

March 20, 1951

E. C. GUEDON

2,545,847

AUTOMATIC RECORD CHANGER SPINDLE

Filed Dec. 28, 1945

4 Sheets-Sheet 1

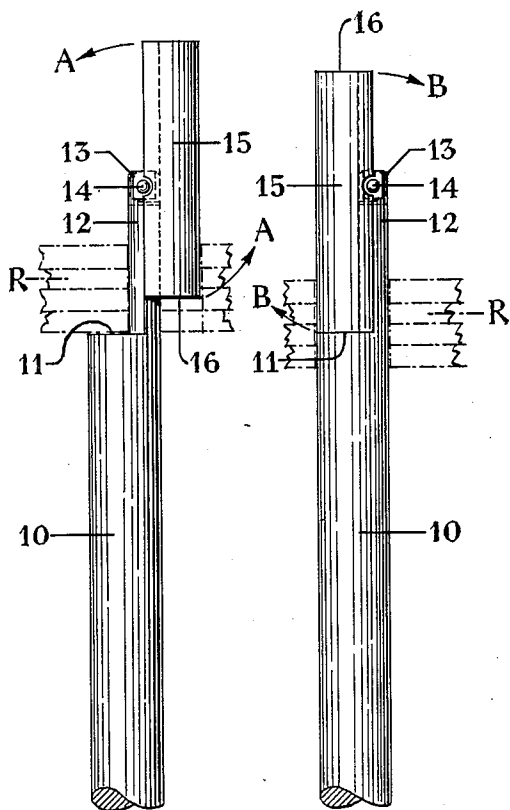


Fig. 1

Fig. 2

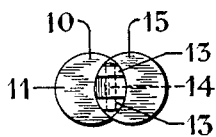


Fig. 3

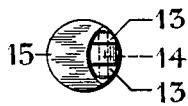


Fig. 4

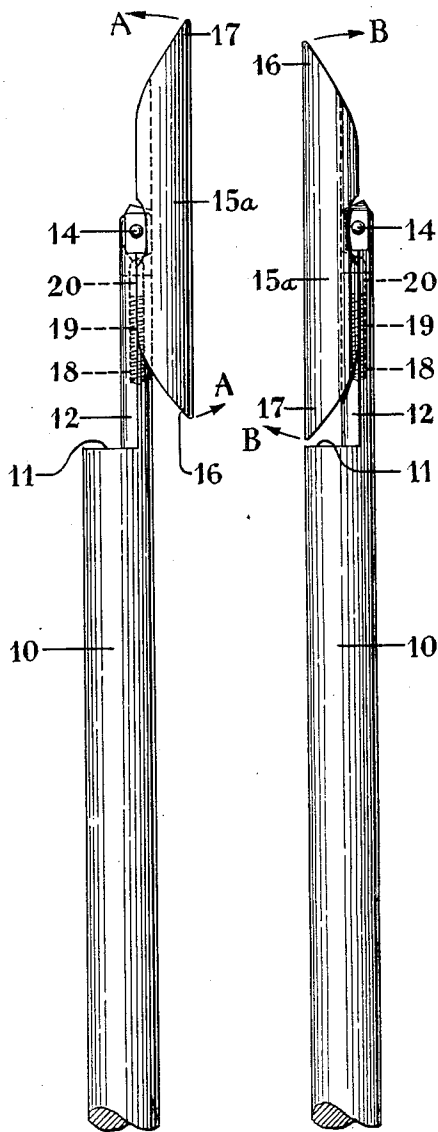


Fig. 5

Fig. 6

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4 Sheets-Sheet 2

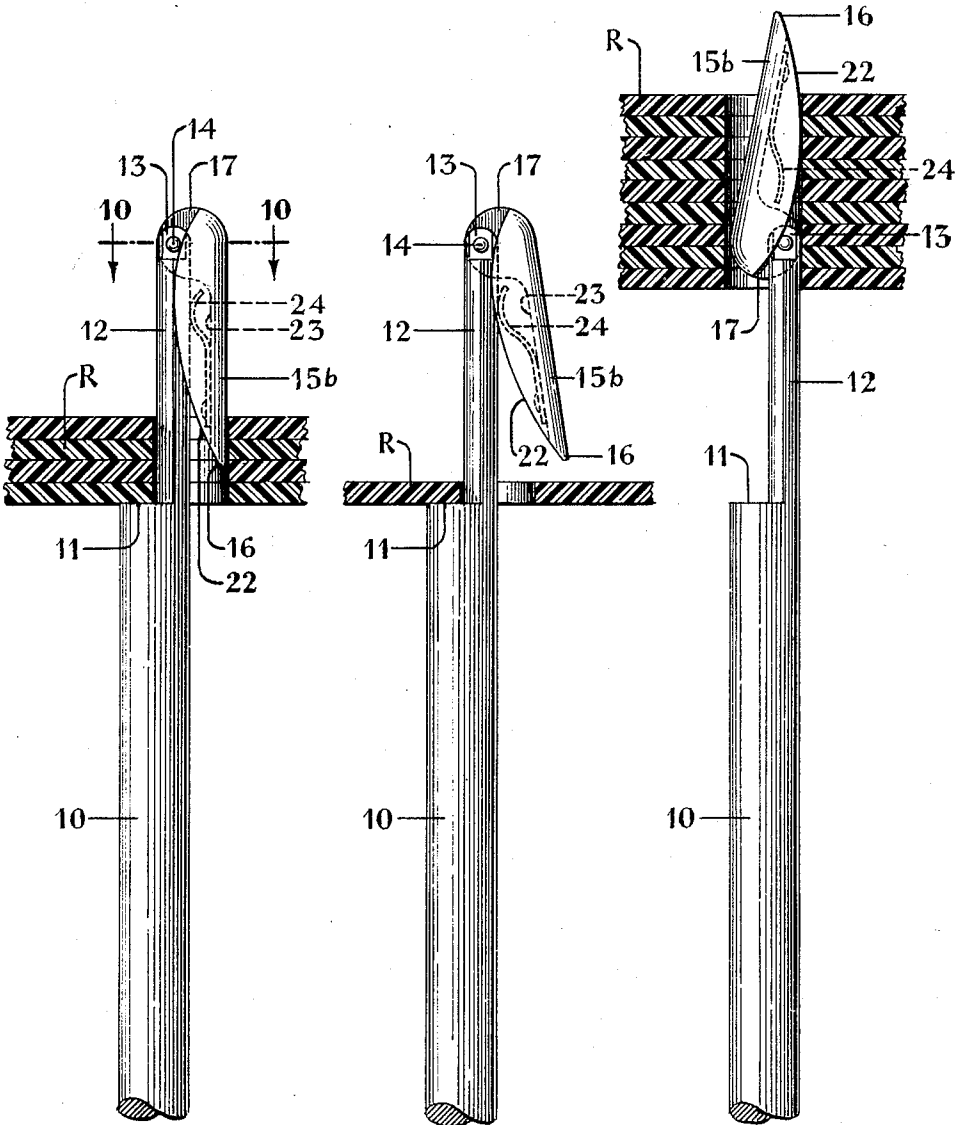


Fig. 7

Fig. 8

Fig. 9

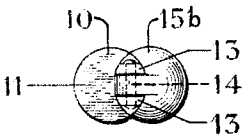


Fig. 10

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4 Sheets-Sheet 3

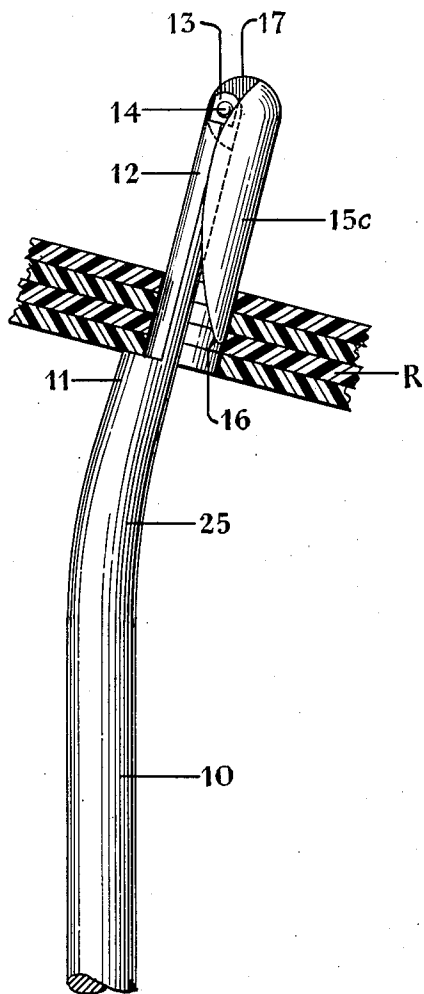


Fig. 11

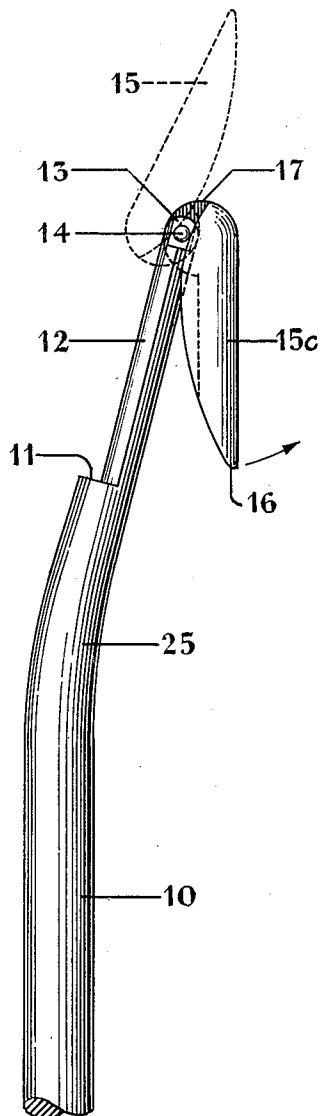


Fig. 12

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4 Sheets-Sheet 4

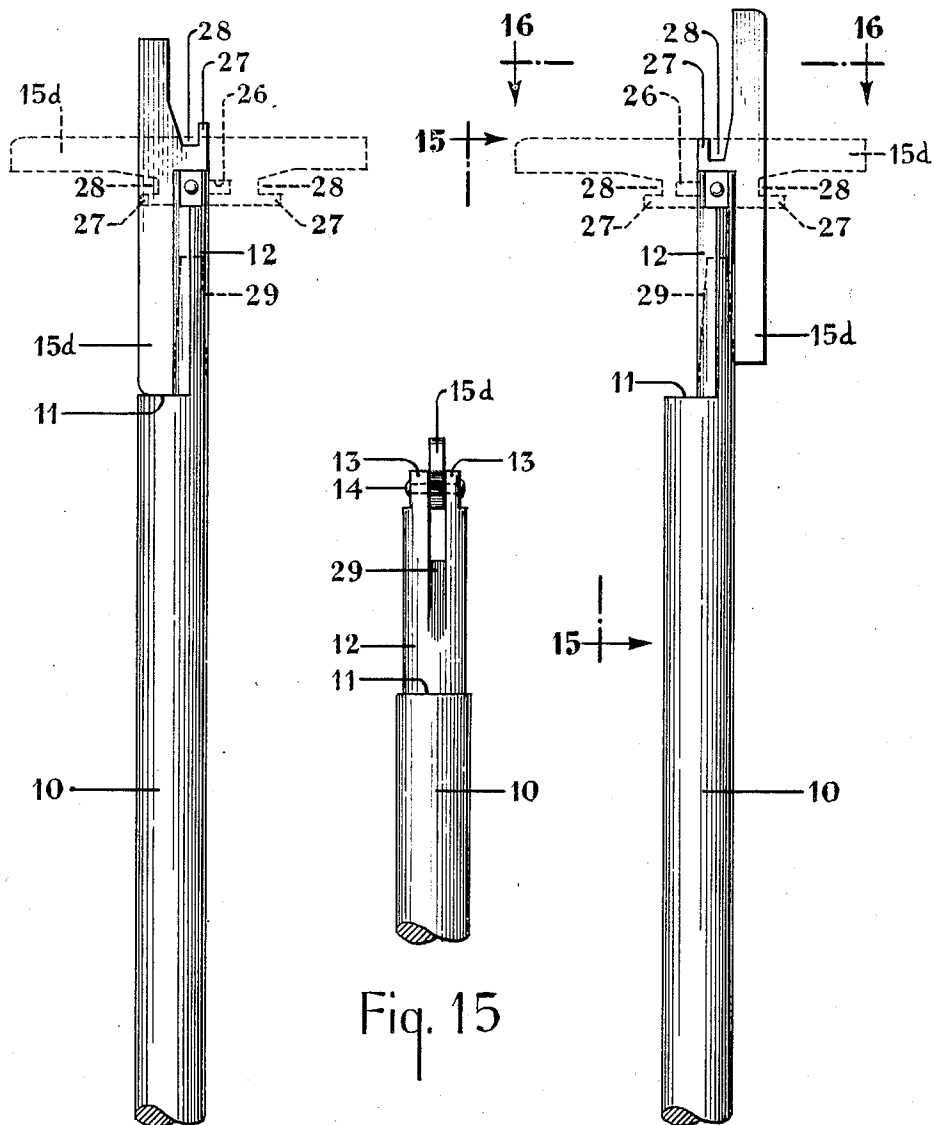


Fig. 13

Fig. 14

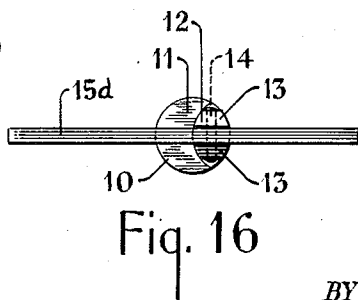


Fig. 16

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UNITED STATES PATENT OFFICE

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AUTOMATIC RECORD CHANGER SPINDLE

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Application December 28, 1945, Serial No. 637,663

2 Claims. (Cl. 274—10)

1

This invention relates to automatic phonographs of the drop type, and it has particular relation to an improved turntable spindle for that form of automatic phonographs of the type specified in which the records are supported above the turntable at their centers by a shoulder on the spindle and at their edges by a supporting device located at one side of the turntable.

