

Dec. 11, 1945.

H. V. ALEXANDERSSON ET AL

2,390,862

RECORD CHANGER FOR PHONOGRAPHS

Filed Jan. 8, 1943

Fig. 1.

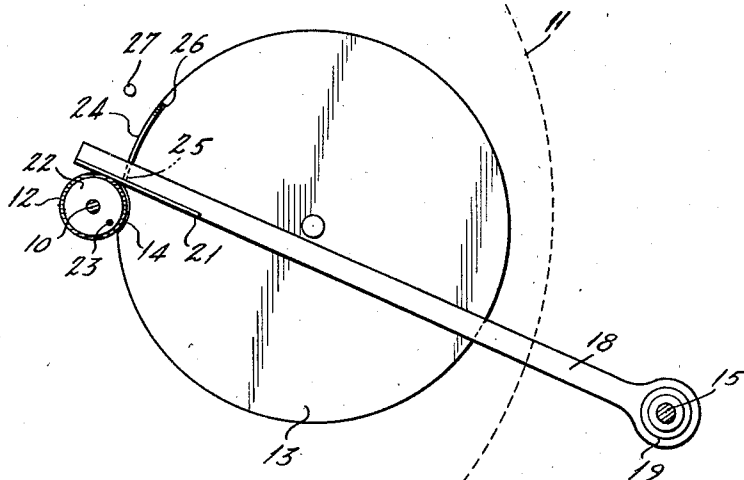
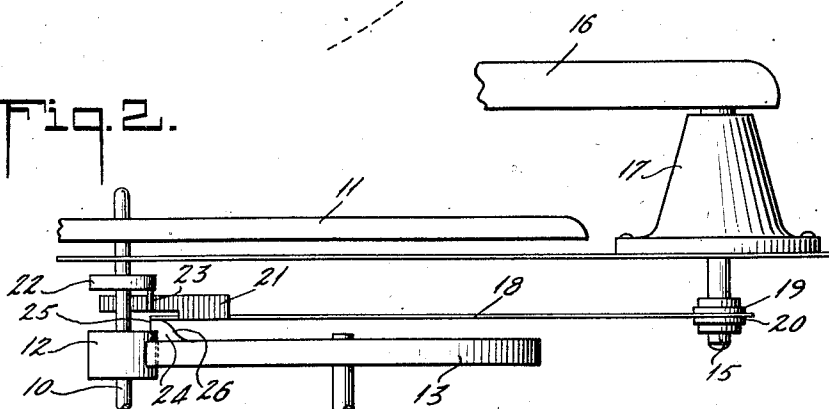


Fig. 2.



INVENTOR
Harald Valdemar Alexandersson
Kjell Uno Hagen
BY
Jens E. Munk
Attorney

UNITED STATES PATENT OFFICE

2,390,862

RECORD CHANGER FOR PHONOGRAPHS

Harald Valdemar Alexandersson and Nils Uno
Hagren, Lidingo, Sweden, assignors to Svenska
Aktiebolaget Gasaccumulator, Lidingo, near
Stockholm, Sweden, a corporation of Sweden

Application January 8, 1943, Serial No. 471,712
In Sweden March 20, 1942

3 Claims. (Cl. 274—1)

Our invention relates to an arrangement in record changers for phonographs with disc controlled record changing.

Certain kinds of record changer arrangements for phonographs are controlled by means of a disc which does not rotate during the playing of a record, but immediately after the record has been fully played is caused to revolve in order to initiate the operations connected with the record changing. One method for starting the rotation of the disc has been to drive it by means of a friction wheel or a cog-wheel, cooperating with its periphery or possibly with the periphery of another wheel, placed in motion transferring relation to the disc. In order that this shall not continuously drive the disc, the latter is provided with a recess in its periphery, in which the friction roller turns freely during the playing. In order that the movement of the disc shall be started, means are provided to give it an impulse in the correct direction, so that the friction roller engages the periphery adjacent to the recess.

In known arrangements of this kind complicated means has been required to give this impulse. The impulse should take place as a result of the needle entering the final groove in the record, which is for this purpose as a rule provided with an increased pitch. A plurality of different arrangements have been proposed in order to start the record changing by means of the increased speed with which the needle will move inwards during the passage through the final or tripping groove, but all these arrangements will, when combined with a record changer arrangement of the above mentioned kind, in which the record changing is controlled by means of a disc, be rather complicated.

The present invention refers to an arrangement for providing the starting impulse for record changing arrangements of the above mentioned kind, which is substantially simpler than the arrangements hitherto used for the same purpose, and which may due to its simplicity be manufactured in a more durable and strong manner, and which is consequently more reliable in operation and simultaneously cheaper in production.

