

[54] RECORD PLAYERS

[75] Inventor: Philip Henry Evans, Stourbridge, England

[73] Assignee: Glenburn Engineering Limited, Hamilton, Bermuda

[22] Filed: Apr. 20, 1973

[21] Appl. No.: 353,013

[30] Foreign Application Priority Data

Apr. 20, 1972 Great Britain 18291/72

[52] U.S. Cl. 274/1 L

[51] Int. Cl. G11b 17/02

[58] Field of Search 274/10 R, 1 L

[56] References Cited

UNITED STATES PATENTS

3,394,938 7/1968 Reed et al. 274/10 R

Primary Examiner—Louis R. Prince

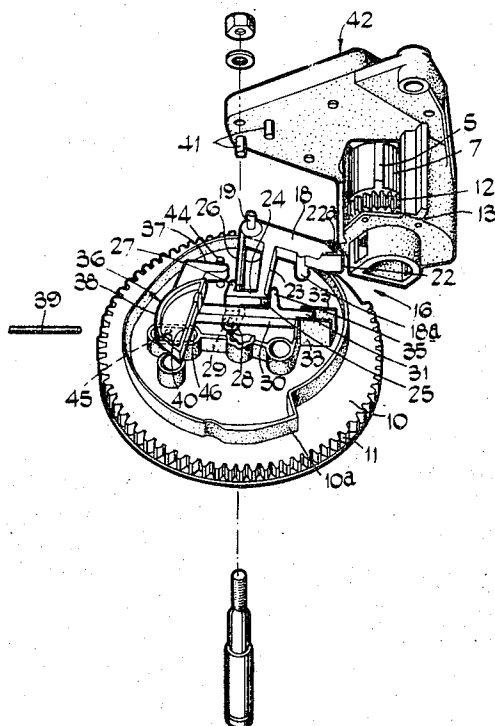
Assistant Examiner—Steven L. Stephan

Attorney, Agent, or Firm—Holman & Stern

[57] ABSTRACT

An automatic record player having a record changing mechanism which is driven by a driving means comprising a first gear wheel capable of driving engagement with the second gear wheel rotatable with the turntable, the first gear wheel having a gap in its teeth which during playing of a record lies adjacent the second gear wheel so that the first gear wheel remains stationary. A pawl member is pivotally mounted on the first gear wheel for pivotal movement into and out of engagement with a part associated with the second gear wheel. An operating member is movably mounted on the first gear wheel for engagement with the pawl member to move the pawl member about its pivotal axis. The operating member is engaged by an actuating means provided on the record player. At the end of the playing of the record the actuating means causes movement of the operating member to move the pawl member into its engaging position thus bring the first and second gear wheels into driving engagement.

