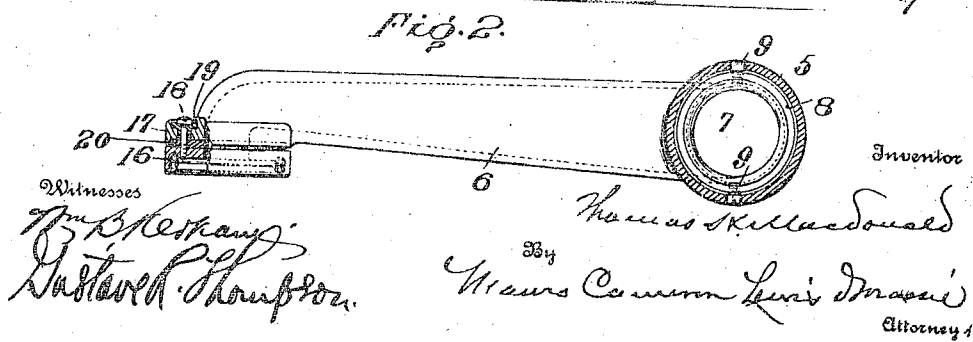
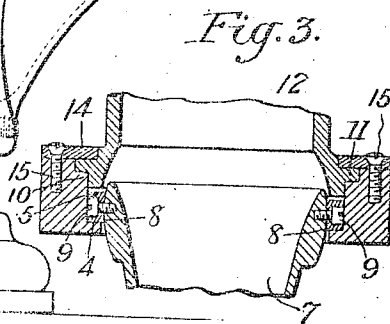
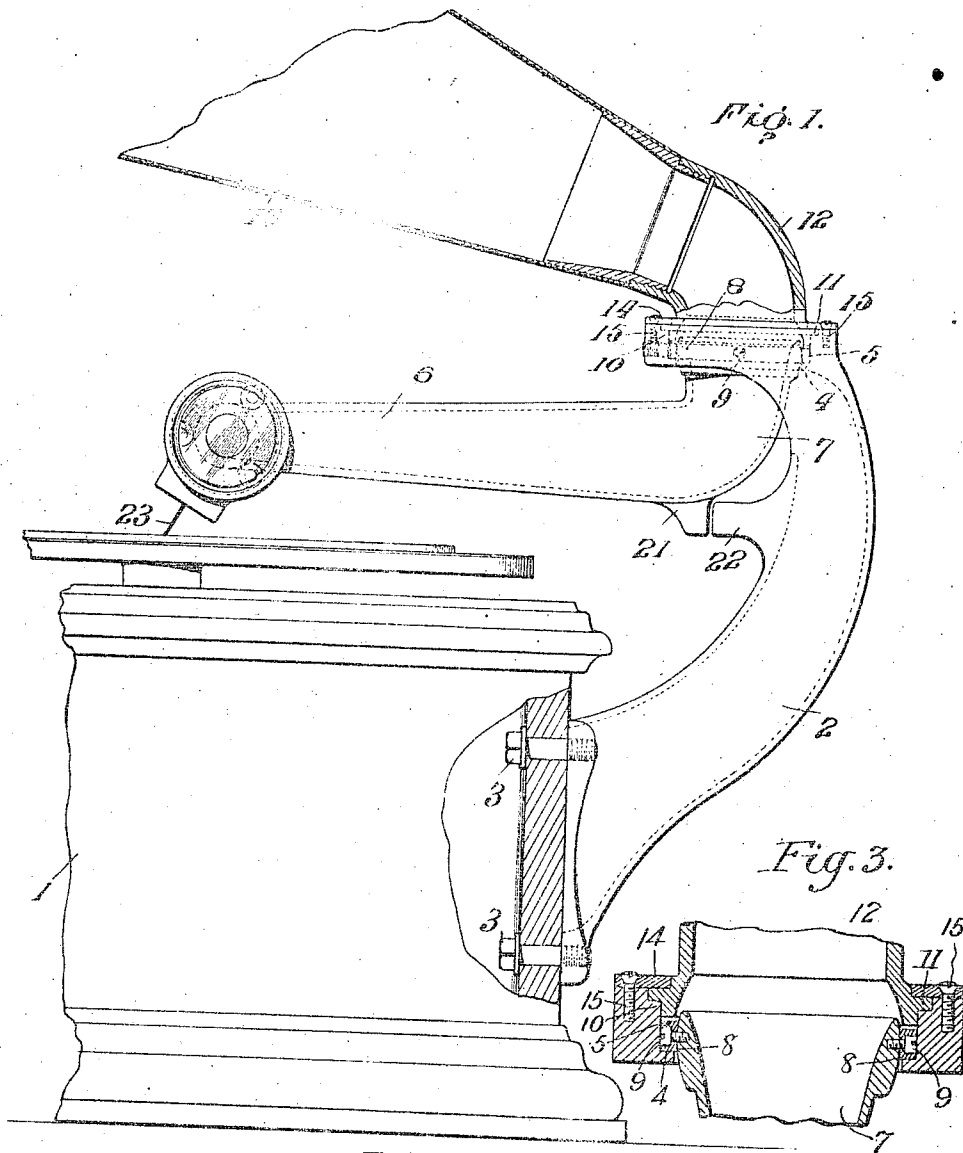


T. H. MACDONALD.
DISK SOUND REPRODUCING MACHINE.
APPLICATION FILED MAY 23, 1905.

957,694.