The invention will be described below in connection with the annexed drawing, in which Fig. 1 shows a part of the starting arrangement in horizontal projection, and Fig. 2 shows the corresponding part in vertical projection. In Fig. 1 reference character 10 indicates the shaft of the turntable. It is assumed that the arrangement is seen from above with the turntable removed, but indicated by the broken line 11, and the driving

roller 12 of the disc as well as the disc 13 therefore being visible in Fig. 1. The above mentioned recess in the periphery of the disc is indicated 14, and as the arrangement in the position, indicated in Fig. 1, is assumed to be in its normal playing position, the disc is stationary, the driving roller 12 rotating freely in the recess 14.

The turntable shaft carrying the pickup arm is indicated 15. It will be evident from Fig. 2 how this cooperates with the above mentioned means as well as with the pickup arm 16. The pickup arm is carried in the usual manner by a bearing arrangement 17, through which the shaft extends, and which contains the required means for providing the raising and lowering of the pickup arm in connection with the record changing. As this means, however, has no function in connection with the present invention, it has not been shown in Fig. 2. A thin blade spring 18 is frictionally engaged between two collars 19 and 20 on the shaft 15. This blade spring preferably extends between the turntable 11 and the disc 13 to the vicinity of the shaft 10 and the driving roller 12 of the cam disc 13, where a projection 21 extends upwardly from the spring 18.

On the shaft 10 below the turntable there is mounted a bushing 22, provided with a pin 23 directed downwards. Further, the disc 13 is provided with a cam surface 24 elevated above the level of the disc, which is formed with a vertical face 25 and with an inclined face 26 which rises from the surface of the disc.

The arrangement operates in the following manner: During the playing of a record the pickup arm is continuously turned towards the centre of the record due to the cooperation with the spiral groove in the record and the needle, thus turning the shaft 15 and the collars 19 and 20 mounted thereon. The spring 18, which is frictionally engaged between these collars, therefore will also turn a corresponding distance for each revolution of the record and thus the spring 18 is moved closer to the shaft 10. The pin 23 hence strikes the projection 21 on the spring, which is thereby displaced back to a position just clearing the pin 23. During the following revolution of the turntable the spring will again be turned inwards a distance, corresponding to one groove-width, and the pin 23 will again strike the projection 21, the spring will again be turned back. During this movement to and fro the spring will ride on the outmost part of the cam surface 24.

When the record is fully played, the pitch of

the tripping groove increases substantially, and hence the spring 18 is turned a greater distance than any time former during the passage of the needle in the turns of the sound groove. This movement is sufficiently great that the spring rides over the top of the cam 24 and engages the vertical face 25. During the following revolution of the pin 23 the latter strikes the spring 18 and turns it back, but due to the engagement of the spring with the vertical face 25, the disc 13 is turned sufficiently to cause the roller 12 to ride up on the periphery of the disc 13, whereby this disc is turned one revolution until the roller 12 again enters the recess 14. During this movement the disc, in a manner which forms no part of the present invention, causes the operations involved in the record changing to be carried out, namely the elevation of the pickup arm from the record just played, the swinging out of the pickup arm into a position beyond the record, the placing of a new record on the turntable, the turning inwards of the pickup arm into a position immediately over the initial groove of the new record and the lowering of the pickup arm into this groove.

During the movement of the pickup arm the spring 18 follows the arm in its movement, as far as is permitted in one direction by a stop pin 27 and in the other direction by the pin 23. It should be observed that during this part of the cycle, the spring 18 does not cooperate with the vertical face 25 on the cam 24 as the rotation of the disc 13 by the roller 12 moves the cam 24 away from the spring. When the record changing is almost completed, suitably during the period when the pickup arm is lowered into the initial groove of the new record the inclined face 26 of the cam strikes the spring 18, whereby the spring is again elevated into its normal working position, and the playing of the new record begins.

During the starting impulse the disc will be driven by means of two independently acting forces, namely that resulting from the cooperation between the spring 18 and the vertical face 25 and that resulting from the engagement by the roller 12 with the periphery of the disc. As this roller, which is usually rubber covered, becomes worn, its diameter will decrease, and hence it is evident that an initial adjustment of the two driving means so that both tend to turn the disc at the same speed cannot be maintained. A reduction in the diameter of the roller results in the latter tending to drive the disc at a slower speed than the cam 24 and spring 18 tend to drive it. This would result in the disc slipping with respect to the roller, thus further wearing the rubber surface of the latter. In order to obviate this, the spring 18 is made as a thin blade spring, and the projection is spaced somewhat above the level of this spring. As long as there is no other resistance to the movement of the spring by the pin 23 than the friction between the collars 19 and 20, no substantial deformation of the spring 18 will take place. If, however, the friction roller 12 should intend to drive the cam disc 13 at a lower speed than that at which the spring 18 drives it, the turning moment resulting from the force applied by the pin 23 to the projection 21 will cause a torsion turning of the spring 18, which compensates for the difference in speed.