In automatic phonographs of the type indicated, it has been common practice to arrange the spindle so that it can be removed from its mounting in order to facilitate removal of the played records which accumulate on the turntable, since the upper portions of the spindles are offset from the lower portions and offer an impediment to the easy removal of the played records. Constructions involving such removable spindles are objectionable not only because of the inconvenience and burden imposed on the users thereof, but also because the removable spindles must have a more or less loose fit in their mountings and this sometimes causes imperfect operation of the phonographs. There have also been proposed a number of constructions which employ spindles that are not removable, these spindles being provided with pivoted or slidable record detaining members which normally cooperate with all but the lowermost record of the stack to restrain lateral movement thereof and which are moved into a concealed position within a slot formed in the spindle when the played records are raised for removal. However, spindles of this type have also been found to have certain inherent limitations which make their use undesirable in many cases.

It is the principal object of my present invention to provide an improved spindle for phonographs of the type mentioned above which will be entirely free from the objections found in similar spindles of the prior art.

Another object of my present invention is to provide an improved turntable spindle for drop type automatic phonographs which will remain fixed in the machine, which will operate effectively to permit release of only one record at a time for dropping onto the turntable, and which will permit ready and easy removal from the turntable of all of the played records thereon without having to be removed itself.

Another object of my present invention is to provide an improved turntable spindle for phonographs of the type set forth above which, in one form, can be adjusted easily from record supporting condition to a condition permitting

2

ready removal of played records and vice versa by a simple manual manipulation in either case, and which, in another form, will accomplish this change automatically.

Another object of my present invention is to provide an improved turntable spindle as previously set forth which is suitable for use in and can readily be applied to existing drop type automatic phonographs.

Still other objects of my present invention are to provide an improved turntable spindle as described above which is very simple in construction, to provide a spindle which is extremely efficient in use and is, in fact, practically fool proof, to provide a spindle which can be manufactured easily and economically in large quantities, and to provide a spindle which is very inexpensive in cost.

The foregoing and other objects and advantages of my present invention I accomplish by providing a fixed or stationary spindle which has a lower part formed with a record supporting shoulder and an upper part in prolongation of the lower part above said shoulder and at one side of the spindle axis. At the upper part end of said upper spindle, there is pivotally mounted a record detaining member which can be swung manually either into a position concentric with the lower spindle part or into a second position eccentric thereto. In the latter position, the lower end of the detaining member terminates above the aforesaid shoulder a distance of the order of the thickness of a record. This is to permit the lowest record of a stack of records supported on the spindle shoulder, and normally held in eccentric relation to the lower spindle part by the upper spindle part and the cooperating detaining member, to be moved laterally relative to the other records of the stack and into concentric relation with the lower spindle part so it can slide downwardly therealong onto the turntable while the detaining member prevents lateral movement of the remaining records of the stack. After all of the records have been released from the stack in turn and played, the detaining member is swung into concentric relation with the lower spindle part by the mere flip of a finger. In the concentric position, the detaining member is wholly within the peripheral confines of the lower spindle part, so that it presents no extensions beyond the spindle and hence no obstructions to the records which are to be removed. Consequently, the played records can be slid freely up along the entire length of the spindle and removed easily without first hav-

