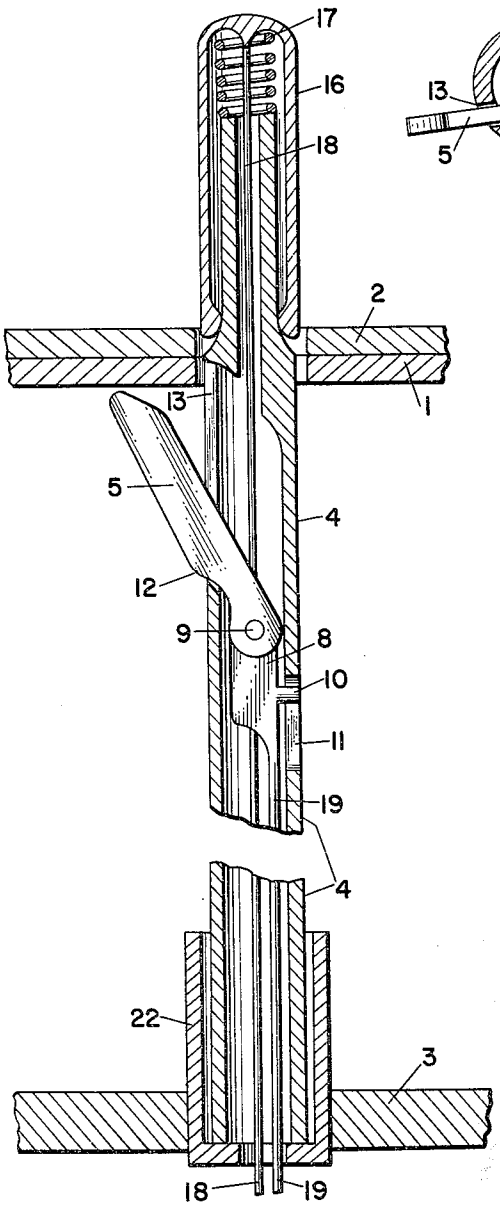
Feb. 27, 1962 A. ANSAR 3,023,008

ARRANGEMENT IN A RECORD-CHANGING GRAMOPHONE

Filed March 23, 1956

FIG.1



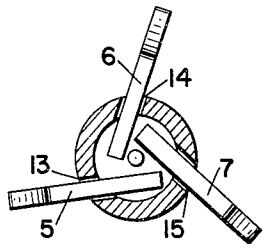


FIG.2

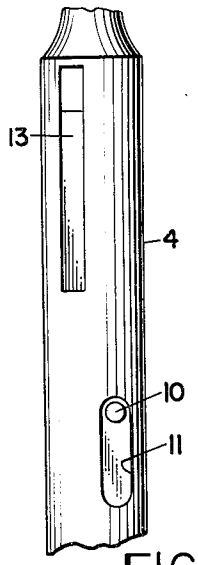


FIG.3

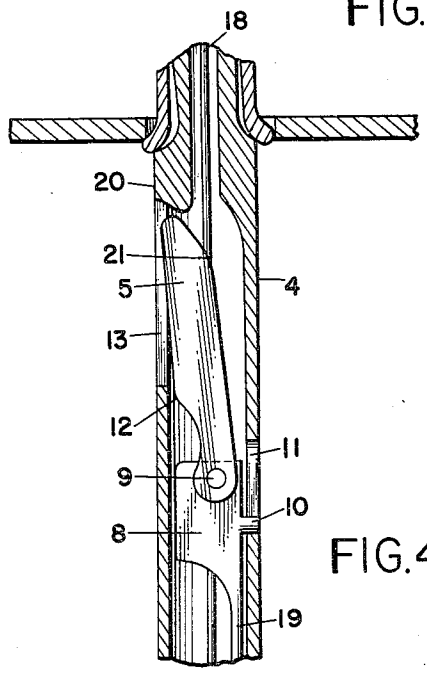


FIG.4

INVENTOR

ANDERS ANSAR

BY Blum Moscovitz Friedman & Blum

ATTORNEYS

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ARRANGEMENT IN A RECORD-CHANGING GRAMOPHONE

Anders Ansar, Nykoping, Sweden, assignor to The Garrard Engineering and Manufacturing Company Limited, Swindon, England

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The present invention refers to an arrangement in a record-changing gramophone in which a pile of discs to be fed down is supported over the turn-table of the gramophone by means of a guide-pin extending through the pile of discs and having arranged thereon retractable, for instance pivotable support-members, which are adapted to be actuated by actuating means arranged in the guide-pin in such a way that the lowermost disc of the pile is released to fall down through a retraction of the support members, whereas the disc that is at the moment immediately above the lowermost one in the pile is retained in its position on the guide-pin, for instance owing to expansion members arranged above the support members so as to engage the centre hole wall of the said disc.

