Dec. 19, 1933. H. C. HARRISON 1,940,089

PHONOGRAPH RECORD TURNTABLE

Filed July 21, 1931

FIG. 1

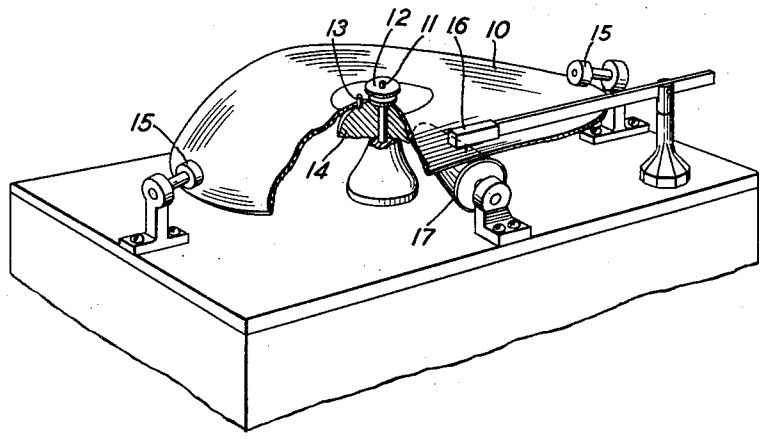


FIG. 4

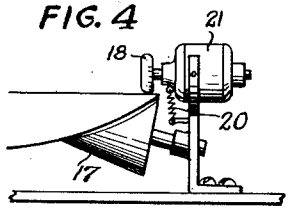


FIG. 3

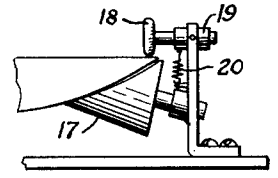
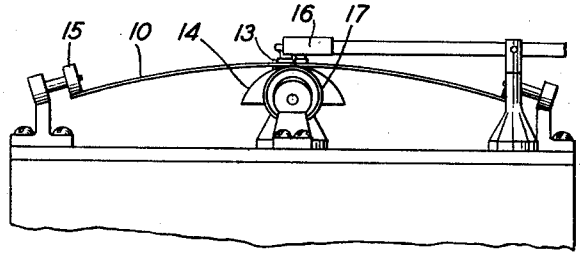


FIG. 2



INVENTOR

H. C. HARRISON

BY G. M. Campbell

ATTORNEY

Patented Dec. 19, 1933

1,940,089

UNITED STATES PATENT OFFICE

1,940,089

PHONOGRAPH RECORD TURNTABLE

Henry C. Harrison, Port Washington, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application July 21, 1931. Serial No. 552,120

4 Claims. (Cl. 274—9)

This invention relates to phonographs and particularly to the turntables thereof.

It is well known that a thin flexible record under ordinary conditions has a tendency to buckle or warp due to varying air temperature and humidity, and that a record which is so misshapen is difficult to use; the quality of sound recorded on it is poor and the reproduction from it further impaired by the irregular movement of the stylus.

The object of this invention is to improve the quality of sound recorded on and reproduced from flexible records by removing undesirable irregularities in the surface of the records.

The object is attained through the application of the principle that an originally flat flexible disc, if bent, produces a straight element at right angles to the radius of curvature, and as applied to the present invention, the flexible record is bent downward by two rollers at opposite ends of a diameter of the record, forming a straight element transverse of the flexed diameter which element is used by the translating device in its radial travel.

In the accompanying drawing which forms a part of this specification is shown one form of the turntable. Fig. 1 is a perspective of the turntable and record; Fig. 2 is a side elevation showing more clearly a record and the bending rollers cooperating therewith, Fig. 3 is an elevation 90° removed from that of Fig. 2 showing a pressure roller which may be used as a straight portion of the record and Fig. 4 shows an alternative form of pressure roller in which a driving motor is coupled to the pressure roller of Fig. 3 to drive the record.

