No. 894,956. PATENTED AUG. 4, 1908.

A. JUNOD.

SOUND REPRODUCER AND RECORDER.

APPLICATION FILED JULY 15, 1907.

4 SHEETS—SHEET 1.

Fig. 1.

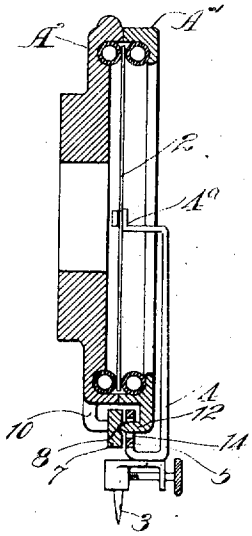
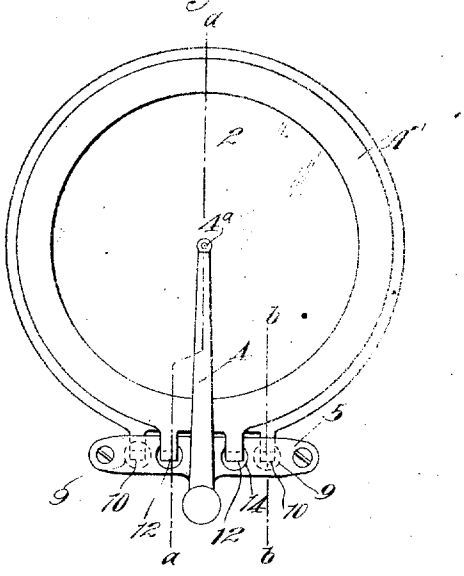


Fig. 2.



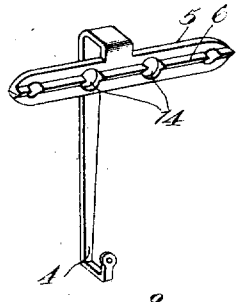
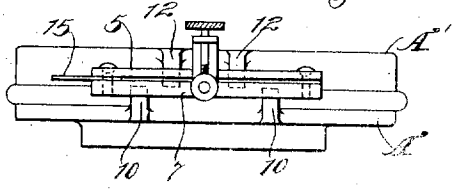


Fig. 3.

Fig. 4.



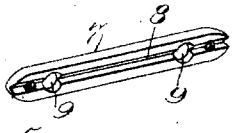
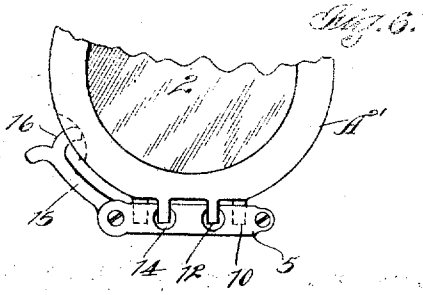


Fig. 5.

Fig. 6.



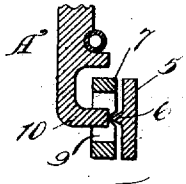


Fig. 7.

WITNESSES

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J. A. Howe

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André Junod;

BY

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ATTORNEY

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PATENTED AUG. 4, 1908.

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4 SHEETS—SHEET 2.

Fig. 8.

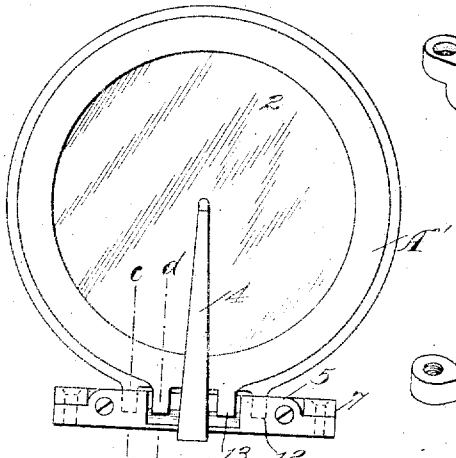


Fig. 8.a

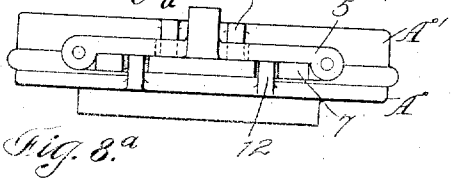


Fig. 9.