7 Claims, 3 Drawing Figures



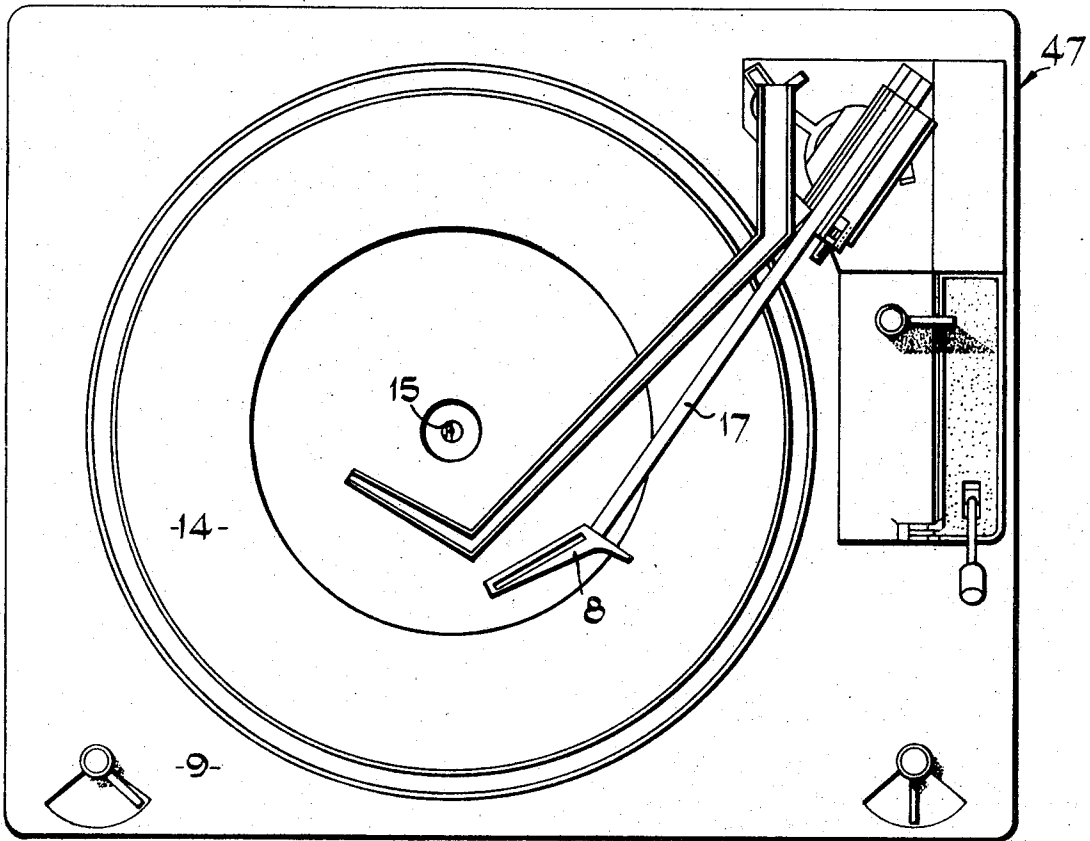


Fig. 1

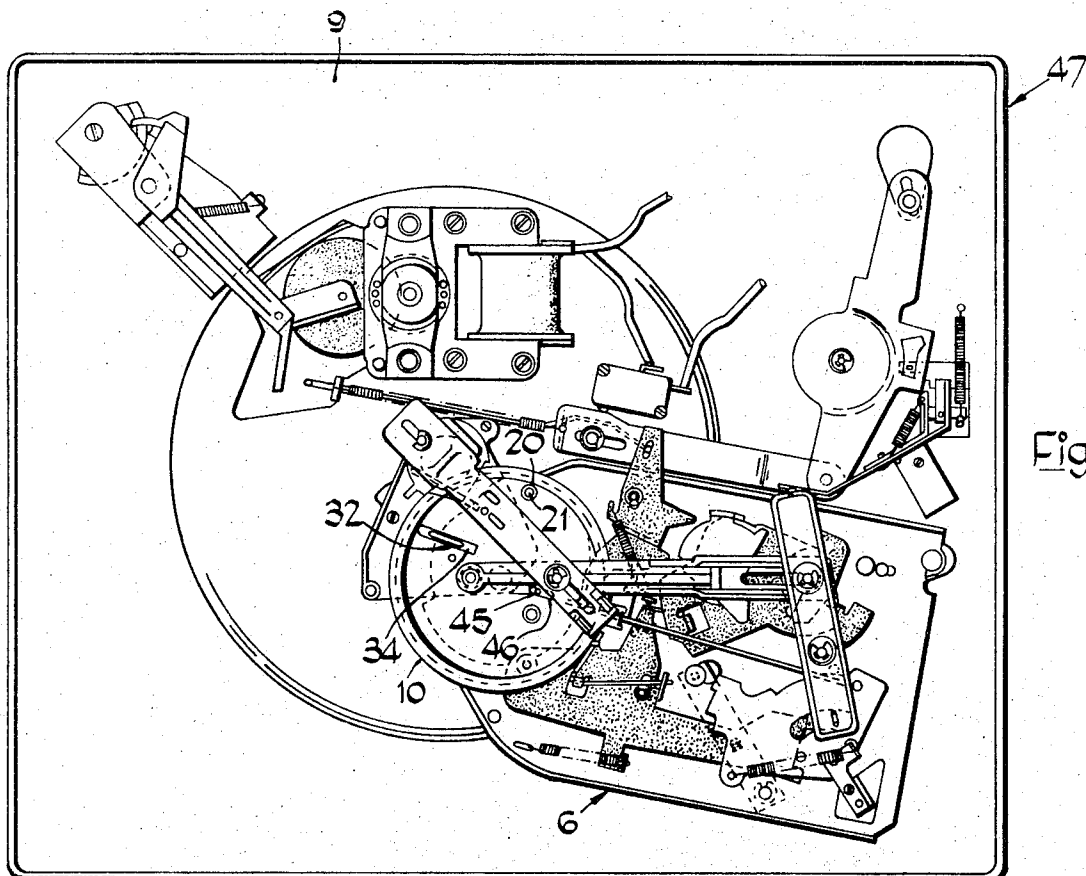


Fig. 2

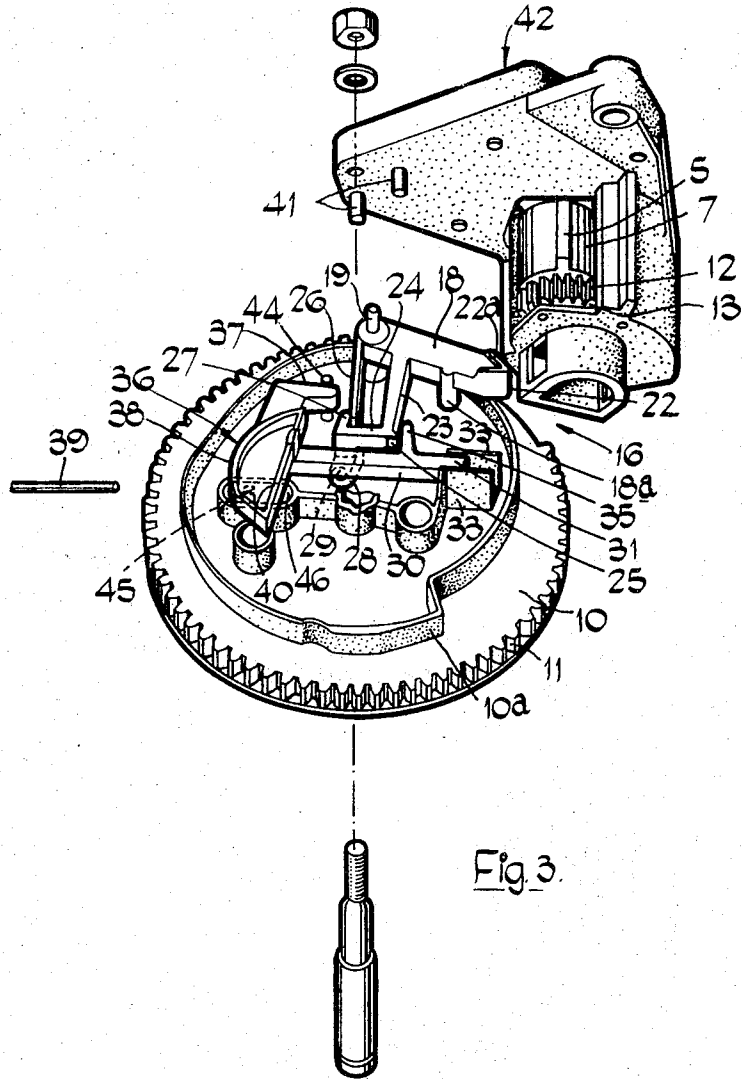


Fig. 3.

1

RECORD PLAYERS

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a record player for playing disc records, which includes a mechanism for executing a cycle of automatic operation upon completion of the playing of a record. such cycle of automatic operations may comprise the repositioning of the pick-up and, in some cases the feeding of a new record to the playing position in preparation for the next reproduction.

The invention more particularly relates to an automatic record player of the type specified, which incorporates a driving means for the automatic mechanism in the form of a first gear wheel capable of driving engagement with a second gear wheel rotatable with a turntable, the first gear wheel having a gap in its teeth which during playing of a record, lies adjacent the second gear wheel so that the first gear wheel remains stationary, drive means being provided comprising an abutment member carried by the first gear wheel and movable into driving engagement with the second gear wheel to start movement of the first gear wheel to cause the teeth of the two gear wheels to mesh, whereby the first gear wheel is rotated through a single revolution, during which said cycle of automatic operations is executed, and returned to its initial position when the gap in the teeth of the first gear wheel again lies adjacent the second gear wheel.

An automatic record player having the features described hereinbefore will be referred to hereinafter as "of the type specified."

SUMMARY OF THE INVENTION

An object of the present invention is to provide a new and improved record player of the type specified.