ing to remove the spindle. In another form of my present invention, the detaining member may be so shaped that it will be automatically swung into the concentric position when the rising records engage its lower end. The detaining member may also be so mounted that it will thereafter return automatically to the eccentric position as soon as the records being removed pass beyond it.

It will be understood that my present invention is capable of receiving a variety of expressions. For purposes of illustration, I have shown several embodiments in the accompanying drawings in which the same reference characters designate corresponding parts throughout, and in which

Figure 1 is a side elevation of one form of spindle according to my present invention with the record detaining member shown in the eccentric position,

Figure 2 is a similar view with the record detaining member shown in the concentric position,

Figure 3 is a top, plan view of the spindle as shown in Figure 1,

Figure 4 is a top, plan view of the spindle as shown in Figure 2,

Figures 5 and 6 are side elevations similar, respectively, to Figures 1 and 2 of a modified form of spindle according to my present invention,

Figures 7, 8 and 9 are side elevations of still another form of spindle according to my present invention, Figure 7 showing the record detaining member in the fully eccentric position which it occupies when a plurality of records are mounted on the spindle, Figure 8 showing the record detaining member in a somewhat displaced position to which it is moved when not more than one record remains in the stack, and Figure 9 showing the record detaining member in the concentric position to which it is automatically moved by the upwardly moving stack of played records as they are being removed.

Figure 10 is a sectional view taken on the line 10—10 of Figure 7,

Figures 11 and 12 are side elevations similar to Figures 7-9 and showing a bent spindle formed according to my present invention,

Figures 13 and 14 are side elevations similar, respectively, to Figures 1 and 2 and showing still another form of spindle according to my present invention,

Figure 15 is an elevational view as seen from the line 15—15 of Figure 14, and with the record detaining member in the horizontal, dotted position of Figure 14, and

Figure 16 is a top, plan view as seen from the line 16—16 of Figure 14 with the record detaining member in the same position.

Referring in greater detail to the drawing, there is shown, in Figures 1-4, a spindle having a lower part 10 formed with a record supporting shoulder 11 and an upper part 12 which extends above the shoulder 11 in prolongation or continuation of the lower part 10. The upper spindle part 12 is preferably located at one side of the axis of the lower spindle part 10 and is formed at its upper extremity with a yoke 13. Pivottally mounted in the yoke 13 on a pin 14 which extends in a direction at a right angle to the spindle axis is a record detaining member or detent 15. The detent member 15 can be swung on its pivot so as to occupy either a position eccentric to the lower spindle part 10, as shown in Figure 1, or a position concentric with the lower spindle part 10, as shown in Figure 2.

In the latter position, the detent 15 lies wholly within the peripheral confines of the lower spindle part 10 and may, in fact, constitute a continuation thereof above the shoulder 11. On the other hand, in the eccentric position of Figure 1, the detent 15 is disposed to one side of the spindle part 10 and it is of such length that its then lower end 16 is spaced above the shoulder 11 a distance slightly greater than the thickness of conventional disc records R.

The diameter of the lower spindle part 10 is just under that of the center holes in conventional disc records. Similarly, the combined transverse dimension (also diameter, as best seen from Figures 3 and 4) of the upper spindle part 12 and the detent member 15 is the same. When the detent 15 is in the eccentric position of Figure 1, the upper spindle part 12 cooperates with the detent 15 to maintain the records R in the stack eccentric to the lower spindle part 10, the lowest record resting on the shoulder 11 and also on a suitable support at its edge in well known manner. Since the then lower end 16 of the detent 15 is spaced above the shoulder 11 a distance slightly greater than the thickness of a record, the lowest record R can be moved laterally to the left to bring it into concentric relation with the lower spindle part 10 so that it can slide down therealong to the turntable (not shown), while the detent 15 prevents the remaining records R from also moving to the left. Thus, each succeeding, new, lowest record can be released from the stack for dropping toward the turntable.

