

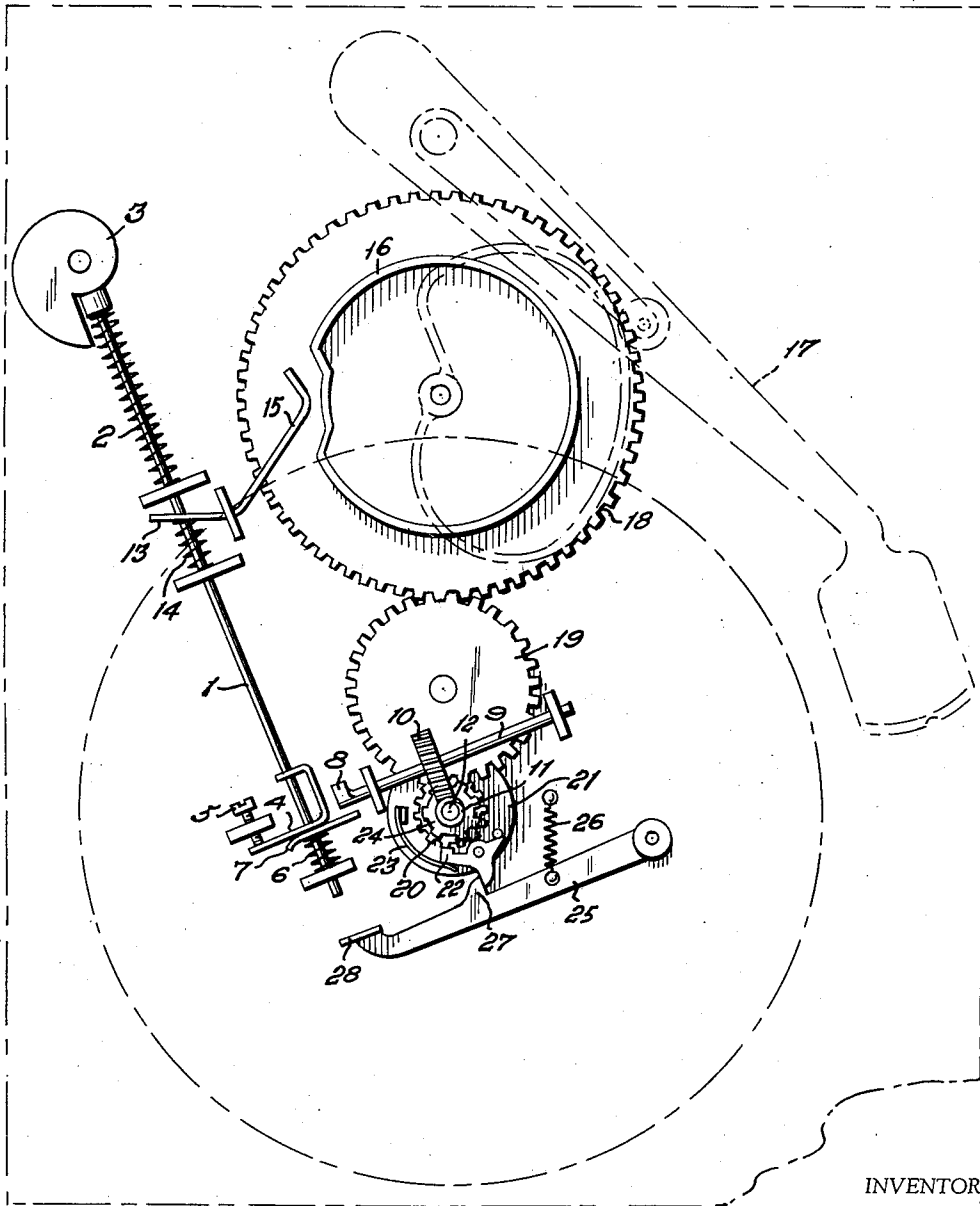
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CLUTCH OPERATOR FOR PHONOGRAPH TONE ARM DRIVES

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CLUTCH OPERATOR FOR PHONOGRAPH
TONE ARM DRIVESSven Gustaf Falk, Stockholm, Sweden, assignor
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The present invention refers to arrangements in gramophones having automatic record change in which the periodically operative driving member of a record changing and tone arm guiding mechanism is retarded at some moment of time in its function and the duration of the playing pause, i. e. the interval between the finished playing of a record and the beginning of the playing of the following record, is regulated by a contrivance combined with the driving mechanism of the gramophone and driven by said latter mechanism, said contrivance being designed to form a step by step mechanism, the principal parts of which consist partly of a push rod which is actuated, in one direction by spring tension, and in the other direction by the driving mechanism, through the intermedium of a driving member, partly of a stop member acting temporarily, which is arranged to impede the return of the push rod during the feeding process before a certain feeding position has been reached, from which the rod is returned by the spring tension.