Known arrangements of this type have the disadvantage that, in their outer position, when supporting the whole pile of discs resting above the turn-table, the support members extend only a short distance outside the circumference of the guide-pin. This causes the disc-pile to rest in a very unstable way on the support-members and it is even possible for the lowermost disc of the pile to be forced past the support-members if the centre-hole of this pile is larger than normal, for instance owing to long use. Also, it is not possible in the earlier arrangements to give the whole pile of discs some inclination, which may be desirable in order to lessen the overall height of the whole gramophone.

According to the present invention, the disadvantages referred to are obviated by an arrangement in which the support members for the lowermost disc of the pile are adapted when swinging back into the guide-pin, for instance for the purpose of letting the lowermost disc of the pile down into the playing position, to move in a tangent plane of a circle concentric with the perifery of the guide-pin. Preferably, the support members are pivoted at the perifery of a sleeve which is serially displaceable within the guide-pin and the outswinging movement thereof is guided by a cam contour formed on the support-members, which co-operates with and is supported by the lower rim of a slot in the guide-pin, through which the corresponding support-member is swung out. In this manner a comparatively large distance is obtained between the pivot point for each support-member and the supporting lower rim of the slot, whereby a very large outswinging movement of the support-members is made possible without loss of strength or stability in the supporting action. This construction also makes it possible to adapt the support-members for swinging into their outer position through the mere action of their own weight which has, among other things, the advantage that the guide-pin need not be removable from the turn-table. Instead, the pile of played-off discs can simply be lifted away by being pulled over the guide-pin, all guide-members being then pressed into the guide-pin after which they fall back into the extended position when released. The arrangement of the support-members according to the invention has the further result that when the supports are unloaded, that is, when no disc is resting on them, an insignificant force is required to swing them back and also that a larger force is necessary for the feeding-down movement the heavier the disc in question is. This can be taken advantage of for stopping the gramophone when the last disc of the pile has been played but also to indicate the weight and with it the size and turning-speed of the disc being fed down.

The attached drawing shows a guide-pin according to the invention. FIG. 1 is a vertical section of the guide-pin, FIGS. 2 and 3 show details thereof and FIG. 4 shows a modified form of the invention.

As shown in the drawing, a number of gramophone discs 1 and 2 are arranged above a bottom plate 3 attached to a guide-pin 4, which is disposed at the centre of a turn-table not shown in the drawing. The guide-pin comprises means for supporting a pile of discs before playing and for feeding the discs down one at a time onto the turn-table. For this purpose the guide-pin is provided with a number, preferably three, of support-members 5, 6, 7, which support the pile of discs when being in an outswung position with regard to the guide-pin. The support-members are active on the lowermost disc and can be retracted into the guide-pin to let the discs down one at a time on the turn-table. The support-members are pivoted and movable in such a way as to move in a tangent plane of a circle concentric with the guide-pin when they are retracted into the latter. To achieve such function, the support-members pivoted by means of bearings 9 on a sleeve 8 axially displaceable within the guide-pin. The axial movement of the sleeve is guided and limited through the action of a pin 10 on the sleeve, which is free to move in an elongated aperture 11 formed in the guide-pin.

The support-members are freely movable on their bearings 9 and are of such a construction that the centre of gravity of a support-member both in its outswung and in its retracted position is always on the same side of a vertical plane passing through the bearing 9. This causes the weight of the support-members themselves to be sufficient to make them swing out into their extended position if no constraining influence is present. However, this action can also be aided by springs acting on the support members. The outswinging movement is guided and limited by means of a cam-contour 12 formed on the support-members so as to rest on and co-operate with the lower rim of slots 13, 14, 15 in the guide-pin for the corresponding support-members. This cam-contour can be shaped in an arbitrary way so as to make the free end of the support-member follow a desired curve during the first part of the retraction. For instance, the end may stay at a constant height over the turntable during this part of its movement, but it can also be either lowered somewhat towards the turntable or raised. As a result of the mounting of the support-members according to the present invention, the distance horizontally, that is to say in projection upon a horizontal plane, is comparatively large between the bearing 9 and the point of contact existing at a certain instance between the cam-contour 12 and the lower part of the slot in the guide-pin. As a consequence, the guide-members can be allowed to perform a comparatively large outward-swinging movement from the guide-pin without excessive values being reached by the strain of the bearing means and guide-surfaces for the support-members. The pile of discs will therefore rest in a very stable manner on the supporting surfaces and it is even possible to tilt it somewhat, for instance in such a way as to make one side of it be at a higher level in the portion thereof under which the movement of the pick-up arm takes place. In this way some reduction in the overall height of the gramophone can be obtained.

During the feeding-down of the lowermost disc of the pile, the remaining part of it must be retained in its raised position as usual, for instance by supporting the second lowermost disc of the pile during the feed-down process.

