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RECORD CHANGER GEAR AND TRIP MECHANISM

Filed Sept. 4, 1946

2 Sheets-Sheet 1

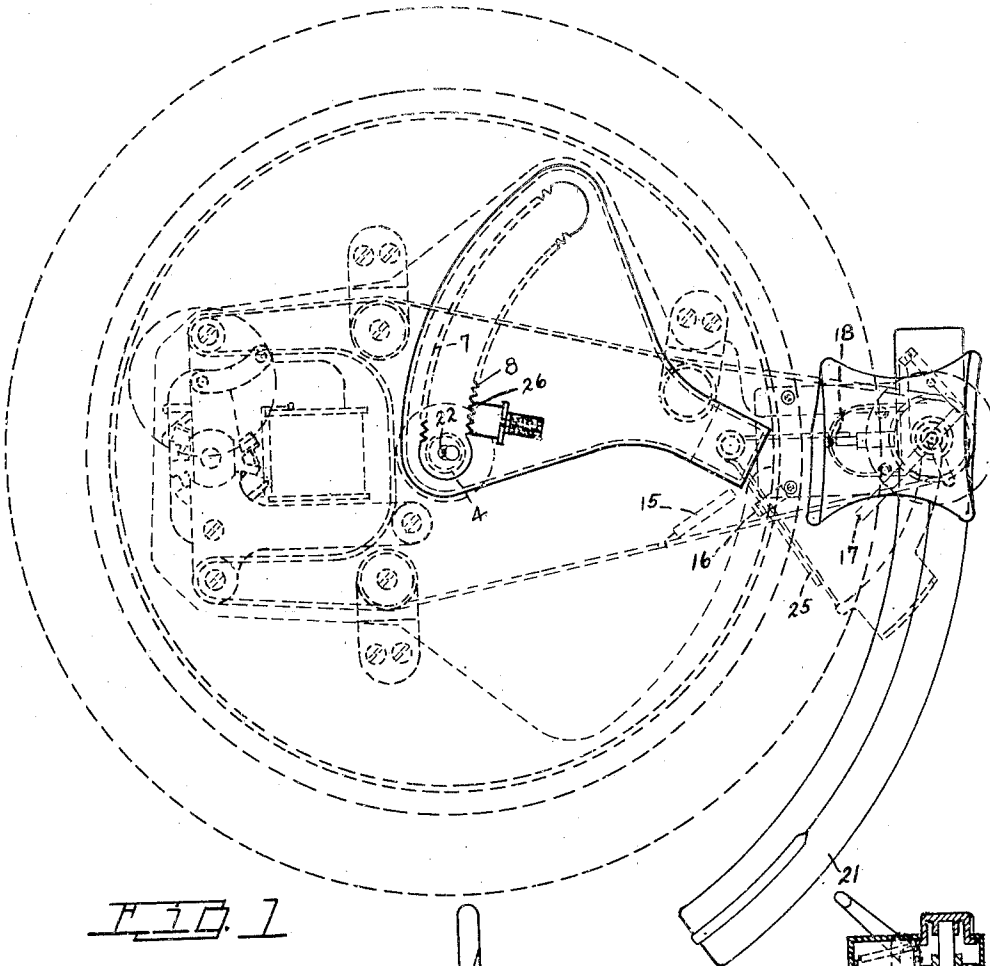


FIG. 1

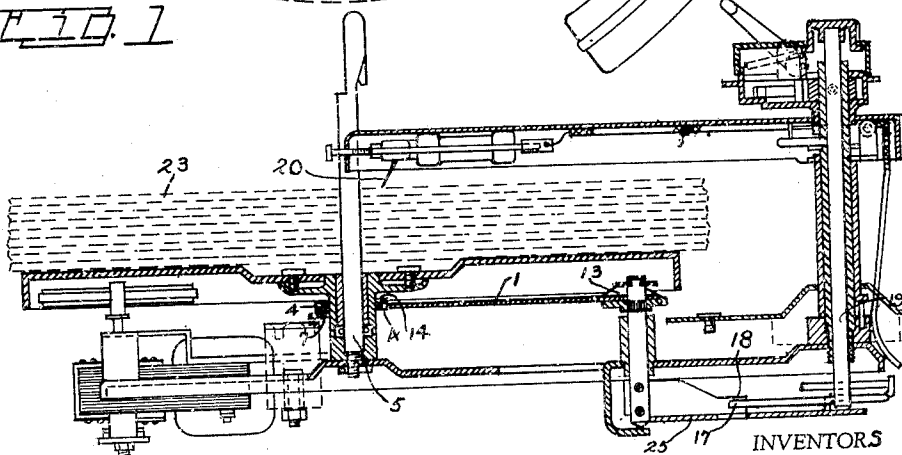


FIG. 2

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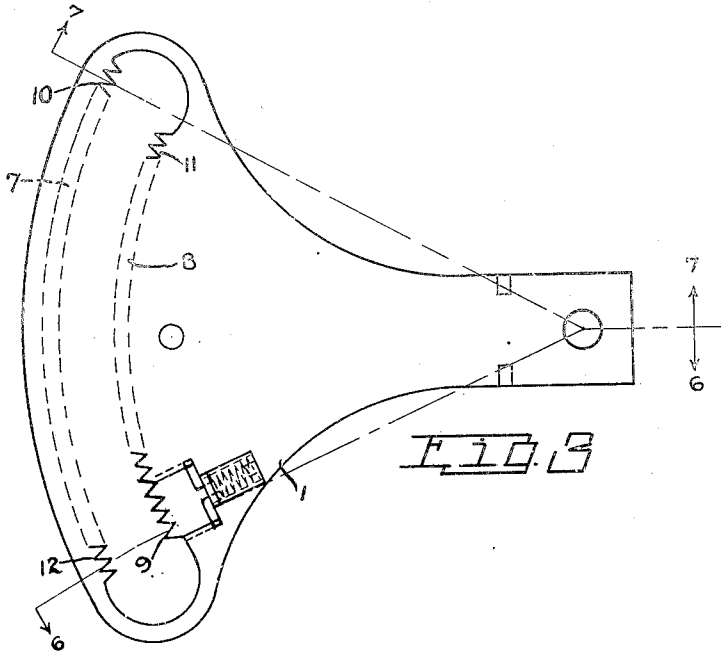


FIG. 3

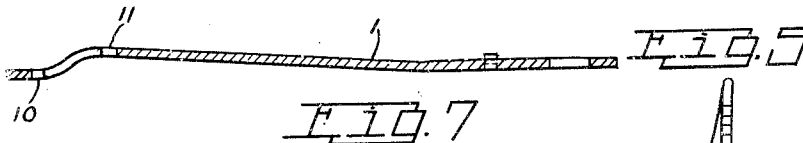


FIG. 5

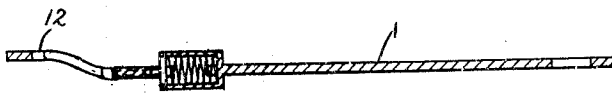


FIG. 6

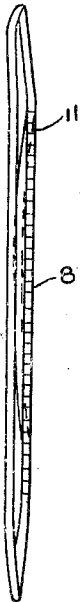


FIG. 4

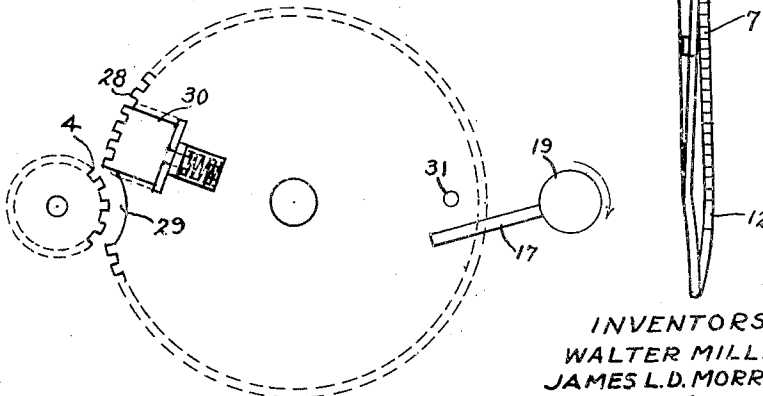


FIG. 8

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RECORD CHANGER GEAR AND TRIP MECHANISM

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6 Claims. (Cl. 74—79)

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The present invention relates to automatic record changers, and more particularly to the operating gear and trip mechanisms for cyclic operation of the several record changer parts in proper sequence, after one record has been played through and the tone arm has been moved to the end of its sound track. The function of this operating gear is to perform a cycle of operations by making either one complete turn or one complete oscillation during each cycle. In the oscillation form, this may be done by turning a sector gear through a predetermined angle first in one direction, then back to the starting position.

The object of the present invention is to provide a simple gear and trip means for automatic operation of the gear through one cycle each time the trip is actuated.

Another object of the present invention is to provide a reduced gear drive for a gear of the oscillating type so as to drive it from a pinion on the turntable or any other continuously operating shaft, in both directions of the oscillation to complete one cycle of operations each time it is thrown into engagement with said pinion by a trip actuated in response to movement of the tone arm to within a predetermined distance from the center of the turntable corresponding to the end of the sound track on the record being played.