The principal object of the invention is to simplify the design and nevertheless to ensure a thoroughly reliable engagement between the driving member and the push rod, while at the same time an unintentional return of the push rod during the feeding process is securely impeded by the stop member.

The essence of the invention resides therein that the push rod is even or practically even and that the driving member grasps the rod by means of mutually opposite engaging edges or the like, which are so arranged that at a certain angular adjustment of the driving member they engage with the rod and carry it with them in the feeding direction, and that the stop member, which likewise grasps the push rod and is provided with corresponding engaging edges or the like, is adapted to stop, in a corresponding manner, the return movement of the rod in a certain angular position but to allow such a movement upon adjustment into another angular position.

Preferably the driving member and the stop member each consist of a plate or the like provided with holes for the push rod, which plate in one instance upon adjustment into a certain angular position relatively to the rod engages with this latter and carries the same with it, and in the other instance on account of its angular position relatively to the rod stops the return movement of this latter but admits of such a movement upon adjustment into another angular position.

The driving member plate is actuated by a

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spring, which tends to adjust said plate into an inoperative position, in which it rests against an abutment and assumes a certain angular position relatively to the push rod, feeding engagement with this rod being effected by an impulsing member, which is driven from the driving mechanism of the gramophone and temporarily moves the plate into another angular position, in which the rod is entrained.

The stop plate is held adjusted in a certain angular position relatively to the push rod by a spring, against the action of which the plate is moved into another angular position by a curve track combined with the curve guide mechanism of the gramophone.

The starting position of the push rod may be regulated by means of a turnable eccentric or the like, the spring tension actuating the rod tending to maintain this latter in contact with said eccentric. However, there is nothing to prevent that a definitely selected starting position is used for the rod and that, instead, the feeding stroke of said latter is varied.

An embodiment of the intended arrangement is illustrated diagrammatically in the accompanying drawing, which shows a plan view of the parts contemplated by the invention.

The step by step mechanism consists, as mentioned above, in the first place of an even push rod 1, which in suitable manner is slidably mounted in stationary bearings and is actuated by a spring 2, which tends to maintain one end of the rod in contact with a stationary eccentric 3 or the like. This eccentric is turnable for setting the starting position of the rod 1 against the action of the spring 2. The rod 1 passes slidably through an abutment 4, which is adjustable along the rod by means of a set screw 5 or the like. A spring 6 tends to maintain a plate 7 or the like in contact with said abutment, which is perpendicular or substantially perpendicular to the rod 1 so that also the plate tends to assume a perpendicular position. The plate 7 is provided with a hole for the rod 1, which hole is so proportioned that the plate may be inclined to the rod. The plate 7 is arranged for being operated from an impulsing member in the form of an eccentric 8, or the like, provided on an axle 9 mounted stationarily, on which is secured a worm wheel 10 meshing with a worm 11 provided on the axle 12, which drives the turn table (only indicated by means of a dashed circle) of the gramophone. When the axle 12 rotates, the worm 11 and the worm wheel 10 transmit rotatory motion to the axle 9 so that the eccentric 8 intermittently in-

clines the plate 7 which, as a result, cooperates with the rod 1 for advancing this latter. The return movement of the rod 1 is impeded during the advancement by the above-mentioned stop member, which has the shape of a plate 13 or the like, provided with a hole for the rod 1. The plate 13 is actuated by a spring 14, which tends to incline the plate relatively to the rod 1 by means of which in this way stopping engagement is effected. For moving the plate 13 into perpendicular (inoperative) position relatively to the rod 1 there is provided a lever 15, which in turn is arranged for being operated from a curve track 16. This track is arranged in combination with a curve guide mechanism appertaining to the gramophone, which mechanism regulates the guided motions of the tone arm 17 (only indicated by means of dashed lines) of the gramophone during the record changing operation. The curve guide mechanism and the curve track 16 are driven from the axle 12 through the intermedium of pinions 18, 19 and 20. The pinion 20 has free motion on the axle 12 and is provided with a flange 21, which carries a locking or coupling pawl 22 actuated by a spring 23, which latter tends to move the pawl 22 into engagement with a toothed wheel 24 secured on the axle 12. When this engagement is present, the toothed wheel 24 entrains the pinion 20, from which thus rotatory motion is transmitted to the curve guide mechanism and the curve track 16. However, the coupling pawl 22 may be released from the toothed wheel 24 by an arm 25 actuated by a spring 26 and provided with a gripping claw 27 or the like, which is capable of catching and releasing the coupling pawl 22 from the toothed wheel 24 when during the rotatory motion the coupling pawl approaches the gripping claw. The free end of the arm 25 forms an abutment 28 which is situated right before the free end of the push rod 1.

