This invention relates to an automatic record-changing phonograph adapted to play a plurality of records continuously on both sides thereof.

The principal feature of the invention resides in the means for supporting a plurality of records to be reproduced on one side and adjacent the turntable, which are automatically transferred into playing position on the turntable, and returning the record to a suitable magazine after reproduction, whereupon a new record is transferred onto the turntable to replace it, the reproduced records being reversed by the magazine and repositioned so as to again be transferred onto the turntable with their faces reversed so as to play the opposite side thereof.

This is accomplished by providing a magazine for supporting the records before and after reproduction, which magazine is bodily reversed after the reproduction of the records contained therein on the one side so as to present the other side of said records when again transferred from the magazine onto the turntable.

A further feature of the invention resides in the double compartment reversible magazine so that when in one position the unplayed records will be contained in the upper compartment for transfer to the turntable, and upon reproduction thereof will be discharged into the lower compartment, whereupon the magazine will be bodily reversed so that the lower compartment of reproduced records will become the upper compartment containing records to be reproduced in reversed position.

Other features of the invention in respect to the mechanism and operation thereof for effecting the transfer of records and reversing the magazine will be hereinafter more fully set forth and described.

The full nature of the invention will be more fully understood from the accompanying drawings and the following description and claims:

Fig. 1 is a side elevation of the phonograph showing parts thereof in section. Fig. 2 is a plan view thereof. Fig. 3 is an enlarged view of a part of the end portion of the machine. Fig. 4 is a sectional view showing the transfer shelf.

In the drawings there is shown a phonograph mounted upon a base support 10 and having a frame supporting a platform 11 upon which is rotatably mounted a turntable 12. Suspended from the platform 11, there is a turntable driving motor 13 which, through suitable gearing contained in the gear housing 14, drives the spindle 15 upon which the turntable is keyed and which terminates in the centering pin 16. Mounted upon the base 10, there is a record changing motor 17 geared to the drive shaft 18 which drives the sprocket wheel 19 and sprocket chain 20. The chain 20, in turn, drives the sprocket wheel 21 keyed to the shaft 22 having its bearings in the standards 23 mounted on the base 10. Operated by the shaft 22, there is 35 a small cam 24 and a large cam 25 for driving the record changing mechanism and controlling the tone arm as hereinafter set forth.

The magazine 26 embraces an upper compartment 27 and a lower compartment 28 separated by the partition 29. A plurality of records 30 to be reproduced are contained in the upper compartment 27, while the reproduced records 31 are discharged from the turntable into the lower compartment 28.

The records are transferred from the magazine to the turntable by the transfer shoe 32 having a projection 33 adapted to engage in the center hole of the record. Said shoe is caused to move rearwardly into engaging position with the uppermost record in the top compartment and thereupon move forwardly sliding said record from the compartment onto a pivotally mounted shelf for placing and centering it thereon. Upon completion of the reproduction of the record, the pivotally mounted shelf lifts the record from the turntable and elevates it at such an incline as to cause it to slide by gravity into the lower compartment 28.

The magazine is mounted on an incline as illustrated in Fig. 1 for rotation with the shaft 34 mounted upon the incline bracket 35. The rotation of the magazine is obtained through the strap 36 passing about pulleys 37 and connected with the chain 38 having the free end thereof connected with the tension spring 39 which is secured to the base 10. Said chain 38 is adapted to engage the teeth over a sprocket wheel 40 having ratchet teeth 41.

Pivotally mounted to the bracket 35 there is a pawl 42 positioned to force the latch 42a into locking engagement with the ratchet teeth 41, said latch being pivotally mounted upon the collar 42b keyed to the shaft 34. The levers 43 and 44 are pivotally mounted on the magazine and connected with the sliding pin 45, which is so positioned as to hold the pawl 42 out of engagement with the latch 42a when one of said levers is in elevated position as shown. Said levers are provided with the fingers 46 adapted
to drop by gravity through an opening in the top of the magazine so as to bear against the uppermost record therein.

In operation, upon the record-changing motor 17 being operated, it will cause the strap 36 to rotate the gear 40 a half revolution, against the tension of the spring 39. Wherein the upper compartment of the magazine may contain one or more records engaged by the fingers 46, the lever 43 through the pin 46 will cause the pawl 42 to be held out of engagement with the latch 42a. Therefore, the return movement of the strap 36 and gear 40 created by the tension of the spring 39 in the opposite direction will have no effect upon the magazine so long as it contains a record in the upper compartment.

However, upon all records being removed therefrom, the fingers 46 will be permitted to drop to such position as to cause the pawl 42 to be released and drop by gravity into engagement with the latch 42a so that the next time the gear 40 is rotated a half revolution by the spring 39, it will rotate the magazine therewith through the latch 42a so that the other compartment will be in uppermost position.

Thus, upon the upper compartment being exhausted, during which time the lower compartment is filled with records reproduced on one side thereof, the magazine will be bodily reversed so that the records in the lower compartment will be reversed and fill the upper compartment ready for transfer to the turntable with the unreproduced side in playing position. This cycle is repeated indefinitely so that the records will be reproduced first on one side and then the other in a continuous operation.