Another object of the present invention is the provision of a sector gear having an internal gear portion and an external gear portion for meshing with a common driving pinion successively to turn said sector gear first in one direction and then automatically in the other to its starting position, whereupon the pinion is unmeshed and continues rotating freely until the sector gear is again moved into engagement therewith.

Another object of the present invention is to cyclically oscillate an operating shaft by means of a sector gear resiliently mounted on said shaft so as to have a limited amount of axial displacement thereon and having axially displaced and inclined internal and external gear portions for meshing with a common continuously rotating pinion, and means for meshing said external gear portion with said pinion at the beginning of an oscillating cycle, said gear portion being inclined axially so as to displace said sector gear until the pinion reaches the end of said external gear portion when the sector gear will spring to its normal axial position to bring the pinion into mesh with the internal gear portion of the sector gear, whereupon the section gear will be driven in the opposite direction, the internal gear portion being

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likewise axially inclined so as to again displace said sector gear axially until the pinion reaches the other end of said internal gear portion when the sector gear is released to its normal position out of engagement with said drive pinion until again placed in engagement with said pinion for initiating another oscillating cycle.

Another object of the present invention is to construct a sector gear having axially inclined external and internal gear portions for meshing with a common drive pinion, said pinion being normally in the plane of one end of one gear portion and the opposite end of the other, and having a shroud on one side of its teeth to press against the side of the external gear portion of the sector gear to keep the engaged gear portion in mesh with it to the end of each portion, said sector gear being mounted on its shaft for resilient axial displacement of its gear portions.

Another object of the present invention is to provide a gear for cyclical operation through one complete turn from a continuously rotating pinion, which gear will stop in a position where its teeth are cut away so as to prevent meshing with said pinion, and which may be readily meshed for initiating a cyclic operation upon slight turning of the gear by extraneous trigger means.

Other and more specific objects will become apparent in the following detailed description of illustrative forms of the device based on the present invention, having reference to the accompanying drawings, wherein:

Figure 1 is a partial plan view of a record changer wherein one form of the present device, comprising a dual sector gear is used,

Figure 2 being a sectional view thereof,

Figures 3 to 7 are detailed views of the sector gear, and

Figure 8 is an illustrative form of a rotating type of gear which might be used for other types of record changers requiring a complete revolution of the operating gear for one cycle of operation of its parts.

The usual operations required by a record changer is to start the operating gear, whatever its form may be, when the tone arm has reached the end of the sound track on the record being played, whereby to perform the following functions in sequence; raise the needle end of the tone arm, swing the tone arm outside the periphery of the record on the turntable, change the record on the turntable, swing the tone arm so as to bring the needle to its starting position over the new record, and lower it to the soundtrack. This cycle of operations may be carried by various

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forms of mechanism through an operating gear which may either be oscillated through a predetermined angle or turned through a complete revolution in one direction to perform this series of functions through intermediate mechanisms which form no part of the present invention.

The novel form of gear and trip mechanism herein disclosed for carrying out a cycle of operations as mentioned above, consists of either a dual sector gear 1 having an external gear portion 8 and an internal gear portion 7 for meshing with a common drive pinion 4, on the turntable shaft 5 as shown in Figures 1 to 7, or a complete circular gear 6 such as shown in Figure 8. In either instance, the gear is connected to record changer mechanism for performing the functions enumerated above.

In the dual sector form of gear, the internal and external gear portions 7 and 8 respectively, are axially spaced relative to each other, so that as one portion is in mesh with the pinion 4 the other is not, and they are each axially inclined so that, although one end 9 of the external gear portion 8 and the opposite end 10 of the other portion 7 are normally in the plane of the drive pinion 4, the other ends 11 and 12 are axially displaced in opposite directions from this plane when the gear is in its normal position. The gear, however, is mounted for limited axial displacement by resilient mounting means 13 tending to prevent its displacement in the axial direction. The drive pinion 4 has a shroud 14 against which the external gear teeth 8 bear to maintain meshing alignment of either portions 7 or 8 therewith until the pinion reaches the end of said portion whereupon the external teeth 8 slide off the shroud 14 and permit the gear to resume its axially normal position.

Both internal and external portions 7 and 8 of the sector gear 1 are cut out at one end (9 and 12) to permit free rotation of the pinion 4 when the gear 1 is in its starting or inoperative position, and the external gear portion 8 is also cut out at the opposite end 11 to permit it to slide off the shroud 14 and allow the corresponding end 10 of the internal gear portion to engage the pinion 4 for the return movement of the gear 1 to its starting position. A light spring 15 may be provided to hold the gear 1 lightly against the stop 16 in this position until moved by the pin 17 striking the projection 18.