This may be achieved in any way and is not of importance for the present invention. In the embodiment shown in the drawing, the upper portion of the guide-pin is provided with an expanding part, which is adapted to be pressed against the inside of the centre hole of the second lowermost disc. For this purpose, the upper portion of the guide-pin **4** is surrounded by an external sleeve **16** which can be pulled downward against the action of a spring **17** disposed within it by a wire **18** connected with the sleeve **16**. The lower part of the sleeve **16** co-operates with a widened and bevelled portion of the guide-pin **4**, so that the external sleeve **16**, which is slotted in its lower part, is extended when the sleeve is pressed down over the widened portion of the guide-pin **4**. As a result of this, the lower part of the sleeve **16** is pressed against the inside of the centre hole of the disc **2** and retains the latter in its position over the turntable during the feeding down of the disc **1**, which takes place through the action of a rod **19**, connected with the sleeve **8** and which is pulled downward by means not illustrated in the drawing.

The force required for pulling down the sleeve by means of the rod **19** together with the supports **5—7** and the lowermost disc of the pile resting thereon is dependent on the weight of the disc. For instance, a greater force is necessary for feeding down a 30 cm. disc than for a 25 cm. disc. Similarly, a certain smaller force is required for feeding down a long-playing disc, which is normally lighter than equal-sized 78 r.p.m. disc. This difference in the force required can be utilized for controlling the inward swinging of the pick-up arm to the initial groove of the disc fed down and for switching to a different turn-table speed.

As long as the supports **5—7** are loaded by one or more discs, these strive to retain the support-members in their fully extended position, whereby the sleeve **8** is held in its upper end position. Contrarily, if no disc rests on the support-members, the sleeve can be pulled downward by a force smaller than what is required for feeding down a disc of the lightest type. This smaller force can be derived, for instance, from the total weight of the sleeve **8** and the rod **19** connected therewith as well as the means not shown in the drawing acting on the rod in order to impart movement to the sleeve **8**. This downward movement of the sleeve occurring when the supports are unloaded can be utilized for triggering a stop-signal causing the gramophone to stop when the last disc has been played.

As was mentioned above, the support-members can be spring-actuated to ensure that they swing-out after having been retracted into the guide-pin. This result can also be obtained through a suitable shaping of the slots through which the support-members swing out. This embodiment is shown in FIG. 4, in which the cross-hatching of the portion **20** of the guide-pin **4** indicates that the upper end surface of the slot is lower than in the embodiment according to FIG. 1. The upper cam-contour **21** of the support-member **5** is pressed against this upper end surface when the member **5** is pressed into the guide-pin by a disc or a pile of discs being pulled up over the guide-pin. As a consequence, the guide-pin will be lifted a certain distance, whereupon the weight of the guide-pin contributes through the said end surface and the cam-contour **21** to ensure that the support-member swings outwardly upon removal of the disc. This function presupposes that the guide-pin is displaceable in an axial direction. This can be achieved in a number of ways, for instance as indicated in the lower part of FIG. 1, according to which the guide-pin **4** rests in a guide-sleeve **22** attached to the bottom-plate **3**.

To enable single discs to be played with no activity on the part of the feed-down mechanism, the guide-pin can be constructed to be retained in a raised position after having been lifted. In this position, the support-members **5—7** are held retracted in the guide-pin, so that a disc can be placed manually on the turn-table unhindered by the support-members and be played off and removed from the turn-table after playing.

The above description referred to a construction adapted for discs having a small centre hole, i.e. of 7 mm. diameter. However, the arrangement according to the invention can be easily adapted for discs having a centre hole of the larger type now occurring without impairment of the advantageous features of the invention. The arrangement of the support-members that are tangentially retractable into the guide-pin, which was chosen in the described embodiment to save space, can then be replaced with an arrangement having radially movable support-members.

What is claimed is:

1. In a phonograph record changer, a central guiding pin, a plurality of supporting members for supporting a pile of discs over the turntable, said supporting members being retractable into said guiding pin for releasing successively the individual discs of the pile, means actuated in response to retraction of said supporting members for supporting the remainder of discs when an individual disc is released, a sleeve axially displaceable within said guiding pin, means pivotally connecting each of said supporting members to said sleeve, a slot being provided in said guiding pin for each supporting member, a cam contour on each supporting member, said cam contour on each supporting member engaging the lower edge of the slot associated therewith to control the swinging movement of the supporting member, each supporting member being shaped and mounted so that the center of gravity thereof is disposed on the same side of a vertical plane through the pivotal mounting for said supporting member in both the retracted and extended positions of said member, whereby, when said sleeve is moved upwardly in said guiding pin, said supporting members will swing outwardly of the latter, solely by gravity.

2. A phonograph record changer according to claim 1 wherein the upper surface of said supporting members is formed with a cam contour, said last named cam contour cooperating with the upper edges of the slots in said guiding member to displace the supporting members outwardly upon upward movement of said supporting members with respect to said guiding pin.

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