Mounted on the table 11, there is a bracket 50 having a slot 51 therein. Pivoted vertically adjacent thereto upon the rod 52 there is a record transfer shelf 53 which, in horizontal position, embraces the turntable while the record is being reproduced. Upon completion of the reproduction of the record, the shelf is swung upward about the pivotal mounting 52 so as to carry a record therewith and cause it to slide rearwardly into the compartment 28 by gravity. As the shelf is lowered, the shoe 32 slides the new record 30 thereon for lowering into playing position on the turntable.

The stop pins 54 are movable in and out of record engaging position at the rear of the shelf so that it will protrude when the shelf is in partially elevated position to prevent the record from sliding therefrom until the shelf is elevated to its maximum angle, whereabouts upon the pin is lowered to release the record and permit it to slide therefrom. As the shelf is being lowered, and before a new record is positioned thereon, the pins 54 are caused to protrude sufficiently to prevent the new record from sliding from the shelf while being lowered onto the turntable. This is accomplished by the carriage 55 upon which the pins 54 are mounted operating within the slot 51 to control said pins depending upon the elevation of the shelf.

The shelf is operated through the link 56 pivotally connected with the rod 57 which is engaged by the cam 24 for raising and lowering it to raise and lower said shelf.

The shoe 32 is actuated through the arm 58, being connected therewith by the rod 59 sliding in the pivotally mounted collar 60. The lower end of the lever is pivotally at 61 to the frame and provided with the slot 62 embracing the pin 63 on the cam 25, the strap 36 being connected therewith. For reproducing a record, there is the usual reproducer 64 mounted on the tone arm 65 which is elevated from engagement with the record through the pin 66 extending through the swivel mounting 67.

The lower end of the pin 66 is mounted upon the periphery of the cam 25 which acts to maintain the reproducer in elevated position for record-changing purposes until the cam is moved to a position to present the recessed portion 25a to the lower end of the pin which drops therein and thereby lowers the reproducer into engaging position. The tone arm is caused to swing beyond the periphery of the record after having been raised therefrom by the arm 68 having one end connected with the tone arm at 50 and the other end bearing against the flange-like cam portion 25b of the cam 25.

A suitable control switch, not shown, is provided for energizing the record-changing motor 17 upon completion of the record, de-energizing said motor and energizing the turntable motor 13 upon the record and reproducer being brought to reproducing position, as well understood in the art.

In operation of the device as a whole, it may be assumed that the lower compartment 28 of the magazine is empty while the upper compartment is filled with records 30. The shelf 53 is in lowered position below the turntable and the record is positioned on the turntable for reproduction. The motor 17 first operates to move the cam 25 slightly to cause the reproducer to swing over the record through the medium of the flange 25b and be lowered into playing position through engagement of the pin 66 in the recess 25a. Thereupon, the motor 17 is de-energized while the motor 13 has previously been energized to rotate the turntable.

Upon completion of the record, the movement of the reproducer in the usual eccentric or spiral groove of the record actuates a circuit control to energize the motor 17 and thereupon de-energize the motor 13. The cam 25 will thereupon be driven through the gear 19 and chain 20 so as to raise the pin 66 and reproducer from the turntable and then swing the reproducer out of engagement with the record through the medium of the flange 25b. The cam 24 will then come into play to elevate the shelf 53 which will pick the record up from the turntable and cause it to slide against the retaining pin 54. Said pin will gradually be retracted until the record is released therefrom upon the shelf reaching its maximum height. The reproduced record 31 will thereupon be discharged by gravity from the shelf into the lower compartment 26.

During this operation the pin 63 on the cam 25 will have caused the shoe 32 to slide a record from the top of the stack onto the lowering shelf, the pin 54 having been slightly elevated to prevent the recording head from sliding therefrom. At the same time, the ratchet teeth 41 will be given a half revolution, but without effecting the magazine due to the non-engagement of the latch 42a for the reasons above described. The shelf 53 will then lower the record onto the turntable over the centering pin 16, the motor 13 will be energized for rotating the turntable, the flange 25b will swing the reproducer over the record and the recess 25a will permit it to be lowered into playing position.

When the last record has been withdrawn from the upper compartment 27 of the magazine
and the reproduced records placed in the lower compartment 28, the fingers 46 will drop to such a position as to release the latch 42a so that upon the next record-changing action the magazine will be reversed so as to carry the reproduced records to the top in reverse position. Thereupon, the cycle will be repeated, the records being transferred from the upper compartment so that their reverse sides will be reproduced.

The invention claimed is:

1. In an automatic phonograph, a rotatable turntable, a magazine positioned wholly to one side of the turntable for containing a stack of records supported one upon the other to be reproduced on said turntable, means for movably supporting said magazine mechanism for sliding a record from the top of the stack, transferring it to horizontal position on said turntable and returning the same after reproduction to said magazine, and means for reversing the position of said magazine for permitting a reproduced record to be repositioned upon said turntable in reverse position.