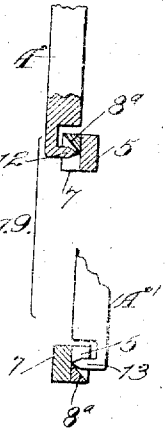


Fig. 10.

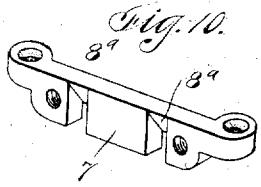


Fig. 10.a

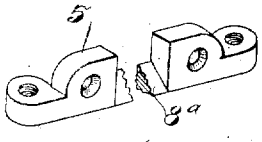


Fig. 15.

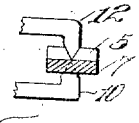


Fig. 12.

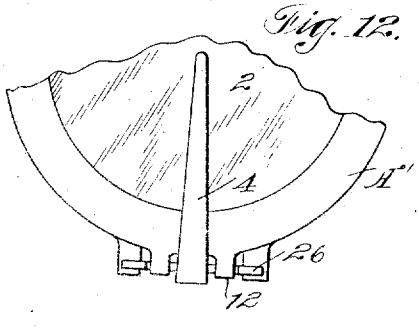


Fig. 11.

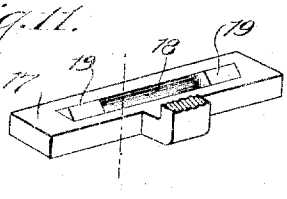


Fig. 11.a

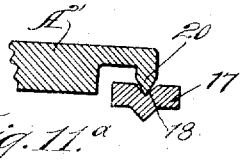


Fig. 13

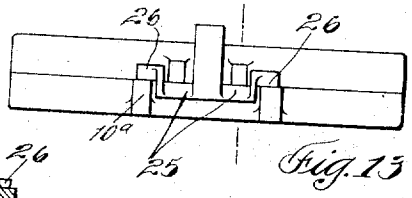
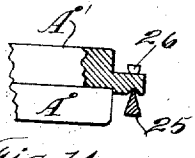


Fig. 14



WITNESSES

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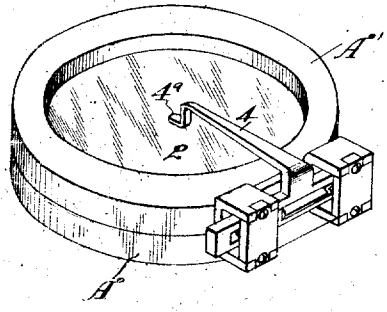
A. JUNOD.

SOUND REPRODUCER AND RECORDER.

APPLICATION FILED JULY 15, 1907.

4 SHEETS—SHEET 3.

Fig. 16.



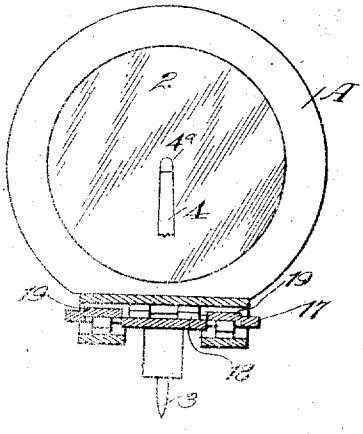


Fig. 17.

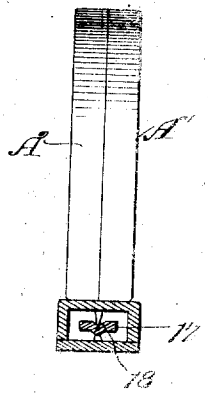


Fig. 18.

WITNESSES

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A. JUNOD.

SOUND REPRODUCER AND RECORDER.

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4 SHEETS—SHEET 4.

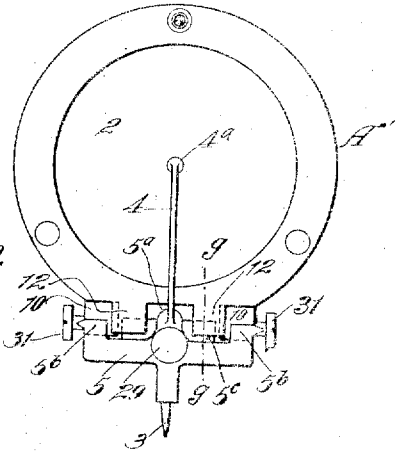


Fig. 19.

