May 26, 1936. N. C. DURAND ET AL 2,042,171

PHONOGRAPH

Filed Jan. 5, 1932

Fig. 1

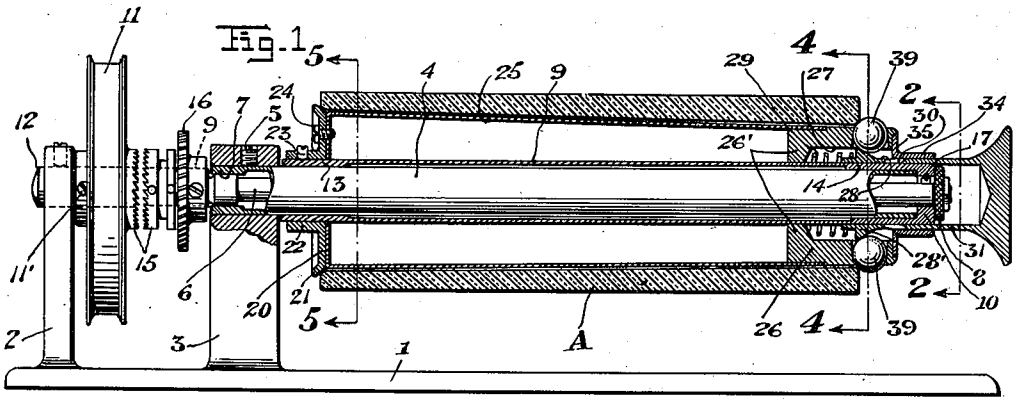



Fig. 2

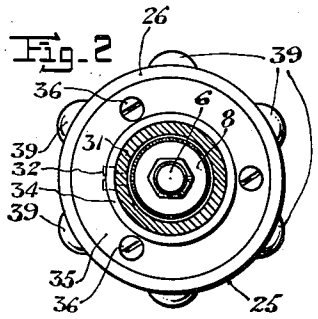



Fig. 3

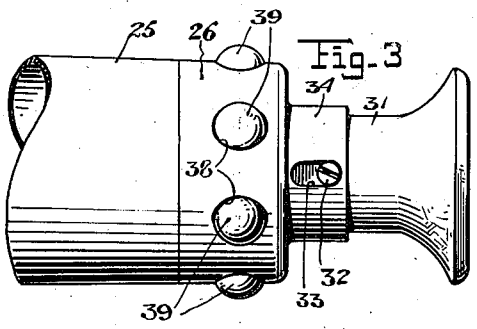



Fig. 4

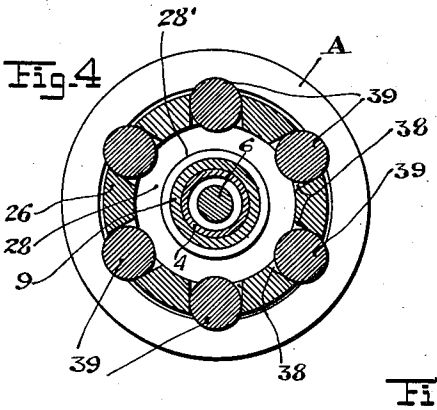



Fig. 5

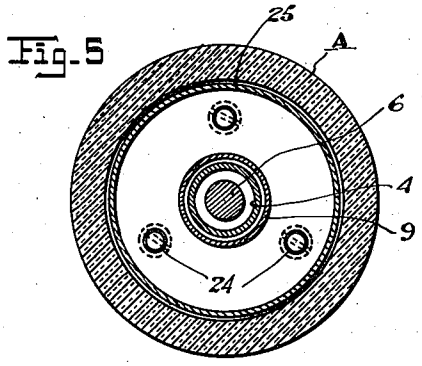
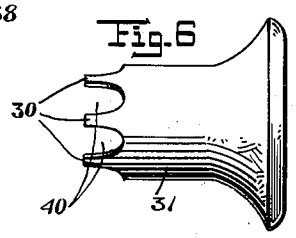



Fig. 6




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# UNITED STATES PATENT OFFICE

2,042,171

## PHONOGRAPH

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Application January 5, 1932, Serial No. 584,772

19 Claims. (Cl. 274—40)

This invention relates to phonographs, and is more particularly directed to improvements in the construction of sound record supports for phonographs designed to use cylindrical record tablets.

