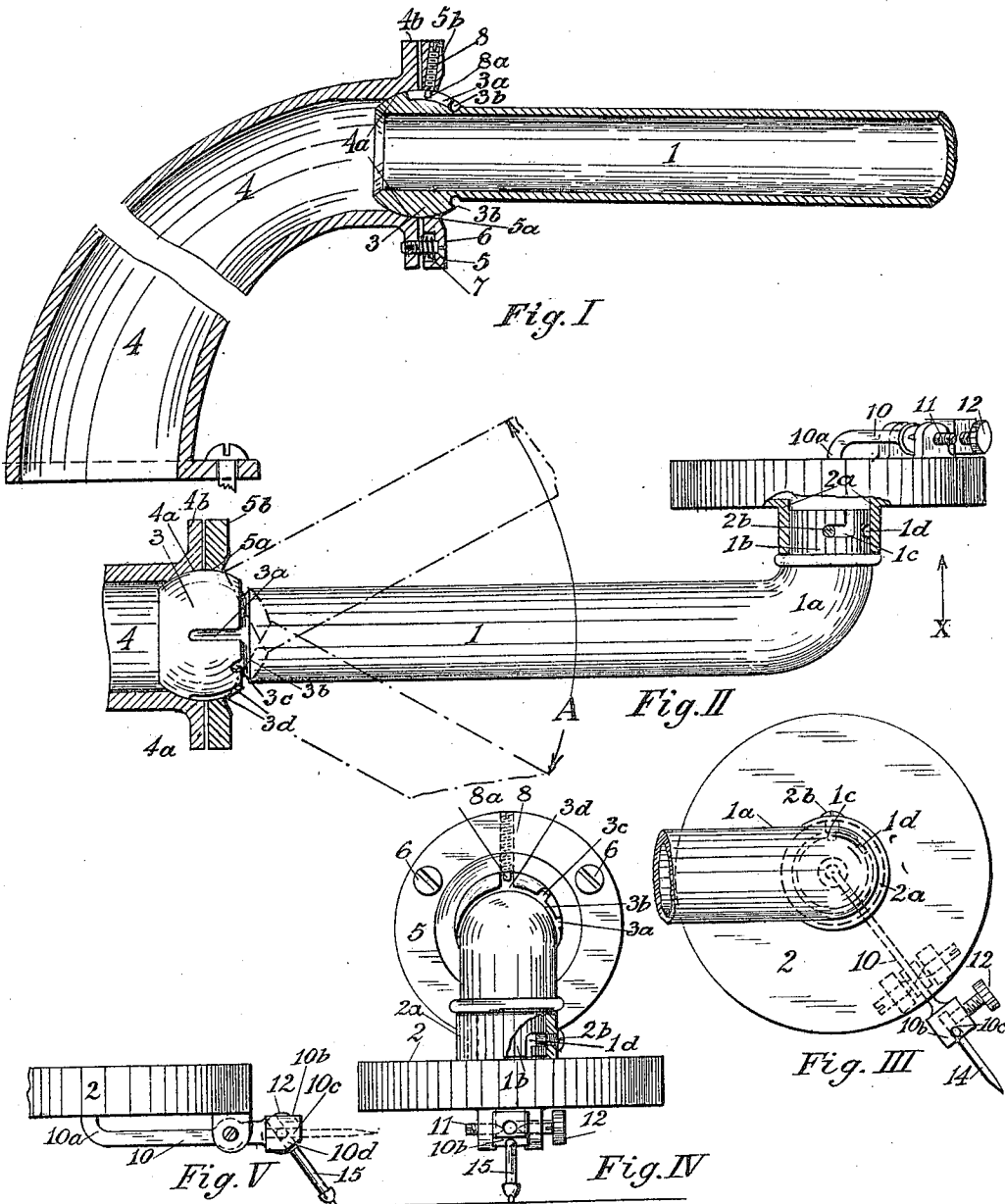


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TONE ARM FOR PHONOGRAPHS.
APPLICATION FILED OCT. 30, 1919.

1,384,015.

Patented July 5, 1921.



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TONE-ARM FOR PHONOGRAPHS.

1,384,015.

Specification of Letters Patent.

Patented July 5, 1921.

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To all whom it may concern:

Be it known that I, WILLIAM FRICK, a citizen of the United States, and resident of the city of New York, in the county of Queens and State of New York, have invented certain new and useful Improvements in Tone-Arms for Phonographs, of which the following is a specification.