The invention is, of course, not limited to the form shown in detail and described, but substantial modifications may be made within its scope. Thus, for instance, the turning movement of the

spring 18 may be provided by another means than the shaft 15, if said means is in movement transferring relation with said shaft. The pin 23 may also be arranged in connection with another shaft than the driving shaft of the turntable.

What we claim is:

1. In a phonograph, a turntable, means for rotating said turntable, a vertical shaft, a pickup arm mounted on said shaft so as to be turnable in a horizontal plane with said shaft for cooperating with a record on said turntable, a rotatably mounted record-change initiating disc, a cam on said disc having an abrupt face, a pair of collars fixed to said shaft, a cam actuating arm frictionally engaged between said collars so as to be turned a predetermined distance towards engagement with said cam face by turning of said pickup arm and shaft during each revolution of said turntable when said pickup arm is cooperating with the playing groove of said record, and a member movable in a circular path in timed relation to said turntable, said path intersecting the path of movement of said actuating arm as the latter approaches said cam face whereby the actuating arm is moved back once during each revolution of said member, said predetermined distance of movement of said actuating arm being insufficient to bring it into engagement with said cam face before it is moved back by said member, said actuating arm being moved a greater distance when said pickup arm cooperates with the tripping groove of said record so as to engage said cam face before the actuating arm is moved back by said member, whereby subsequent movement of said actuating arm by said member actuates said cam.

2. In a phonograph, a turntable, means for rotating said turntable, a vertical shaft, a pickup arm mounted on said shaft so as to be turnable in a horizontal plane with said shaft for cooperating with a record on said turntable, a rotatably mounted record-change initiating disc, a cam on said disc having an abrupt face, a friction roller normally freely rotatable in a recess formed in the periphery of said disc, a cam actuating arm frictionally engaged by said shaft so as to be turned a predetermined distance towards engagement with said cam face by turning of said pickup arm and shaft during each revolution of said turntable when said pickup arm is cooperating with the playing groove of said record, and a member movable in a circular path in timed relation to said turntable, said path intersecting the path of movement of said actuating arm as the latter approaches said cam face whereby the actuating arm is moved back once during each revolution of said member, said predetermined distance of movement of said actuating arm being insufficient to bring it into engagement with said cam face before it is moved back by said member, said actuating arm being moved a greater distance when said pickup arm cooperates with the tripping groove of said record so as to engage said cam face before the actuating arm is moved back by said member, whereby subsequent movement of said actuating arm by said member actuates said cam to rotate said disc into frictional engagement with said roller, said actuating arm being resiliently yieldable between its points of contact with said member and said cam face to compensate for any inequality between the rate at which the disc is driven by the roller and the rate at which said member tends to drive the disc.

3. In a phonograph, a turntable, means for rotating said turntable, a vertical shaft, a pickup arm mounted on said shaft so as to be turnable in a horizontal plane with said shaft for cooperating with a record on said turntable, a rotatable 5 mounted record-change initiating disc, a cam on said disc having an abrupt face, a friction roller normally freely rotatable in a recess formed in the periphery of said disc, a resiliently yieldable cam actuating arm frictionally engaged by said shaft so as to be turned a predetermined distance towards engagement with said cam face by turning of said pickup arm and shaft during 10 each revolution of said turntable when said pickup arm is cooperating with the playing groove of said record, a lateral projection offset with respect to the center line of said actuating arm, and a member movable in a circular path in timed relation to said turntable, said path intersecting the path of movement of said projection as the 15 actuating arm approaches said cam face where-

by the actuating arm is moved once during each revolution of said member, said predetermined distance of movement of said actuating arm being insufficient to bring it into engagement with said cam face before it is moved back by said member, said actuating arm being moved a greater distance when said pickup arm cooperates with the tripping groove of said record so as to engage said cam face before the actuating arm is moved 10 back by said member, whereby subsequent movement of said actuating arm, by said member actuates said cam to rotate said disc into frictional engagement with said roller, said resilient actuating arm being twistable about its center line by the force applied to said offset projection by said member to compensate for any tendency of said member to drive said disc at a faster rate than 15 that at which it is driven by said roller.

20 HARALD VALDEMAR ALEXANDERSSON.
NILS UNO HAGREN.