According to the present invention, we provide a record player of the type specified wherein the drive means includes a pawl member pivotally mounted on the first gear wheel for pivotal movement of an abutment portion of the pawl member which is moved into and out of a position for engagement with a part associated with the second gear wheel and there being an operating member movably mounted on the first gear wheel for engagement with the pawl member to move the abutment portion into said position, the operating member having a portion engageable with an actuating means, provided on the record player, when the first gear wheel is in said initial position, whereby movement of the actuating means causes movement of the operating member to move said abutment portion into position for engagement with said part of the second gear wheel.

The operating member may be slidably mounted on the first gear wheel.

There may be a resilient connection between the operating member and the pawl member to move the abutment member of said pawl member into said position and to permit movement of the operating member in a direction to move the abutment portion of the pawl member into said position if movement of the pawl member is prevented.

The pawl member may include a mounting portion which engages said operating member on the underside thereof whereby the operating member is supported, at least in part, on the pawl member.

2

The operating member may be provided with means for engagement with the pawl member to move the pawl member or said abutment portion thereof out of said position.

5 The operating member may be provided with means for engagement with a part fixed relative to the record player, whereby rotation of the first gear moves said portion of the operating member into engagement with said fixed part to cause movement of the operating member in a direction to move the abutment portion of the pawl out of said position.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail by way of example with reference to the accompanying drawings wherein:

FIG. 1 is a plan view of an automatic record player embodying the present invention;

FIG. 2 is an underneath plan view of the record player of FIG. 1; and

FIG. 3 is a diagrammatic exploded perspective view, to an enlarge scale, of part of the record player of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and particularly to FIG. 1, a record player deck plate is indicated generally at 9 and, in conventional manner, has a turntable 14 mounted thereon for rotation about an axis 15, a pick-up arm 17 and a control arm 8 as well as the usual operating controls. The turntable 14 has a downwardly depending boss 7 which is received in a bearing on the deck plate 9, not shown, to rotatably mount the turntable on the deck plate.

Referring now particularly to FIG. 2 of the drawings, the deck plate 9 carries a mechanism indicated generally at 6 arranged to perform the usual record changing cycle of operations at the end of playing of a record. The mechanism 6 is driven by a first gear wheel 10 having a plurality of gear teeth 11 which mesh with gear teeth 12 of a second gear wheel 13 formed integrally on the lower end of the turntable boss 7 so as to rotate with the turntable about the axis of rotation 15 thereof.

Referring now particularly to FIG. 3, there is a gap 16 in the teeth 11 of the first gear wheel 10 and this gap is adjacent the second gear wheel 13 in the initial position of the first gear wheel, i.e., when a record is being played.

In order to initiate an automatic cycle of operations at the end of playing of a record, for example to reposition the pick-up arm 17, and, in some cases, to position another record on the turntable 19, it is necessary to rotate the first gear wheel 10 through a single revolution to operate the mechanism 6.

In order to start the first gear wheel rotating, a pawl member 18 is pivotally mounted on the first gear wheel 10 by means of a pivot pin 19 fixed to the pawl member and received in a passage 20, see FIG. 2, in the gear wheel 10, the lower end of which is closed by a plate 21 rivetted into position. The pivot pin 19 has a spherical end which engages on the plate 21 and so provides a relatively friction free pivot for the pawl member 18.

The pawl member 18 has an abutment portion 22 which is movable into a position where it projects out-

wardly of the periphery of the first gear wheel and hence engages a dog 5 formed on the boss 7 of the turntable, to cause initiation of rotation of the first gear wheel when the second gear wheel is rotated. If desired the abutment portion may engage some other part associated with the second gear wheel such as one of the teeth 12 thereof. Once rotation of the first gear wheel has been initiated, the teeth 11 thereof are engaged with the teeth 12 of the second gear wheel 13 and rotation of the first gear wheel continues for a single revolution until the gap 16 again lies adjacent the second gear wheel. In the meantime the abutment portion 22 of the pawl member 18 has been moved out of said position so that when the gap 16 again lies adjacent the second gear wheel rotation of the first gear wheel ceases.

The manner in which the abutment portion 22 of the pawl member 18 is moved into and out of said position will now be described.