It is customary, in commercial phonographs, to employ cylindrical sound records and to carry the latter on rotary supports or mandrels so constructed as to ensure such a record being held thereby in correct and predetermined position for properly effecting the recording of sound on or the reproduction of sound from the record. In the past, record supports of this general character, have been somewhat complicated in construction and required considerable manipulation in changing records or cylinders.

It is an object of the present invention to provide an improved record support of the character described which will act automatically to adjust a record to the correct operative position longitudinally and radially of the support, when in applying such record to the support, it is moved along the latter to or beyond a given point.

It is another object of our invention to provide a record support which will permit easy removal and replacement of records and which also will accommodate and properly hold in operative position cylinders or records varying considerably in internal diameter and length, as, for example, cylinders subject to such variations in dimensions as result from the process of manufacture thereof and from changes in temperature.

Other objects and features of our invention will appear more clearly from the following description taken in connection with the accompanying drawing and the appended claims.

In the drawing:

Fig. 1 is a vertical, cross-sectional view, with parts in elevation, showing one embodiment of our improved record support applied to a commercial phonograph of conventional form;

Fig. 2 is an enlarged sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary view in elevation of the record support shown in Fig. 1;

Fig. 4 is an enlarged sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is an enlarged sectional view taken on line 5—5 of Fig. 1; and

Fig. 6 is an enlarged detailed view of the operating and controlling knob of the record support shown in Fig. 1.

The phonograph to which a support in accordance with our invention is shown applied in Fig. 1, is of well-known construction and comprises a bed plate 1 provided with standards 2 and 3. Supported at one end in the standard 3 is a tube or sleeve 4 secured in fixed position by a set screw 5. The driving shaft 6 of the phonograph extends through the sleeve 4, the left-hand end of said shaft (Fig. 1) being journaled in a bearing 7 in the corresponding end of sleeve 4. A knurled nut 8 secured to the right-hand end of shaft 6, as shown in Fig. 1, engages the corresponding end of a tube or sleeve 9 and co-operates with the end portion 10 thereof, which engages the end of sleeve 4, to prevent the shaft 6 from shifting longitudinally to the left with reference to sleeve 4. Power is transmitted to the shaft 6 by means of a belt (not shown) encircling a pulley 11 rotatably mounted on a stud or shaft 12 which is secured in the standard 2 by a set screw. Any suitable means may be provided to prevent lateral movement of the pulley 11, such as a set screw 11' threaded through the pulley hub and fitting in an annular groove (not shown) in the shaft 12. The shaft 12 is axially in line with shaft 6, to which it is adapted to be connected by a clutch 15, one member of which is slidable back and forth upon the enlarged left-hand end portion 9 of the driving shaft 6. A gear 16 is secured to the enlarged end portion 9 of shaft 6; and from this gear by suitable connections (not shown) the feed screw of the phonograph is driven in the usual manner.

The tubular shaft 9 is rotatably mounted upon the sleeve 4 by its bearings 13 and 14 and is a part of our improved record support. The shaft 6 is so threaded that the nut 8 cannot be drawn up tightly enough to prevent slight end play and free rotation of shaft 9. The end portion 10 of shaft 9 is slotted to receive a pin 17 carried by the shaft 6, and thus the shaft 9 is caused to rotate with shaft 6.