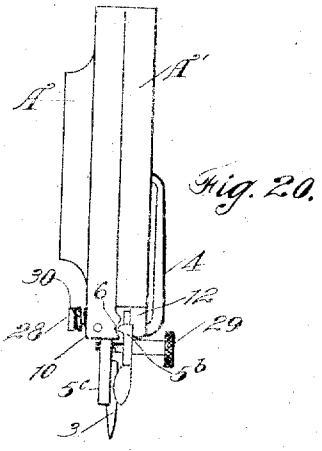


Fig. 20.

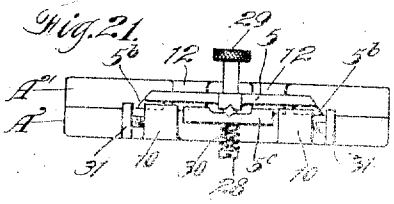


Fig. 21.

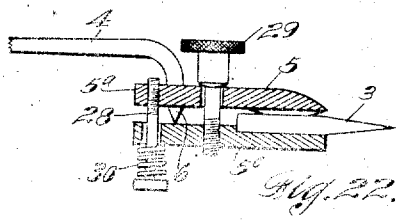


Fig. 22.

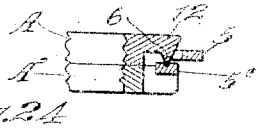


Fig. 24.

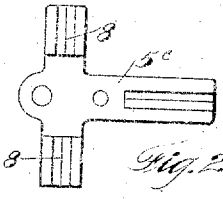


Fig. 23.

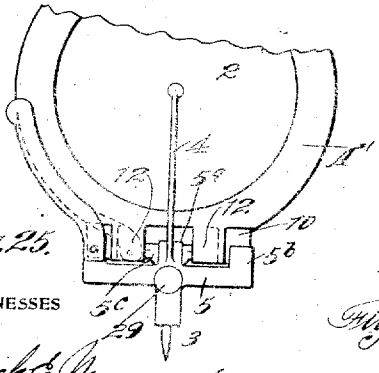


Fig. 25.

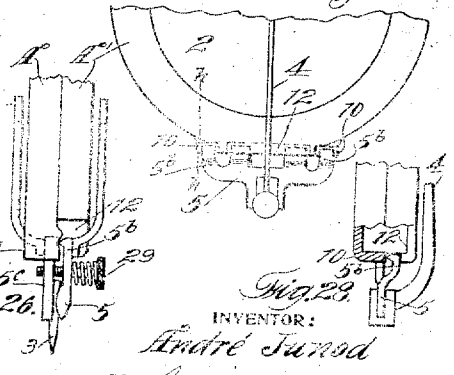


Fig. 26.

Fig. 27.

Fig. 28.

WITNESSES

Frederick C. Haynard.

J. L. Bouse

INVENTOR:

André Junod

BY

Geo. H. Strong

ATTORNEY

UNITED STATES PATENT OFFICE.

ANDRÉ JUNOD, OF FRUITVALE, CALIFORNIA.

SOUND REPRODUCER AND RECORDER.

No. 894,956. Specification of Letters Patent. Patented Aug. 4, 1908.

Application filed July 15, 1907. Serial No. 383,734.

To all whom it may concern:

Be it known that I, ANDRÉ JUNOD, a citizen of Switzerland, residing at Fruitvale, in the county of Alameda and State of California, have invented new and useful Improvements in Sound Reproducers and Recorders, of which the following is a specification.

My invention relates to a sound-reproducing apparatus, and is especially designed to be employed in connection with the stylus-bar of the gramophone, or kindred instrument, for producing an oscillating anti-friction bearing for said bar, and in which other undesirable movements are entirely obliterated.

My invention consists of the parts and the constructions and arrangements of parts which will be hereinafter described and pointed out in the claims.

Figure 1 is a sectional view on line A—A of Fig. 2, which is a plan view of the apparatus. Figs. 3 and 5 are perspective views of the members of the stylus-bar. Fig. 4 is a side view. Fig. 6 shows the hook attachment. Fig. 7 is a section on line B—B of Fig. 2. Figs. 8—8ª are plan and side view of a modified form. Fig. 9 shows sections on lines C—C and D—D Fig. 8. Figs. 10—10ª are detail views. Figs. 11—11ª show another form; as also do Figs. 12—13—14 and 15. Figs. 16—17—18 show the knife edged bearings in a plane parallel with the stylus-bar. Figs. 19—20—21 are a plan and two edge views of the bearing and the stylus point clamp. Figs. 22 to 28, inclusive, are sections and details of the same.