The pawl member 18 is made as a moulding in a suitable plastics material and has a transversely extending limb 23 with a hooked end portion 24. A rib 25 projects outwardly from the end of the limb 23. Also moulded integrally with the remainder of the pawl member 18 is a flexible part 26 which is normally biased into engagement with the part 27 of the hooked portion 24. The hooked portion 24 also carries a transversely extending lug 28 which has a hemispherical upstanding part 29.

The part 29 engages the undersurface of an operating member 30 at approximately the position of the centre of gravity thereof and so the operating member 30 is approximately balanced on the hemispherical part 29 so that the weight of the operating member 30 is carried wholly or almost wholly by the pawl member 18 through the hemispherical part 29.

At its forward end 31 the operating member 30 is cranked downwardly to a position underneath the surface of the first gear wheel 10 and forwardly, as indicated at 32 and the forward end is engaged between a pair of upstanding lugs 33 provided on the first gear wheel 10. The downwardly extending part passes through a slot 34 in the gear wheel 10 so that the end forwardly extending part lies below the plane of the undersurface of the gear wheel 10 and hence underlies the usual cam track 10a provided on the upper surface of the gear wheel 10.

The pawl member has a downwardly depending projection 18a for engagement with the inwardly facing surface of the cam track 10a provided on the first gear wheel 10 to limit outward movement of the pawl member 18.

The operating member 30 has a transversely extending lug 35 positioned for engagement with the rib 25 on the pawl member 18.

The operating member 30, at its rearward end is of generally T-shaped configuration as indicated at 36 and has a forwardly extending part 37 for engagement with the flexible element 26 of the pawl member 18. The T-shaped part also has a generally curved abutment surface 38 for engagement by a wire actuating means 39, the curved part 38 being generally centered about the axis of rotation of the first gear. The T-shaped part 36 is also provided with an upstanding lip 40 for engagement with a pair of downwardly depending pegs 41 provided on a member 42, fixed to the underside of the record player deck plate 9, and spaced adjacent the axis

of rotation of the first gear so that the pegs engage the lip 40 as hereinafter to be described.

The first gear 10 is provided with an upstanding peg 44 to limit inward movement of the pawl member 18 and the operating member at the T-shaped end 36 thereof is provided with a downwardly extending peg 45 which engages in a slot 46 in the first gear wheel so that in co-operation with the lugs 33 the operating member is constrained to slide rectilinearly of the first gear wheel.

The first gear wheel 10 is mounted on the record player 47 so that part of the member 42 is positioned closely above the first gear to prevent upward movement of the pawl member 18 and operating member 30 out of engagement with the first gear.

In use, assuming the first gear 10 to be in the above described initial position, and with the pawl member 18 out of said position wherein it can engage the dog 5 or other part associated with the second gear wheel.

In order to start an automatic cycle of operations at the end of playing of a record, the actuating wire 39 is caused to be moved inwardly towards the axis of the pivot of the first gear wheel 10 either by the usual inward motion of the record player pick-up arm 17 at the end of playing a record or manually and the end of the wire 39 engages the surface 38 and displaces the operating member 30 transversely of the first gear wheel 10. The curved part 38 is provided as a safety precaution in case a user moves the pick-up arm inwardly during a record changing cycle of operation. If this were done and if the curved part 38 were not provided then as the first gear wheel 10 rotates the wire 39 would engage a side portion of the operating member 30 and thus damage would be caused. By providing the part 38 of the above described curved configuration the reaction between the wire 39 and the curved surface 38 causes the operating member 30 to be moved transversely of the first gear wheel 10 away from the wire 39 thus avoiding damage to the mechanism.

As the operating member 30 moves transversely of the first gear wheel it causes pivotal movement of the pawl member 18 around its axis of pivot 19 due to the frictional engagement between the undersurface of the operating member 30 and the hemispherical portion 29 on the pawl member 18. Continued movement of the operating member 30 causes engagement of the forwardly extending part 37 thereof with the flexible element 26 to ensure a positive drive to the pawl member 18 to move the abutment portion 22 thereof into engagement with the dog 5 on the Boss 7.

The flexibility of the element 26 ensures that there is no damage to the mechanism of the record player 47 if outward movement of the pawl member 18 prevented for any reason, for example if the abutment portion 22 thereof is aligned with the dog 5 which would prevent outward movement of the pawl 18.