When all of the records have been played, it is merely necessary to swing the detent member 15 in the direction of the arrows A—A (Fig. 1) into the concentric position of Figure 2. This can be done very easily by the simple flip of a finger. Since the detent 15 then forms an uninterrupted, smooth continuation of the lower spindle part 10, the records R can be readily slid up along the entire length of the spindle for facile removal thereof without requiring removal of the spindle from the turntable. The spindle part 10 can therefore be permanently mounted in a fixed or stationary position concentric to the turntable. When it is desired to load a new stack of records, the detent 15 is swung in the direction of the arrows B—B of Figure 2 into the eccentric position of Figure 1, whereupon the shoulder 11 becomes available to support the stack.

If the detent 15 is formed with flat or squared-off ends, as in Figs. 1-4, it sometimes happens that, while loading a new stack of records on the spindle, the detent is accidentally tilted into a horizontal position and then needs resetting. To facilitate threading records on the spindle and minimize the chance of accidentally tilting the detent 15A, the ends of the detent 15 may be tapered or curved as shown in Figures 5 and 6. Its upper, tapered end 17 of Figure 5 then resembles more nearly the conventional spindle of manual phonographs. If the end 16 is also tapered, the same condition will prevail when the detent 15A is in the concentric position of Figure 6, in which case the spindle is also especially useful for manual operation of the phonograph. To further insure against accidental displacement of the detent 15 from either its concentric or its eccentric position, the upper spindle part 12 is provided with a longitudinal bore 18 in which are received a coil spring 19 and a plunger 20. The plunger 20 is arranged to coop-

5

erate with a lug or ear 21 on the detent 15 and to pressingly engage the ear 21 in response to the spring 19 for releasably latching or holding the detent 15 in either of its two positions.

In the modification of Figures 7 to 10, the detent member 15B is made only about half the length of the corresponding detent members of Figures 1 to 6 so that it extends downwardly toward the shoulder 11 when it is in the fully eccentric position of Figure 7 and it extends upwardly away from the shoulder 11 when it is swung up into the concentric position of Figure 9. The detent 15 of this modification of my invention is formed with a suitably curved or tapered end 17 which protrudes somewhat above the yoke 13 of the upper spindle part 12 when the detent is in the eccentric position (Figure 7) and which then constitutes the upper extremity of the whole spindle. As in the case of Figure 5, the purpose of making the detent end 17 curved or tapered is to facilitate threading the records on the spindle.

It will be noted that the side or edge 22 of the detent 15 which is adjacent to or faces the upper spindle part 12 when the detent is in the eccentric position is also curved and tapers downwardly away from the upper spindle part as it approaches the detent end 16. The purpose of this is to space the detent end 16 from the upper spindle part 12 so that, when a stack of played records is being raised upwardly along the spindle for removal, the leading or topmost record will engage the detent end 16 and, as the records are raised, will swing the detent 15 up into the concentric position of Figure 9 to permit free and easy removal of the records. Preferably, the detent 15 is also provided with a longitudinal groove 23 in which a leaf spring 24 is mounted. The leaf spring 24 bears against the upper spindle part 12 and tends to force the detent member 15 away somewhat from the upper spindle part 12 to the position shown in Figure 8 so as to space the lower detent end 16 even more from the spindle part 12 and thus insure upward swinging of the detent into the concentric position of Figure 9 by the records being removed.

When a stack of records is loaded onto the spindle, the records compress the spring 24 and hold the detent in the fully eccentric position of Figure 7. As soon as all but the lowermost record R have been released from the stack, the spring 24 moves the detent 15 to the position of Figure 8. Thereafter, when the played records are raised along the spindle for removal thereof, the uppermost record engages the detent end 16 and swings it up into the concentric position of Figure 9, as described above, after which the detent 15 is again lowered to the position of Figure 8 in readiness for the loading of a new stack of records on the spindle. It is apparent that the spring 24 could be mounted on the upper spindle part 12, if desired, to bear against the detent 15 with equal effectiveness.