Referring particularly to Fig. 1, numeral 20 represents a centralizing disc provided with a conical face 21 and a collar 22. Disc 20 is rigidly secured to the shaft 9, by means of a set screw 23 and therefore rotates with said shaft. Supported upon the shaft 9 and suitably secured to the disc 20 by a screw 24, is a tubular tapering shell or hollow record guiding member 25, provided at its outer or right-hand end with a thick annular member 26 forming an extension thereof. The member 26 is provided with a central cylindrical recess 27 for practically its full length. Slidably mounted upon the shaft 9, within the recess 27, is a sleeve 28, having an annular conical portion 28', said sleeve being constantly urged outwardly towards the right by a coil spring 29

engaging at one end with a shoulder on the sleeve and having its other end engaging the end wall 26' of the recess. The sleeve 28 is limited in its outward movement by fingers or prongs 30 (Figs. 1 and 6) provided on the operating and controlling cup-shaped knob 31. This knob 31 is slidably mounted on the right-hand end portion of shaft 9 and outward movement thereof is limited by engagement of a screw 32 carried thereby with one end of a slot 33 formed in a collar 34. The collar 34 is formed on a disc 35 which is secured by screws 36 to the outer end of annular member 26 and closes the recess 27 therein. A number of spherical members or balls 39 are respectively disposed in a circular series of conical openings 38 extending radially through the wall of recess 27 in member 26, and are adapted to co-operate with the conical portion 28' of sleeve 28. Normally spring 29 acts through the conical portion 28' of sleeve 28 to hold balls 39 in their outermost positions in the openings 38, as shown in Fig. 3. The balls 39 then extend outwardly a considerable distance beyond the surface of member 26. The outer end portions of the openings 38 are slightly less in diameter than the balls 39 and accordingly the walls of said end portions coact with the balls to limit their outward movement and to prevent their being dislodged from said openings. Also, to prevent such wear of the outer wall portions of openings 38 as might permit or result in dislodgment of any of the balls through the outer ends of said openings, the construction and arrangement are such that the movement of the spring-pressed sleeve 28 to the right will be stopped by the fingers 30 of knob 31 just as the balls are forced by said sleeve into engagement with said wall portions, because of the fact that outward movement of the knob is then arrested by the engagement of the screw 32 with the right hand end of slot 33.

The operation of the record support will now be briefly described. When a record A is mounted in proper operative position on the support, the parts will be in the positions shown in Fig. 1. If it is then desired to remove the record A from the support, it is merely necessary to press the knob 31 to the left and move the record to the right until the balls 39 enter the bore of the record, after which the pressure may be removed from the knob and the record may easily be drawn off the support. The bore of the record tapers, being largest at the end to be engaged with the disk 20 and of such diameter at that end as to readily take over the balls 39 when the latter are in their outermost positions. Accordingly in mounting a record A on the support, pressure need not be applied to the knob 31. That end of the record where the bore is greatest, is merely slipped over the balls 39 and the record moved to the left until the said end thereof is brought into firm engagement with the conical flange 21 of the supporting and centering disc 20. The record in this movement thereof, is guided by the tapering shell 25 and as it approaches the disc 20 the contracted right hand end portion of its bore acts to press the balls 39 inwardly against the action of the spring-pressed sleeve 28. When the record is firmly engaged with disc 20 the right-hand end thereof will have passed over the high points of the balls and the spring-pressed sleeve will then act to hold the balls in firm engagement with the adjacent end of the record and to support the record at that end in proper centralized position with respect to the axis of the mandrel. The record is then also supported and properly centralized at its left hand end by the conical flange 21 of disc 20. The record will then be positioned as shown in Fig. 1 and will be supported in proper operative position longitudinally of the mandrel and properly centralized with respect thereto, only by the flanged disc 20 and the balls 39. The shell 25 is of such size that there will then be no point of contact between it and the bore of the record, said shell acting only as a guide for the record to direct it to proper engagement with the conical flange 21, as a protecting cover, and as a mounting for disc 20 and member 26. It is to be noted that after the right hand end of the record passes the high points of balls 39 (in the application of the record to the support) said balls by reason of the action of the spring-pressed sleeve 28 thereon, will aid in moving the record into firm engagement with the conical flange 21. It is also apparent that when the record is operatively positioned on the support, as shown in Fig. 1, the balls 39 will have a camming or inclined surface engagement with the adjacent end of the record and accordingly that said balls by reason of the action of the spring-pressed sleeve 28 thereon, will then constantly exert a force on the record tending to move the same to the left whereby the left-hand end of the record will be maintained in firm engagement with flange 21.