When the abutment portion 22 has been moved into engagement with the dog 5 the first gear wheel is caused to start rotating to bring the teeth 11 thereof into engagement with the teeth 12 so that rotation of the first gear wheel 10 continues through a single rotation. As the gear wheel 10 rotates the pegs 41 engage the lip 40 and due to their position relative to the axis of rotation of the gear wheel 10 cause return transverse movement of the operating member 36 so that the transversely extending member 35 thereof engages the rib 25 on the pawl member 18 so that the pawl member

18 is returned to its original position whereby, when the first gear wheel 10 has completed a single revolution, the gap 16 again moves into alignment with the teeth 12 of the second gear wheel 13 and hence further rotation of the first gear wheel 10 ceases.

Because the operating member 36 is carried on the pawl member at approximately the position of balance again there is relatively little friction between the operating member and the gear wheel and so little effort is required to move the pawl member 18 into and out of said position for engagement with the dog 5.

It will be appreciated that due to the resilience of the flexible element 26 which permits movement of the operating member 30 to occur, even if movement of the pawl member 18 is prevented, damage to the record player mechanism which would otherwise occur is avoided.

The mechanism has the usual tap back facility so that the pawl member 18 does not drivingly engage the dog 5 except when a large and rapid inward movement of the pick-up arm occurs at the end of playing a record when the pick-up is travelling along the run out groove of the record. When the pick-up is playing the last part of the record then although the inward movement of the pick-up arm is such as to move the pawl member 18 into contact with the dog 5 the tip of the pawl member does not engage the dog 5 but only a part of the face 22a thereof and thus the pawl member 18 is pushed out of engagement with the dog due to reaction between the dog and the face 22a and this is repeated until the above-mentioned large rapid inward movement occurs at the end of playing of the record to move the tip of the pawl member into driving engagement with the dog.

I claim:

1. A record player for playing disc records, which includes a mechanism for executing a cycle of automatic operations upon completion of the playing of one record, incorporating a driving means for the automatic mechanism in the form of a first gear wheel capable of driving engagement with a second gear wheel rotatable with the turntable, the first gear wheel having a gap in its teeth which, during playing of a record, lies adjacent the second gear wheel so that the first gear wheel remains stationary, drive means being provided comprising a pawl member carried by the first gear wheel and movable into driving engagement with a part associated with the second gear wheel to start movement of the first gear wheel to cause the teeth of the two gear wheels to mesh, whereby the first gear wheel is rotated through a single revolution during which said cycle of automatic operations is executed and returned to its initial position when the gap in the teeth of the first gear wheel again lies opposite the second gear wheel, wherein the pawl member is pivotally mounted on the

5 first gear wheel in relatively friction free pivot means for pivotal movement of an abutment portion of the pawl member into and out of a position for engagement with said part associated with the second gear wheel, an operating member mounted for rectilinear sliding movement relative to the first gear wheel, the pawl member including a mounting portion which engages said operating member on the underside and near the center of gravity thereof to support the operating member, at least substantially wholly, on the pawl member, the operating member having a portion engageable with an actuating means provided on the record player, when the first gear wheel is in said initial position, whereby movement of the actuating means causes movement of the operating member which pivots the pawl member to move said abutment portion into position for engagement with said part of the second gear wheel.

2. A record player according to claim 1 wherein the pawl and operating members are provided with an overload connecting means comprising an elongate inherently resilient tongue member integral with the pawl member and an abutment part on the operating member engageable with said tongue member and effective to communicate movement of the operating member to the pawl member to move the abutment portion of the pawl member into said position for engagement with said part of the second gear wheel and to permit movement of the operating member in said direction to move the abutment portion of the pawl member into said position if movement of the pawl member is prevented.

3. A record player as claimed in claim 2 wherein said tongue is resiliently biased into engagement with a part of the pawl member and is movable away from said part against said resilient bias.

4. A record player as claimed in claim 2 wherein the pawl member is made of a moulding in a synthetic plastics material.

5. A record player as claimed in claim 2 wherein said operating member is made of a synthetic plastics material.

6. A record player as claimed in claim 1 wherein the operating member is provided with means for engagement with a part fixed relative to the record player whereby rotation of the first gear moves said portion of the operating member into engagement with said fixed part to cause movement of the operating member in a direction to move the abutment portion of the pawl member out of said position.

7. A record player as claimed in claim 1 wherein the operating member has at one end thereof an elongate generally arcuate surface for engagement by said actuating means.

* * * * *