To initiate the gear operation in the present disclosure, the pin 17 mounted on shaft 19 which is turned in response to inward movement of the needle 20 on the tone arm 21 towards the center 22 of the record 23 being played, strikes a projection 18 on the cam 25 attached to the gear 1, when the needle 20 moves within a predetermined distance from the center of the record 23, corresponding to the end of the sound track thereon. The gear 1 is thus moved so as to bring the resiliently mounted piece 26 of the external gear 8 into engagement with the pinion 4. This piece 26 is pushed back until proper mesh is established, when it is pushed out to form a continuous gear with the rest of the external gear portion 8. As the gear 1 is driven by the pinion 4, the shroud 14 keeps the external gear portion 8 from running off the pinion 4 and tilts the gear axially against the force of the spring 13 until the end of this gear portion 8 is reached, when the shroud 14 slips off this gear portion 8 and the internal gear portion 7 is thrown into mesh with the pinion to start the gear on its return movement. During this movement, the internal

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gear portion 7 is kept in mesh with the pinion by the shroud 14 cooperating with the other side of the external gear portion 8 until the pinion reaches the other ends of the gear portions 7 and 8 where they are both cut out to permit continued free rotation of the pinion 4 until the trip projection 18 is again actuated by the pin 17 to start another cycle.

The complete circular gear 6 shown in Figure 8 may be used instead of the dual sector gear 1 by using appropriate cam mechanism to carry out the necessary functions during one complete turn of this operating gear 6. In this gear the teeth 28 are cut out in one place 29 corresponding to the starting position to allow free rotation of the pinion 4. A spring pressed element 30 of the gear may be mounted adjacent this cut out portion 29 for engaging the pinion 4, in the same way as in the sector gear form, when a projection or trip pin 31 is struck by the pin 17 on the tone arm shaft 19. A light resilient centering means may be provided for holding the gear 6 in its starting position until the tripping means is actuated to start it on its cycle.

Obvious modifications in form and arrangement of parts of these devices may be made to suit requirements without departing from the spirit and scope of this invention as defined in the appended claims.

What is claimed is:

1. A dual sector gear, a drive pinion therefore, a shroud on one side of said pinion teeth, an external gear portion and an internal gear portion on said sector gear for meshing with said pinion, said gear portions being axially spaced relative to each other and both being axially inclined in the same direction relative to the plane of the pinion, so that one end of one portion and the other end of the other portion are normally in the plane of said pinion, both portions being cut out at one end to disengage the pinion and the portion normally displaced from the plane of said pinion being cut out at the other end, said gear being mounted on its shaft for resilient limited axial displacement of its outer end in response to pressure of the shroud on said pinion bearing against one side of the teeth of one of said gear portions while said pinion drives said sector gear in one direction until the cut out of said portion is reached by the pinion whereupon the other portion is automatically brought into mesh with said pinion for reverse turning of said gear to its starting position.

2. A dual sector gear having axially spaced and correspondingly inclined internal and external gear portions for successive meshing with a common drive pinion to turn the gear first in one direction then return it to its starting position, said gear being resiliently mounted for limited axial displacement, means for moving said external gear portion into mesh with said pinion, guide means to keep said meshing engagement by displacing said gear axially until the pinion reaches a cut out space at the end of said portion releasing said gear to assume its normal axial position and bringing it into mesh with the corresponding end of said internal gear portion, said guide means being formed so as to keep this latter meshing engagement by displacing said gear axially until the pinion runs off the end of said internal gear portion and the gear assumes its starting position.

3. A dual sector gear having axially spaced and correspondingly inclined internal and external gear portions for successively meshing with a

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common continuously operating drive pinion, said gear being resiliently mounted on its shaft for limited axial displacement of its gear portions, said gear portions being cut out at one end to permit free rotation of said pinion when said gear is in its inoperative position, trip means for initiating operation of said gear by moving it to bring one of said portions into engagement with said pinion, a shroud on said pinion to keep the inclined gear portion in mesh until the end of said gear portion is reached whereupon said gear portion runs off said pinion, the gear springs into its normal axial position and engages the corresponding end of the other gear portion for return movement of said gear while said shroud cooperates to keep this gear portion in mesh with said pinion to ensure the return of the gear to its starting position.

4. A dual sector gear as defined in claim 2 having a tooth section mounted in a block radially slidable in said gear at the engaging end of the external gear portion and resilient means biasing said block outwardly to hold said tooth

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section normally in coextensive relation with the rest of the teeth of said portion whereby to facilitate proper mesh being established without harming the teeth or causing binding.

5. A dual sector gear as defined in claim 2 wherein one or more of the teeth first engaged by the pinion are yieldably mounted.

6. A dual sector gear as defined in claim 5 with a trip mechanism which causes the gear to engage the pinion by a rotating motion applied to the dual sector gear.

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