The intended arrangement operates in the following manner:

When the gramophone is running, the eccentric 8 evidently actuates the driving member plate 7 intermittently, whereby each time the push rod 1 is endowed with a certain, though rather slight feeding motion. However, during the playing of a record this feeding motion is neutralized, inasmuch as in this instance the curve track 16 cooperates with the lever 15 in such a manner that the stop plate 13 is held adjusted in inoperative (perpendicular) position, whereby the spring 2 is allowed to return the push rod 1 to the starting position after each time when it has been endowed with a feeding impulse. When the playing of the record has been terminated in order to be followed by the record changing operation, and the curve track 16 has been turned into the position shown in the drawing, the tone arm 17 is located outside the edge of the record, besides which the gripping claw 27 of the arm 25 engages with the pawl 22 so that this latter is released from the driving toothed wheel 24. In consequence, the curve track 16 has been brought to a standstill in such a position that the lever 15 is released and the spring 14 is capable of inclining the plate 13 relatively to the push rod 1, which results in that surely the feeding motion of the rod is allowed but, on the other hand, not a return movement under the influence of the spring 2. From this follows that the push rod 1 is advanced from its starting position and finally actuates the abutment 28 of the lever 25 so that the gripping claw 27 is raised outside the path of motion of the coupling pawl 22 and said latter

engages the toothed wheel 24. As a result, the curve guide mechanism is started anew, the tone arm together with the needle microphone then being moved in an inward direction towards the record, and the needle being lowered towards this latter for being played. According to the embodiment described and illustrated, the period of time elapsing between the playing of two records is influenced by the starting position, in which the push rod 1 is set by the aid of the eccentric 3, inasmuch as the push rod will actuate the abutment 28 on the lever 25 at an earlier or later point of time. By this, an accurate timing of the interval between the termination of the playing of a record and the beginning of the playing of the next record is rendered possible in a simple and reliable manner. The eccentric 3 is secured on an axle, which preferably is provided with a finger grip in the form of a pointer adjustable along different time marks. However, the invention is not limited to a realization according to which the duration of the above mentioned period of time is influenced by that starting position of the push rod 1, which is set by means of the eccentric 3. Thus, there is nothing to prevent that the eccentric 3 is exchanged for a fixed abutment which determines a definitely selected starting position for the rod 1, the feeding motion of which is, on the other hand, regulated in such a case by varying the stroke of the feeding motion. This may, for instance, be effected by adjusting the abutment 4 so that the cooperation of the eccentric 3 with the plate 7 is varied, i. e. becomes longer or shorter for each feeding stroke, which results in that the rod 1 impinges on the abutment 28 at an earlier or later point of time. If desired, this realization, which, of course, is also contemplated by the invention, may be combined with the realization first described (the use of the adjustable eccentric 3).

I claim:

1. In an automatic record changing gramophone a main drive member, a clutch device operable by said drive member, a control member operative in one position to render the clutch device inoperative, a rod movable longitudinally in one direction to displace said control member to a second position wherein said clutch device is operative, means normally tending to move the rod in the opposite direction, a stepping member operative when disposed in one angular position with relation to the rod to grip and displace said rod in the first mentioned direction, means driven by said drive member for periodically actuating the stepping member to impart a succession of step-wise movements to said rod, a check member operative when disposed in one angular position with relation to the rod to grip and hold said rod against movement in the second mentioned direction, and means yieldably retaining the check member in said holding position.

2. An arrangement as claimed in claim 1 wherein the stepping and check members are constituted by plates provided with openings receiving said rod, the edges of the opening in each plate being operated in said angular position to engage and grip said rod.

3. An arrangement as claimed in claim 1 provided with an abutment for said stepping member, and means operative between the periods of actuation of the stepping member for moving the latter into engagement with said abutment.

4. An arrangement as claimed in claim 1 provided with means for moving the check member

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into a second angular position wherein said rod is freely movable through said check member.

5. An arrangement as claimed in claim 1 provided with an adjustable stop for variably limiting the longitudinal movement of said rod.

6. An arrangement as claimed in claim 1 provided with means coacting with the stepping member for varying the amplitude of movement imparted thereto by the drive member, and means establishing a fixed position for limiting the movement of the rod in the second mentioned direction.

7. An arrangement as claimed in claim 1 provided with an abutment for limiting the movement of the stepping member, and means for adjusting the position of said abutment.

8. An arrangement as claimed in claim 1 provided with means for variably limiting the range

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of longitudinal movement of the rod, and means for varying the amplitude of each stepwise movement of the stepping member.

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