Patented May 10, 1910.



Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS H. MACDONALD, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO AMERICAN GRAPHOPHONE COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF WEST VIRGINIA.

DISK SOUND-REPRODUCING MACHINE.

957,694.

Specification of Letters Patent.

Patented May 10, 1910.

Application filed May 23, 1905. Serial No. 361,392.

To all whom it may concern:

Be it known that I, THOMAS H. MACDONALD, a resident of Bridgeport, Connecticut, have invented a new and useful Improvement in Disk Sound-Reproducing Machines, which invention is fully set forth in the following specification.

This invention relates to talking machines, and more particularly to the class known as "disk" machines, in which the reproducer is carried on the end of a swinging arm which is capable of moving transversely across the face of the record during the act of reproduction.

The object of the invention is to provide a construction of swinging arm which shall readily respond in a vertical direction to any irregularities in the surface of the tablet and at the same time be capable of freely moving transversely across the face of the record without the necessity of carrying or moving the usual horn, and at the same time be capable of transmitting the sound vibrations from the hollow swinging arm to the horn without loss or modification due to an imperfect or incomplete union between the swinging arm, which moves and the horn, which, during the act of reproduction, is stationary.

Moreover the invention has for its object to provide a construction wherein the horn may be readily turned so as to direct the great volume of the sound in any desired direction without the necessity of moving the machine, and furthermore of attaching the reproducer to the hollow swinging arm in such a way as to avoid the loss of sound vibrations or modifications thereof through the introduction of false vibrations.

With this object in view the invention consists of the usual stationary supporting arm attached in any suitable manner to the machine casing, which supporting arm is provided with an annular ledge upon which rests a ring, free to turn in a horizontal plane on the ledge, the interior face of the ring being cut on the lines of a sphere whose center is the center of the ring, combined with a hollow reproducing arm having a spherical end of bearing fitting snugly within the spherical portion of the ring and capable of rocking in a vertical plane about trunnions passing through the ring and into the spherical portion of the swinging arm.

Furthermore, the invention consists in providing a flange on the base of the horn which rests on a suitable annular ledge in the stationary supporting arm, said flange being engaged on its upper side by a clamping ring secured to the stationary supporting arm by screws or other suitable devices, the entire joint between the horn, the stationary arm, the ring and the hollow swinging arm being treated with a non-fluid lubricant, such as petroleum jelly or the like, whereby the joint is not only lubricated but is also rendered air-tight, to the end that the sound vibrations are fully and completely transmitted from the hollow arm to the horn without any escape or diminution thereof.

The invention is illustrated in the accompanying drawings, which show one mechanical expression of the inventive idea, in which drawings—

Figure 1 is a broken side elevation, partly in section; and Fig. 2 is a plan view of the hollow swinging arm, showing the ring and the trunnions connecting said ring to the hollow arm, in horizontal section; and Fig. 3 is a vertical section through the upper end of the swinging arm and the lower end of the stationary arm, illustrating the mounting of said arms.

Referring to the drawings, 1 indicates the usual framework of the machine, and 2 is the usual or any suitable stationary arm secured to said framework by any suitable means, as by bolts 3. The upper end of the arm 2 is annular in form and has formed on the interior thereof an annular ledge 4 upon which rests a ring 5, the interior of the ring corresponding to the zone of a sphere whose center is the center of the ring 5. The swinging arm 6 is hollow, as is usual in arms of this character, and has its outer end formed in the shape of an elbow 7, the exterior surface of the upper end of the arm having a spherical surface 8 corresponding with the interior spherical surface of the ring 5, and fitting snugly therein. Trunnions 9—9, preferably in the form of screws, are passed through the ring 5 into the material of the spherical portion of the hollow arm, said trunnions 9—9 being diametrically opposite each other and forming centers about which the hollow arm 6 may be rocked in a vertical plane, the arm at the same time

being capable of revolving in a horizontal plane carrying the ring 5 with it, which moves upon the bearing ledge 4. Immediately above the ring 5 is an annular ledge 10 of somewhat greater diameter than the ledge 4, upon which rests the flange 11 of the base portion 12 of the horn 13, the same being held in position by means of a clamping ring 14 secured by screws 15 passing into the body of the stationary arm 2, the interior diameter of the ring 14 being less than the exterior diameter of the flange on the horn. The horn is retained in position on said stationary arm by said clamping ring 14 while at the same time being free to entirely revolve in a horizontal plane so as to direct the open end of the horn in any direction without moving the casing 1 of the machine.