This invention relates to improvements in tone-arms for phonographs, and particularly to that class of these arms, which may be used for the reproduction of disk records of either the laterally cut, or the hill and dale type.

It is the object of the invention, to provide a tone-arm by which the position of the reproducer, relative to the record, may instantly be changed from a vertical position of its diaphragm to a horizontal position of the same and vice versa.

Another object of the invention is to provide simple means for the use of the same reproducer with either one of the above named types of records.

A further object of the invention is, to provide easily operated means to hold the tone-arm securely in non-operative position.

The reproducer which is to be used in connection with this tone-arm includes means to use interchangeably the stylus points, best suited for the reproduction of either, laterally cut, or hill and dale-type records, for the novel features of this reproducer I have filed a separate and copending application for Letters Patent.

With these and other objects in view the invention consists in certain novel details of construction and arrangements of parts hereinafter described and shown and illustrated in the accompanying drawings, made part of these specifications, in which:

Figure I is a sectional elevation of my tone-arm, tone-arm-joint and tone-arm-support.

Fig. II is a plan of my tone-arm, showing a reproducer attached thereto, adapted for playing horizontally cut records. For clearness the outer parts of the tone-arm joint are shown in section and a part of the reproducer is broken out.

Fig. III is a side elevation of the reproducer and its attachment to the tone-arm, as seen in the direction of the arrow X of Fig. II.

Fig. IV is a front elevation, showing the

tone-arm and reproducer attached thereto, when adjusted to play hill and dale records. Fig. V is a side elevation of Fig. IV.

Similar characters of reference indicate corresponding parts throughout the various views.

Referring to the drawings, 1 represents the tone-arm which consists of a tube, shaped at its reproducer end into an elbow 1^a provided with a shoulder 1^b for attachment of the sleeve 2^a of the reproducer 2 by means of a pin 2^b held in this sleeve. Shoulder 1^b is provided with two angular slots, commonly called bayonet slots, 1^c and 1^d, arranged 40 degrees apart on the circumference of sleeve 1^b and intended for the attachment of the reproducer in different relative positions to the tone-arm 1. The opposite end of the tone-arm 1 terminates into a hollow sphere 3 which is rotatively mounted in a spherical socket 4^a of the stationary tone-arm support 4 and is held in place in this socket by means of the cap 5 to form a ball and socket universal joint. Cap 5 forms a part of the spherical socket at 5^a and its flange 5^b is joined to a similar flange 4^b of the tone-arm support by means of screws 6; these screws are surrounded by small helical springs 7 which rest in recesses of flange 5^b and tend to press flanges 4^b and 5^b apart, to form a smooth and easy working joint and prevent binding of the ball in its socket. Cap 5 carries also a screw 8 which terminates into a pivot 8^a and whose axis is preferably located in a plane through the axis of the tone-arm, when in position of alinement with that of the tone-arm support (as shown in full lines on the drawings). This pivot 8^a enters a slot 3^a or 3^d in the surface of the sphere, when the tone-arm is in playing position. The slot 3^b surrounds the circumference of the sphere, close to its joining line with the tube 1, and connects the slots 3^a, 3^b and 3^c, which extend in longitudinal direction of the tone arm, with each other. The two long guide grooves 3^a and 3^d are arranged to form an angle of 90 degrees with each other and the tone-arm axis as vertex the short stop-groove 3^c is preferably arranged between 3^a and 3^d, but may be placed at any other point on the circumference of 3^b. In resting position the pivot 8^a is located in this short stop-groove 3^c and the tone-arm held thereby in an elevated position.

Referring to the reproducer 2 which I use in connection with this tone-arm, 10 is the stylus lever, connected at its end 10^a to the diaphragm in any suitable manner and hinged to the reproducer 2 by means of the pivot screws 11; this stylus lever is provided with a needle-socket 10^b in which I provide two apertures, 10^c and 10^d in angular relation to each other, the aperture 10^c is preferably arranged on the line of the longitudinal axis of the stylus-lever, it is intersected by the aperture 10^d which forms an angle of about 50 degrees therewith; at the place of intersection of these two apertures and transversely thereto, a set screw 12 is placed for clamping a stylus, inserted into either aperture.