Figures 11 and 12 show a spindle having a detent 15C like that of Figures 7 to 10. However, in the spindle of Figures 11 and 12, the lower spindle part 10 is formed with a bend 25. This disposes the upper spindle part 12 angularly relative to the lower spindle part. Consequently, when there are no records on the shoulder 11, or at least not more than one record thereon, the detent member 15 will swing out automatically to the solid line position of Figure 12 in response to gravity and it will not be necessary to employ

6

the spring 24 for this purpose. When played records are later removed, they will engage the then lower end 16 of the detent member 15 and will swing it up into the dotted line position of Figure 12 above and in substantial extension of the upper spindle part 12. As soon as the records being removed have passed beyond the raised detent member, the latter will immediately and automatically fall back into the solid line position of Figure 12 under the influence of gravity because the center of gravity of the raised detent lies to the right of the pivot pin 14, as viewed in Figure 12. When a stack of records is loaded onto the spindle, the detent 15 is forced against the upper spindle part 12 and it assumes the position shown in Figure 11.

The modification of my invention shown in Figures 13 to 16 is somewhat similar to that of Figures 1 to 4, but in Figures 13 to 16 the detent member 15D is formed with a longitudinal slot 26 through which the pivot pin 14 passes so that the detent member can not only pivot on the pin 14 but will also be slidable thereon. The detent member 15 is also formed with a pair of oppositely directed fingers 27 which are spaced transversely from the main body portion thereof to provide slots 28 in which a latching tongue 29 is adapted to be received. The tongue 29 serves to positively lock the detent 15 in either its concentric position (Figure 13) or its eccentric position (Figure 14) against accidental tilting while records are being threaded on the spindle.

To move the last described detent member 15 from its concentric to its eccentric position, it is first raised to disengage it from the latching tongue 29, then tilted clockwise to the horizontal, dotted line position of Figure 13, then pushed to the left and tilted or swung down clockwise again toward the solid line, eccentric position of Figure 14, and finally slid down until the latching tongue 29 is within the then lower slot 28. This firmly latches the detent in its final, operative, eccentric position. To move the detent 15 back to its concentric position in order to permit ready removal of played records, the detent 15 is first raised, then swung counterclockwise to the horizontal, dotted line position of Figure 14, then pushed to the right and again swung counterclockwise, and finally lowered into latching engagement with the tongue 29.

It will be apparent from the foregoing description that I have provided an improved phonograph spindle which can be made a permanent part of a drop type automatic phonograph and need not be removed when it is desired to remove the played records from the turntable. As will be evident to those skilled in the art, many forms of my present invention, other than those described above, are possible, in some of which, for instance, the upper spindle part 12 need not necessarily be altogether to one side of the axis of the lower spindle part 10.

It will also be evident that my improved spindle may be used effectively in many phonographs employing a horizontally disposed spindle with the records arranged thereon in vertical planes. Hence, I desire that my invention shall not be limited except to the extent made necessary by the spirit of the appended claims.

I claim as my invention:

1. A phonograph spindle for supporting a stack of records adjacent their center holes comprising a lower part adapted to be supported in a stationary position concentrically with a rotatable turntable, said lower part having a shoulder for

7

engagement by the lowest record of the stack, an upper part extending upwardly beyond said shoulder in prolongation of said lower part and at one side of the axis thereof, and a detent member pivotally mounted on said upper part for swinging movement from a position concentric with said lower part to a position eccentric thereto and vice versa, said detent member, when it is in said eccentric position, cooperating with said upper part to hold said records eccentric to said lower part and the then lower end of said detent member terminating at a point which is spaced above said shoulder a distance of the order of the thickness of said lowest record whereby said lowest record is free to be moved laterally of the stack into concentric relation with said lower spindle part to permit it to slide down along said lower part while said detent restrains lateral movement of the next highest record above said lowermost record in the stack said detent being pivotally mounted on an axis which is at right angles to said spindle axis, and the upper end of said detent member constituting the upper extremity of the spindle when said detent member is in said eccentric position.

8

2. A phonograph spindle as set forth in claim 1 wherein the side of said member facing said upper spindle part when said member is in said eccentric position is angularly related to said upper spindle part and tapers downwardly away therefrom on an angle whereby, when a record threaded on said lower spindle part is slid upwardly therealong and into engagement with said lower end of said member, the upwardly moving record will swing said member into its said concentric position to permit upward movement of said record along the entire length of said spindle for removal of said record.

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15

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The following references are of record in the file of this patent:

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