Attention is called to the fact that our support may be modified in its operation. For instance, if a comparatively light spring 29 is utilized, the record A may readily be removed without actuating knob 31. Where such a spring is employed, it is merely necessary in removing a record from the support, to directly pull or push the record outwardly or to the right, whereupon the smaller end portion of the bore of the record will cam the balls 39 inwardly against the action of the spring-pressed member 28, and consequently the record may then easily be withdrawn, over said balls, from the support.

To permit complete retraction of the balls 39 within member 26, knob 30 has been provided between fingers 30 with suitable notches 40 (Fig. 6). With this arrangement it is possible to retract the balls sufficiently to permit records having exceptionally small bores to be readily applied to the support.

The single embodiment above described is merely illustrative of our invention and it is to be understood that we are not limited to the exact construction herein shown and described, but that the same is subject to many changes and modifications without departing from the spirit of our invention or the scope of the appended claims.

Having now fully described our invention, what we claim as new and desire to protect by Letters Patent of the United States is as follows:

1. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices being expansible and collapsible radially in respect to the axis of the support and being biased to expanded condition, and one of said devices being movable bodily with respect to the other of said devices, said expansible and collapsible device when a record for which the support is designed is operatively positioned on the support, having camming engagement with one end of the record whereby to exert a force on the record tending to move the same towards the other of said devices.

2. A support for hollow cylindrical sound records, comprising two spaced record-engaging, centralizing and supporting devices respectively having inclined surface engagement with the ends only of a record for which the support is adapted when such record is operatively positioned on the support, one of said devices being expansible and collapsible radially in respect to the axis of the support, and one of said devices being movable bodily with respect to the other of said devices.

3. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices being expansible and collapsible radially in respect to the axis of the support and being biased to expanded condition, and the other of said devices comprising a member having an inclined and annular record-engaging portion, said expansible and collapsible device when a record for which the support is designed is operatively positioned on the support, having camming engagement with one end of the record whereby to exert a force on the record tending to move the same towards the other of said devices.

4. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices adapted for respective engagement with the ends only of a record operatively positioned on the support, one of said devices being expansible and collapsible radially in respect of the axis of the support, being biased to expanded condition and being sufficiently collapsible to permit a record to be applied thereover to the support, one of said devices being movable bodily with respect to the other of said devices, and said expansible and collapsible device having camming engagement with one end of a record when the latter is operatively positioned on the support whereby to exert a force on the record tending to move the same towards the other of said devices.

5. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices adapted for respective engagement with the ends only of a record operatively positioned on the support, one of said devices being expansible and collapsible radially in respect of the axis of the support, being biased to expanded condition and being sufficiently collapsible to permit a record to be applied thereover to the support, and guiding means between said record-engaging and supporting devices for directing a record in the movement thereof over said expansible and collapsible device into proper operative engagement with the other of said devices, one of said devices being movable bodily with respect to the other of said devices, and said expansible and collapsible device having camming engagement with one end of a record when the latter is operatively positioned on the support whereby to exert a force on the record tending to move the same towards the other of said devices.

6. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices adapted for respective engagement with the ends only of a record operatively positioned on the support, one of said devices being expansible and collapsible radially in respect of the axis of the support, being biased to expanded condition and being sufficiently collapsible to permit a record to be applied thereover to the support, said expansible and collapsible device having a portion acted upon by a record during movement of the latter along the support to collapse such device, one of said devices being movable bodily with respect to the other of said devices, and said expansible and collapsible device having camming engagement with one end of a record when the latter is operatively positioned on the support whereby to exert a force on the record tending to move the same towards the other of said devices.

7. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices adapted for respective engagement with the ends only of a record operatively positioned on the support, one of said devices comprising a plurality of record-engaging members which are expansible and collapsible radially in respect to the axis of the support and which are biased to expanded condition, one of said devices being movable bodily with respect to the other of said devices, said record-engaging members having camming engagement with one end of a record when the latter is operatively positioned on the support whereby to exert a force on the record tending to move the same longitudinally of the support.

8. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices being expansible and contractible radially in respect to the axis of the support, and movable means operable to expand said expansible and contractible device, said means being biased to operative position and said expansible and contractible device having camming engagement with one end of a record when such record is operatively positioned on the support, whereby to exert a force on the record tending to move the same towards the other of said devices.

9. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices comprising a plurality of record-engaging members which are expansible and contractible radially in respect to the axis of the support, said expansible and contractible members having camming engagement with one end of a record when the latter is operatively positioned on the support whereby to exert a force on the record tending to move the same towards the other of said devices, and means operable to expand said members uniformly, said means being biased to a position in which said members are expanded thereby.

10. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices comprising a plurality of record-engaging members which are expansible and contractible radially in respect to the axis of the support, means movable relatively to said record-engaging members to expand the same, and means for limiting the movement of said expanding means.

11. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices being movable bodily

with respect to the other of said devices, and one of said devices being expansible and collapsible radially in respect to the axis of the support and being sufficiently collapsible to permit a record to be applied thereover onto the support, said expansible and collapsible device having portions which after a record has been moved a certain distance onto the support, coact with the record to urge it towards the other of said devices.

12. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively having engagement with the ends only of a record for which the support is designed when the record is operatively positioned on the support, one of said devices comprising a plurality of record-engaging spherical members which are expansible and collapsible radially in respect to the axis of the support, one of said devices being movable bodily with respect to the other of said devices.

13. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices adapted for respective engagement with the ends only of a record operatively positioned on the support, one of said devices being expansible and collapsible radially in respect to the axis of the support, being biased to expanded condition and being sufficiently collapsible to permit a record to be applied thereover to the support, and guiding means between said record-engaging and supporting devices for directing a record in the movement thereof over said expansible and collapsible device into proper operative engagement with the other of said devices, said devices being supported by said guiding means, one of said devices being movable bodily with respect to the other of said devices, and said expansible and collapsible device having camming engagement with one end of a record when the latter is operatively positioned on the support whereby to exert a force on the record tending to move the same towards the other of said devices.

14. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices being expansible and contractible radially in respect to the axis of the support and being sufficiently contractible to permit a record to be applied thereover to the support, and manually operable means for contracting said expansible and contractible device.

15. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices being expansible and contractible radially in respect to the axis of the support and being sufficiently contractible to permit a record to be applied thereover to the support, and manually operable means for contracting said expansible and contractible device, the latter device being contractible independently of said means.

16. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices being expansible and contractible radially in respect to the axis of the support and being sufficiently contractible to permit a record to be applied thereover to the support, and means comprising a member movable longitudinally of the support to effect the radial expansion of the expansible and contractible device.

17. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices comprising a plurality of record-engaging members which are expansible and contractible radially in respect to the axis of the support, and a single member movable longitudinally of the support to effect uniform radial expansion of said record-engaging members.

18. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices being expansible and contractible radially in respect to the axis of the support and being sufficiently contractible to permit a record to be applied thereover onto the support, and means comprising a member movable in a certain direction longitudinally of the support to effect the radial expansion of said expansible and contractible device, said expansible and contractible device having portions which after a record has been moved onto the support towards the other of said supporting devices a certain distance, coact with the record to urge it in a direction opposite to said direction of movement of said member.

19. A support for hollow cylindrical sound records, comprising two spaced record-engaging and supporting devices respectively adapted to cooperate with the ends of a record on the support, one of said devices comprising a plurality of record-engaging members which are expansible and contractible radially in respect to the axis of the support, and a single movable member adapted when moved in a certain direction longitudinally of the support to effect uniform radial expansion of said record-engaging members, said record-engaging members having portions which after a record has been moved a certain distance towards its proper operative position on the support, coact with the record to urge it in a direction opposite to said direction of movement of said movable member.

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