The operation of this tone-arm and the reproducer used therewith is greatly simplified by the invention. Assuming that it be desired to play a laterally cut record, the tone-arm will be placed into the position shown in Figs. I and II by means of the ball and socket joint, and pivot 8^a will be located in groove 3^a while the reproducer sleeve 2^a will be attached to shoulder 1^b by using bayonet slot 1^c for the connection with pin 2^b, which holds the face of the reproducer vertically, and stylus lever 10 in the position shown in Fig. III, giving the latter an inclination of about 50 degrees with the horizontal. In this position the reproducer may be swung freely in horizontal direction over the face of the record through an angle of sufficient opening for playing records of largest size, as the tone-arm 1 can be rotated by means of the sphere 3 through the angle "A" indicated by dash and dot lines in Fig. II, the size of which is governed by the opening of flange 5. The pivot 8^a locates at all times the axis of this motion as it is slidably arranged in groove 3^a and the tone-arm 1 may swing vertically sufficiently to permit the stylus of the reproducer to follow the usual undulations of the record.

Should it now be desired to play a record of the hill and dale type, the tone-arm would be lifted vertically far enough that pivot 8^a enters slot 3^b, and then rotated on its axis until pivot 8^a enters slot 3^c which will hold the tone-arm and reproducer in resting, elevated position and conveniently arranged to remove the stylus 14 from aperture 10^c by opening set screw 12. A sapphire pointed stylus 15 will then be inserted into aperture 10^d and set screw 12 tied. The reproducer will now be removed from bayonet slot 1^c and shoulder 1^b and so replaced thereon, that bayonet slot 1^a is held on pin 2^b, which involves a turning of the reproducer on its axis through an angle of about 40 degrees. The tone-arm is then lifted slightly to free pivot 8^a from slot 3^c and revolved on its axis, that pivot 8^a which slides in slot 3^b during this rotation, can enter slot 3^a, which brings

the reproducer into the position shown in Fig. IV, with its face or diaphragm in horizontal position and the stylus lever into the vertical plane of the tone-arm axis. In this position the stylus may follow the vertical tone waves of a record of this type, while the tone-arm remains free to move horizontally through the same angle "A" indicated in Fig. II.

While the advantages of this invention are many; its striking feature is its mechanical simplicity for its manifold purposes.

The tone-arm consists of a single moving part, the tube 1; and the tone-arm support 4 is rigidly mounted on the phonograph. The vertical and horizontal motion required for reproducing both types of records—horizontally cut as well as hill and dale types—are accomplished by one single joint.

No special parts or complex motions are required for holding the tone-arm in resting position.

The correct positions of the stylus lever for playing either type of record are fixed by the position of the bayonet slots 1^c and 1^a and not subject to disarrangement by the operator.

The smooth and easy operation of the ball and socket joint is insured by means of the spring seated cover 5 and the joint can easily be cleaned and lubricated.

The change from reproducing one type of record to that of another type is easily accomplished in a minimum of time.

The number of parts and especially movable parts is reduced to a minimum.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a phonograph, a support holding a sound conveying tube, a spherical shaped member having guide-forming grooves in its surface at one end and a reproducer at the other end of said tube, a stationary pin on said support slidably engaged by said guides forming means to restrict the oscillatory motion of said tube and to permit a rotative motion thereof about its axis.

2. In a phonograph, a support holding a sound conveying tube, a spherical shaped member having guide-forming grooves in its surface at one end and a reproducer at the other end of said tube, a stationary pin on said support slidably engaged by said guides forming means to restrict oscillatory motion of said tube and to permit different guides alternately to engage said pin.

3. In a phonograph, a support, a universal joint thereon, a sound conveying tube connected to said support by said joint, a reproducer held at one end of said tube, a spherical shaped member at its other end forming part of said joint, a pin adapted to restrict the motion of said spherical shaped member in its socket and a series of grooves forming

guides for said pin, said guides and pin providing means to permit oscillatory motion of said reproducer simultaneously in two directions and to swing its face from horizontal
5 to vertical position.

4. In a phonograph, a support, a universal joint thereon, a sound conveying tube connected to said support by said joint, a reproducer held at one end of said tube, a
10 spherical shaped member at its other end forming part of said joint, a pin connecting said spherical member to its socket and a series of grooves forming guides for said pin,

said guides and pin providing means to permit a rotative motion of said tube about its axis and to suspend said reproducer in elevated position. 15

5. In a phonograph, a support, a sound conveying tube, a ball and socket joint connecting one end of said tube to said support, said joint including means to permit a
20 rotative motion of said tube about its axis and means to restrict oscillatory motion of said tube alternately in different, predetermined positions thereof.

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