It is the object of my invention to provide an oscillating anti-frictional bearing for the stylus-bar of a gramophone, or like instrument, said bearing being so contrived as to allow an absolutely free movement of the stylus-bar in unison with the movements of the diaphragm, to which it is attached, and to prevent as far as possible any of the disagreeable rattling and vibratory noises caused by a loose action in such instruments; but it will be manifest that my device may be also employed in any connection where a perfect vibratory or oscillating action is required, with the least possible friction.

As shown in the present invention A and A′ are two rings between which the vibratory diaphragm 2 is suitably clamped. The stylus 3 which follows the lines of the record-plate is fixed in one end of the stylus-bar 4, either by a locking screw or by devices to be hereafter described, and the other end of the bar is fixed to the center of the diaphragm 2, as shown at 4ª, so that it transmits all of the vibrations and movements caused by the stylus on the record, through the diaphragm and the transmitter in the usual manner.

The stylus-bar 4 is bent into a form plainly shown in Fig. 3, and is fixed to a transverse bar 5, along the central line of the face of which is formed a V-shaped ridge 6. 7 is another bar parallel with and opposed to the bar 5, and this bar 7 may have formed longitudinally within it, a groove 8 of sufficiently wider angle than the V-shaped wedge of the bar 5, so that the latter may rest in the bottom of the V-shaped groove or channel 8 and have sufficient space on either side to allow it to tilt upon this knife edge without other movement. The bars 5 and 7 may be secured together with the parts in the above position, as shown in Figs. 1, 2, 4 and 8, or separated as in Figs. 19 to 28. The plane of these meeting edges is parallel to the plane of the diaphragm 2, and to the plane of separation of the rings A and A′. The groove or channel may be omitted from the bar 7 if desired, and the knife edge of 5 rest upon a plane surface of the part 7.

Holes are made through the bar 7, as shown at 9, and these holes register with arms 10 which project from one of the plates, as A, and may be bent at right angles so as to enter the holes 9 and present flat surfaces against which the V-shaped edges 6 contact. Knife edges are formed on projections or arms 12, plainly shown in Fig. 2, these arms projecting from the periphery of the ring A′, and in the opposite direction from the arms 10. These arms enter holes 14 which are made in the bar 5. These knife edges and bearing surfaces being thus opposed to each other, it will be seen that there will be one set of bearings formed by the arms 12, entering the holes 14, and resting in the V-shaped groove 8; and the other arms 10 in like manner enter the opposed opening 9 in the bar 7, and rest upon knife edges 6.

The transverse bars 5 and 7, being bolted or otherwise secured together, as more plainly shown in Fig. 4, and carrying the stylus-bar, it will be seen that the tilting movement of the latter takes place upon these knife edges, and that the opposing contacts are of such a nature as to substantially eliminate any

other movements, and the vibration transmitted from the stylus to the diaphragm, produces a soft and pleasant tone.

Pivoted between the plates 5 and 7 is an arm 15 having at its outer end an inwardly turned point 16, and this point may be turned either into or out of contact with the periphery of the rings. When thrown into contact with the rings it increases the volume of the tone, and is very effective for instrumental or loud music. When thrown outwardly and away from the rings the tone is correspondingly softer, and fitted for vocal music.

In Figs. 8, 9 and 10 I have shown a device modified so that in place of the complete V-shaped groove, I have shown inclined surfaces 8^a which form practically opposing inclined sides, against one of which the V or wedge-shaped edge of 12 contacts, and against the other a correspondingly shaped edge of 13. The relative position of these inclines is well shown in the sectional views, Fig. 9, and the perspective views, Figs. 10 and 10^a; and it will be seen that when the bars 5 and 7 are bolted or secured together, as previously stated, these edges or inclines will be opposed so as to practically form opposite sides of V-shaped grooves upon the plane surfaces, at the bottom of which the wedges 12 and 13 rest.

In Figs. 11 and 11^a I have shown another means for accomplishing the same result. In this case the bar 17 is stamped out so that in the central portion is formed the V-shaped groove 18, and toward each end are formed the V-shaped wedges 19 having their convexities in opposite directions, as shown in the transverse section Fig. 11^a, in which the V-shaped wedge 20 is shown fitting the V-shaped groove 18.