Referring to Fig. 2, 16 is the usual or any suitable reproducer head which is secured to the flange 17 on the end of the swinging arm by any suitable means, as by screws 18, which are insulated from the metal of the flange 17 by rubber gaskets 19, an annular gasket 20 being interposed between the face of the flange 17 and the inner face of the reproducer head 16. By this means a perfectly closed joint between the inner face of the reproducer head and the face of the flange on the swinging arm is secured, and at the same time all danger of transmission of foreign vibrations through the clamping screws 18 to the metal of the swinging arm and thence to the horn is avoided.

As before stated, the joint formed between the end of the swinging arm and the ring 5 is packed with a suitable non-fluid lubricant, as petroleum jelly, whereby the joint is perfectly sealed and at the same time friction avoided.

21 indicates a lug on the under side of the swinging arm 6, which is normally opposite to but out of engagement with a corresponding lug 22 on the stationary arm 2. When the reproducing needle 23 is removed from the reproducer, or whenever a record tablet is absent from the machine, the engagement of the lug 21 on the swinging arm with the lug 22 on the stationary arm acts to support the same and prevent it from resting upon the tablet or upon the tablet-holder.

It will be perceived that in the construction thus devised, there is provided a swinging arm which has great freedom of movement while at the same time there is no joint between said arm and its support which would in any way interfere with the accurate transmission of the sound vibrations, which latter are transmitted free from the introduction of foreign vibrations of any kind whatever. Moreover, it will be perceived that the horn itself has absolute freedom of movement in a horizontal plane, and that the method of securing the reproducer head to the end of the swinging arm is such

as to entirely avoid the introduction of foreign vibrations at this point.

What is claimed is:

1. In a talking machine, the combination of a stationary supporting arm having a horizontal annular ledge, a ring resting on said ledge and having its interior surface corresponding to a spherical zone whose center is the center of the ring, a hollow swinging arm carrying the reproducer at one end, the other end having its exterior surface in the form of a spherical zone fitting snugly within said ring, and diametrically opposite trunnions engaging said ring and hollow arm.

2. The combination of a swinging arm carrying the reproducer at one end, a ring within which the other end of the arm is joined on lines corresponding to a portion of the surface of a sphere, trunnions securing said ring and arm together, and a stationary arm supporting said ring.

3. The combination of a swinging arm carrying the reproducer at one end, a stationary arm, a ring mounted on said stationary arm to turn in a horizontal plane and trunnions connecting the ring to the swinging arm to permit said arm to turn in a vertical plane.

4. The combination of a stationary arm, a substantially horizontal hollow swinging arm having a vertically extending elbow at one end and a reproducer at the other end, a horizontal ring jointed to said elbow on spherical lines, trunnions also connecting said ring and elbow, and a stationary arm supporting said ring.

5. The combination of a stationary arm, a horn mounted thereon so as to be free to turn in a circle, a hollow swinging arm having a reproducer at one end, a ring connected to the other end by a spherical joint and a pair of trunnions and a horizontal bearing for said ring on the stationary arm.

6. The combination of a stationary arm having an annular ledge formed thereon, a ring resting on said ledge, a hollow swinging arm hinged to said ring, a second annular ledge on said stationary arm above the first mentioned ledge, a horn having a flanged base resting on said second ledge, and a clamping device engaging the flange on the horn securing it in position to be revolved on said second ledge.

7. In a talking machine the combination of a stationary and a swinging arm, a flexible joint between the two arms, and a non-fluid oil or lubricant sealing said joint.

8. The combination of a swinging arm carrying the reproducer at one end, a stationary arm having a circular opening provided with a circular bearing upon its inner wall, supporting means supported by and to turn upon said bearing and horizontal trunnions supported by said means and en-

gaging said swinging arm at its other end to permit vertical movement of said swinging arm.

9. In a talking machine the combination 5 with a sound conveying tube, a fixed support having a circular opening therein, a horizontal circular bearing provided upon one of said parts, circular supporting means for said tube conforming to said opening 10 and tube and engaging said bearing to support said tube and permit horizontal swinging movement of said tube and opposite horizontal trunnions supported by said fixed support to support said conveying tube and 15 to permit vertical swinging movement of said conveying tube.

10. The combination of a swinging arm carrying the reproducer at one end, a fixed support having a circular opening in which 20 the other end of said arm is situated, supporting means interposed between the end of the arm situated within said circular opening and said fixed support and movably engaging one of said parts to permit 25 the arm to turn in a horizontal plane, and a connection between said supporting means

and the other of said parts to permit said arm to turn in a vertical plane.

11. The combination of a swinging arm carrying the reproducer at one end, a fixed support having a circular opening in which 30 the other end of said arm is situated, supporting means interposed between the end of the arm situated within said circular opening and said fixed support and movably 35 engaging one of said parts to permit the arm to turn in a horizontal plane, and trunnions connecting said supporting means with the other of said parts to permit said arm to turn in a vertical plane. 40

12. The combination of a swinging arm carrying the reproducer at one end, a stationary arm having a fixed support, and trunnions secured to the swinging arm and 45 carried by the fixed support.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOS. H. MACDONALD.

Witnesses:

A. B. KEOUGH,
C. A. GIBNER.