser Teil im wesentlichen konzentrisch zu der Tonarmachse (4c) gekrümmt ist, wobei die erste und zweite Positionierungsfläche (71, 72) in dem geringeren Abstand bzw. in einem grösseren Abstand von der Schwenkachse (4c) des Tonarms



(4) liegen als die weitere Fläche (70) Fig. 6, 9, 10, 11, 15, 16).

10. Plattenspieler nach Anspruch 9, dadurch gekennzeichnet, dass die konvergierenden Führungswände (74a, 74b) des Wählelementes (66) eine Ausnehmung (73) in einem weiteren gekrümmten Teil des Wählelementes (66) begrenzen, wobei dieser Teilebenfalls im wesentlichen konzentrisch zu der Tonarmachse (4c) gekrümmt ist (Fig. 6, 9, 10, 11, 15, 16).

Revendications

1. Tourne-disque comportant un plateau (2), un bras de lecture (4) comprenant une embase (63; 84) et un dispositif de commande pour le bras de lecture, comprenant:

un disque de commande (60), et un moyen (11) pour faire tourner le disque de commande (60), un élément d'entraînement (62; 82) qui peut être entraîné par le disque de commande (60) et qui porte un élément de commande (75; 86),

un élément de guidage (78; 87) relié à l'élément d'entraînement (62; 82) et pouvant pivoter entre une première position stable inactive et une seconde position stable active, l'élément de guidage (78; 87) se trouvant dans la première position pendant un premier mouvement de l'élément d'entraînement (62; 82) et dans la seconde position pendant au moins une partie d'un mouvement de retour de l'élément d'entraînement (62; 82) opposé au premier mouvement,

un élément de couplage (63b; 84b) sur l'embase (63; 84) du bras de lecture, l'élément de guidage (78; 87) pouvant être engagé avec l'élément de couplage (63b; 84b) pour guider le bras de lecture (4) vers le plateau (2) uniquement lorsque l'élément de guidage (78; 87) se trouve dans la seconde position,

une saillie d'arrêt (64; 85) disposée sur l'embase (63; 84) du bras de lecture,

un organe de sélection pivotant (66; 89) comportant une première (71; 92) et une seconde (72; 93) surface de positionnement disposées de telle sorte qu'elles puissent coopérer sélectivement avec la saillie d'arrêt (64; 85) pour positionner le bras de lecture (4) sélectivement dans une première ou une seconde position au-dessus du plateau (2),

une butée (81; 90) contre laquelle l'élément de guidage (78; 87) vient se placer à la fin du premier mouvement, le contact avec la butée (81; 90) faisant pivoter l'élément de guidage (78; 87) vers la seconde position,

un moyen pour faire pivoter l'élément de guidage (78; 87) à partir de la seconde position, de manière à dégager cet élément de guidage (78; 87) de l'élément de couplage (63b; 84b) pendant le mouvement de retour de l'élément d'entraînement (62; 82) après que la saillie d'arrêt (64; 85) est entrée en contact avec la surface de positionnement (71, 72; 90, 91, 92) sélectionnée, l'élément de commande (75; 86) faisant pivoter l'organe de sélection (66; 89) vers une position inactive pour amener la surface de positionne-

ment sélectionnée (71; 92; 72; 91) hors du chemin de la saillie d'arrêt (64; 85) de l'embase (63; 84) du bras de lecture lorsque l'élément de guidage (78; 87) a été dégagé de l'élément de couplage (63b; 84b),

caractérisé en ce que l'organe de sélection pivotant (66; 89) comporte une autre surface (70; 93) et que l'élément de guidage (78; 87) vient buter contre cette autre surface (70; 93) et pivote vers la première position immédiatement après le démarrage du mouvement de retour de l'élément d'entraînement (62; 82) lorsque l'organe de sélection (66; 89) se trouve dans sa position inactive.

2. Tourne-disque suivant la revendication 1, caractérisé en ce que l'autre surface est constituée par une extrémité libre d'une languette (70; 93) adjacente à la première et la seconde surface de positionnement (71, 72; 91, 92) (Fig. 6 à 17).

3. Tourne-disque suivant la revendication 2, caractérisé en ce que la première surface de positionnement (71) est disposée d'un côté de la languette (70) et la seconde surface de positionnement (72) est disposée du côté opposé de la languette (70) (Fig. 6 à 16).

4. Tourne-disque suivant l'une quelconque des revendications précédentes, caractérisé en ce que l'élément de commande (75) est articulé à l'élément d'entraînement (62) et, pendant au moins une partie du mouvement de retour de l'élément d'entraînement (62), il se trouve dans une position active dans laquelle l'organe de sélection (66) est positionné dans la position inactive (Fig. 15, 16, 17).

5. Tourne-disque suivant la revendication 4, caractérisé en ce que, pendant la dite partie du mouvement de retour de l'élément d'entraînement (62), l'élément de commande (75) se déplace entre deux parois de guidage convergentes (74a; 74b) de l'élément d'entraînement (62), l'élément de commande (75) réglant l'organe de sélection (66) dans la position inactive à la fin du déplacement entre les parois de guidage (74a; 74b) (Fig. 15, 16).

6. Tourne-disque suivant la revendication 5, caractérisé en ce qu'au début du mouvement d'avancement de l'élément d'entraînement (62), l'élément de commande (75) est dégagé de l'organe de sélection (66) et est espacé du côté de l'organe de sélection dans lequel les deux parois de guidage convergentes (74a; 74b) de l'organe de sélection (66) se terminent (Fig. 6).

7. Tourne-disque suivant la revendication 6, caractérisé en ce qu'après le contact de butée avec le côté de l'organe de sélection (66) pendant l'avancement de l'élément d'entraînement (62) qui se poursuit, l'élément de commande (75) pivote dans une position inactive (Fig. 9).

8. Tourne-disque suivant la revendication 5, dans lequel l'organe de sélection (66) comprend une partie d'actionnement (66a) qui peut coopérer avec un moyen d'actionnement (68 ou 69) en vue de pivoter vers une de ses positions actives, caractérisé en ce que, par rapport à l'axe de pivotement (67) de l'organe de sélection (66), les parois de guidage (74a; 74b) et les surfaces de



positionnement (71; 72) sont situées près du côté de l'organe de sélection qui est tourné vers l'axe (4c) du bras de lecture et la partie d'actionnement (66a) est située près du côté de l'organe de sélection (66) qui est éloigné de l'axe (4c) du bras de lecture (Fig. 6, 9, 10, 11, 15, 16).

9. Tourne-disque suivant l'une quelconque des revendications précédentes, caractérisé en ce que l'élément d'entraînement (62) peut pivoter autour d'un axe qui coïncide au moins en substance avec l'axe de pivotement (4c) du bras de lecture (4), tandis que les surfaces (70; 71; 72) sont situées sur une partie de l'organe de sélection (66) qui est courbée en substance concentriquement à l'axe

(4c) du bras de lecture, la première et la seconde surface de positionnement (71; 72) étant situées, respectivement, à des distances de l'axe de pivotement (4c) du bras de lecture (4) qui sont respectivement inférieure et supérieure à la distance de l'autre surface (70) (Fig. 6, 9, 10, 11, 15, 16).

10. Tourne-disque suivant la revendication 9, caractérisé en ce que les parois de guidage convergentes (74a; 74b) de l'organe de sélection (66) bornent une ouverture (73) dans une autre partie courbe de l'organe de sélection (66), qui est aussi courbée en substance concentriquement à l'axe (4c) du bras de lecture (Fig. 6, 9, 10, 11, 15, 16).

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