2. In an automatic phonograph, a rotatable turntable, a magazine positioned wholly to one side of the turntable for containing a stack of records supported one upon the other to be reproduced on said turntable, means for movably supporting said magazine mechanism for sliding a record from the top of the stack, transferring it to horizontal position on said turntable and returning the same after reproduction to said magazine, and means for turning said magazine so as to present the bottom side to the top for reversing the position of the records therein whereby, upon repositioning said records on said turntable, they will be presented with their playing sides reversed.

3. In an automatic phonograph, a rotatable turntable, a magazine positioned wholly to one side of the turntable for containing a plurality of records to be reproduced on said turntable, means for movably supporting said magazine mechanism for positively sliding a record from the top of the stack, transferring it to horizontal position on said turntable and returning it from said turntable to the other side of said magazine after reproduction, and means for reversing the position of said magazine for presented the reproduced record to transfer to said turntable in reverse position, whereby the opposite side thereof will be reproduced.

4. In an automatic phonograph, a rotatable turntable, a magazine positioned wholly to one side of the turntable for containing a plurality of records to be reproduced thereon, means for supporting said magazine, means for transferring a record onto said turntable in playing position from one side of said magazine and returning it after reproduction from said turntable to the other side thereof, and means for reversing said magazine and records for permitting a reproduced record to be repositioned upon said turntable in reverse position to play the other side thereof.

5. In an automatic phonograph, a rotatable turntable, a magazine positioned wholly to one side of said turntable for containing a stack of records supported one upon the other to be reproduced on said turntable, means for supporting said magazine, mechanism for sliding records from the top of the stack, transferring them to horizontal position on said turntable and from said turntable to said magazine, said means being assisted by gravity in the sliding of said records on their face, and means for reversing the position of said records in the magazine for repositioning the reproduced records on said turntable in reverse position.

6. In an automatic phonograph, a rotatable turntable, a magazine positioned wholly to one side of said turntable for containing a stack of records supported one upon the other to be reproduced on said turntable, mechanism for sliding a record from the top of the stack, transferring it to horizontal position on said turntable for reproduction thereof and returning said record to said magazine after reproduction, and means for rotating said magazine a half revolution about a diametrically extending axis for reversing the same and the records contained therein whereby a reproduced record will be carried into position for transfer to said turntable with its sides reversed.

7. In an automatic phonograph, a rotatable turntable, a magazine having upper and lower compartments therein for containing a plurality of records to be reproduced in one compartment and reproduced records in the other compartment, means for transferring a record from the first mentioned compartment onto said turntable for reproduction thereof and from said turntable to the last mentioned compartment after reproduction, and means for reversing the position of said compartments for carrying the records in the second mentioned compartment in reverse position for transfer to said turntable whereby the opposite side thereof will be reproduced.

8. In an automatic phonograph, a rotatable turntable, a magazine positioned wholly to one side of said turntable for containing a stack of records supported one upon the other to be reproduced on said turntable, means for reversing the position of said records in the magazine for causing the reproduced records to be so positioned as to be positively transferred to said turntable with their faces reversed.

9. In an automatic phonograph, a rotatable turntable, a magazine positioned wholly to one side of said turntable for containing a plurality of records to be reproduced thereon, means for sliding a record from said magazine for placement on said turntable, a pivotally mounted shelf for raising a reproduced record from said turntable in position to slide by gravity back into said magazine, and means for turning said magazine bottom side up so as to turn upper side of said records whereby the reproduced records will be in position to be slidable transferred to said turntable for reproduction of the opposite side thereof.

10. In an automatic phonograph, a rotatable turntable, a magazine having an upper and lower compartment adapted to contain a plurality of records in said upper compartment for reproduction, means for transferring a record from said upper compartment onto said turntable, mean for transferring a record from said turntable after reproduction of one side thereof to said lower compartment, and means for reversing said magazine so that the lower compartment will be uppermost and the records reversed whereby the reproduced records may be
transferred upon said turntable for reproduction of the opposite sides thereof.

11. In an automatic phonograph, a rotatable turntable, a magazine having an upper and lower compartment adapted to contain a plurality of records in one of said compartments for reproduction, means for transferring a record from said last mentioned compartment onto said turntable, means for transferring a record from said turntable after reproduction of one side thereof to the other compartment, means for reversing said magazine so that the lower compartment will be uppermost and the records reversed whereby the reproduced records may be transferred onto said turntable for reproduction of the opposite sides thereof, and means for actuating said magazine reversing means upon exhaustion of the records from the upper compartment.

12. In an automatic phonograph, a rotatable turntable, a magazine having an upper and lower compartment adapted to contain a plurality of records in said upper compartment for reproduction, means for transferring a record from said upper compartment onto said turntable, means for transferring a record from said turntable after reproduction of one side thereof to said lower compartment, means for reversing said magazine so that the lower compartment will be uppermost and the records reversed whereby the reproduced records may be transferred onto said turntable for reproduction of the opposite sides thereof, and means for actuating said magazine reversing means upon exhaustion of the records from the upper compartment.

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