Figs. 12—13—14 show another modified form in which the stylus-bar is provided with a transverse trunnion having central knife edge 25 and a pair of knife edges 26 at its ends resting in V-slots on the supporting arms 10^a.

It will be understood that in all the foregoing forms the general principle is preserved, of elongated, transverse, anti-frictional bearings and that such bearings may include either knife edges and corresponding grooves, or knife edges and plane opposing surfaces, the lines of contact being in any case in the plane of oscillation.

In Figs. 19 to 28, inclusive, the lugs 10 and 12 which are carried upon the rings A and A' are made enough wider than the lugs as shown in Figs. 1 to 18, so that the inner edges of one pair overlap the outer edges of the opposed pair, and the knife edges of one, and the opposed grooved surfaces of the other pair, have a very short bearing, and serve to bring the opposed rings and lugs to an exact register when they are put together.

The transverse bar 5 has three tongues, a central one 5^a, and two at the ends 5^b. The exterior tongues have knife edges which rest upon the bearing grooves or surfaces of the lugs 10, exterior to the lugs 12 of the other ring. The central tongue carries the stylus-bar 4 which is connected therewith.

5^c is a clamp, opposed to the bar 5, and held in contact with the knife edges of the lugs 12 by a thumb screw 28 connecting the clamp with the bar 5 upon one side of the knife edge bearing, and a second thumb screw 29 upon the other side of said bearing, as plainly shown in Fig. 22, so that when the screws are loosened, the clamp may tilt upon the knife edge and open to admit a point or stylus 3, and the screw 29 serves to clamp it when placed. The screw 28 is free within the hole in the inner end of the clamp, and a spring 30 surrounding the shank of the screw acts to open the clamp when the screw 29 is loosened. In order to limit and regulate side play of the stylus carrying parts, the ends of the tongues 5^b are made outwardly divergent, as shown in Figs. 19 and 21, and the heads of adjusting screws 31 are brought into as close contact with these points, as desirable to limit the side play.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a sound reproducing apparatus, the combination with the diaphragm, its supporting rings and stylus bar, of parallel connected bars transverse to the stylus bar, to one of which bars the stylus bar is attached, said bars having opposed knife edge and co-acting bearing surfaces, with their line of contact in the planes of the diaphragm, and said rings having members with opposed bearings disposed in line with the first named bearings.

2. In a sound reproducing apparatus, the combination with the diaphragm, its supporting rings and stylus bar, of parallel connected bars transverse to the stylus bar, to one of which bars the stylus bar is attached, said bars having co-acting knife edge and opposed bearing surfaces, arms projecting from the rings and having opposed bearings in line with the first named bearings.

3. In a sound reproducing apparatus, the combination with a diaphragm, its supporting rings and stylus bar, of parallel connected bars transverse to the stylus bar and provided with holes, and to one of which parallel bars the stylus bar is fixed, said bars having knife edge and opposed bearing surfaces respectively, arms projecting from the rings and bent to pass through the holes in the parallel connected bars, said bent arms having knife edge and opposed bearing surfaces in line with the bearings of the bars.

4. In a sound reproducing apparatus, the combination with the diaphragm, its sup-

porting rings, stylus bar, parallel connected bearing bars at right angles to the stylus bar, and arms projecting from the rings, having opposed bearings in line with those of the bars, of a pivoted arm having an inwardly turned point adapted to contact with the rings, or be moved out of contact therewith.

5. In a sound reproducing apparatus, a diaphragm, supporting rings with projecting lugs bent to form opposing knife edge and co-acting grooved contacts connected bearing bars having openings, the inner edges of one pair of contacts overlapping the outer edges of the opposed pair to automatically register the connected bars.

6. In a sound reproducing apparatus, a diaphragm, parallel connected bars having knife edge bearings, opposed clamping rings, a stylus bar connected with the diaphragm, and turnable upon said knife edge bearings, lugs projecting from the rings, and having opposing groove and knife edge bearings registering with those of the stylus bar.

7. In a sound-reproducer, the combination with the diaphragm and its holder, of a stylus-bar, a bar upon which the stylus-bar is carried, extending transversely to the stylus-bar, said bar having a raised knife edge extending lengthwise, a second bar having a corresponding bearing surface upon which the knife edge rests, arms projecting from the diaphragm holding rings, overlapping and forming contacts upon the transverse line of the knife edges.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ANDRÉ JUNOD.

Witnesses:
S. H. NOURSE,
FREDERICK E. MAYNARD.