The record 10 is of the thin flexible type adapted to be continuously bent along succeeding diameters as it is rotated. The mandrel 12 transmits the driving power required for the record and the driving is made positive by means of a pin 13. A weight 12 serves to maintain the record in contact with the driving pin. A member 14 on the mandrel 11 partially supports the record and maintains it at a definite height on the mandrel relative to the rollers which is necessary to secure the desired curvature of the record.

The bending is accomplished through the inclined rollers 15, 15. These are placed 180° apart so that the diameter on which the translating device is tracking will be horizontal. The angle at which the rollers are inclined is dependent upon the degree of flexure desired in the record. For the average 10" record the edges need not be depressed in excess of 1" to produce a sufficient amount of tension to remove surface irregularities. The corresponding angle of the axis of the roller is about 20°. For convenience the rollers can be made adjustable both as to inclination and height.

The portion of the record under the translating device is supported by a cone idler 17. The cone is made as large as possible to provide a relatively wide contact surface for the record. The inclination of the axis of the cone is such that the uppermost element of the cone is horizontal and hence for a given cone the inclination is fixed. The cone is driven from the frictional contact of the record. The weight necessary to smooth out motor and gear vibration is supplied by the solid metal spherical segment 14 which also serves to support the record partially, as mentioned above.

A pressure roller 18 (Fig. 3) may be used over the cone at the edge of the record to maintain the record in contact with the cone. The roller 18 is mounted on a pivoted member 19 held in place by spring 20 to permit the removal of the record from the turntable.

To place a record on the turntable the record is bent until the edges are under the rollers 15, 15. It is threaded over the mandrel 11 and rotated until the driving pin engages with the record. The weight 12 is placed over the mandrel and the record is ready to be used.

The upper surface of the record when bent will be stretched slightly in the direction of the rollers, giving a unidirectional tension. Since the record is almost totally unsupported the irregularities in it will be free to adjust themselves to the curved contour impressed upon the record. The portion under the stylus of the translating device will always be in tension and hence regular, thus providing smooth tracking for the stylus.

The description herein given pertains to a preferred form of the invention but conceivably modifications of this form can be obtained without departing from the spirit of the invention. For example, it might be of some advantage to relieve the center of the record of driving stresses and therefore introduce the driving force at the edge of the record instead. This could be accomplished by means of a driving pressure roller such as is shown in Fig. 4 which is similar to the one described except that pivoted member 19 is replaced by a similarly pivoted small electric motor 21 balanced by spring 20 to give the required pressure to the roller 18.

What is claimed is:

1. In an apparatus for driving flexible phonograph disc records, bending means for tensioning the surface of the records while in operation comprising a pair of rollers placed at the outer margin of the record and symmetrically disposed with reference to a diameter of said record.

2. In an apparatus for driving flexible phonograph disc records, a central supporting member comprising a mandrel, a heavy mass and a driving pin, and bending means comprising a pair of rollers placed 180° apart with reference to the center of rotation of the record to produce a straight portion in the record along a diameter of the record located midway between the bending means substantially as described.

3. In an apparatus for driving flexible phonograph disc records, a central supporting member for the record comprising a mandrel, a heavy mass and a driving pin, bending means comprising a pair of rollers placed 180° apart with reference to the center of rotation of the record to produce a straight portion in the record along a diameter of the record located midway between the bending means, a cone roller supporting the straight portion of the record and a pressure roller positioned over the cone roller whereby the record is maintained in contact with the cone roller.

4. In an apparatus for driving flexible phonograph disc records, a central supporting member for the record comprising a mandrel, means on the mandrel for limiting the vertical movement of the record, bending means comprising a pair of rollers spaced 180° apart with reference to the center of rotation of the record to produce a straight portion in the record along a diameter of the record located midway between the rollers, a cone roller supporting the straight portion of the record and a pressure roller positioned over the cone whereby the record is maintained in contact with the cone roller, and means for driving the pressure roller to rotate the record.

HENRY C. HARRISON.