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PATENTED JULY 2, 1907.

R. A. BOSWELL.

SOUND CONVEYING TUBE FOR TALKING MACHINES.

APPLICATION FILED OCT. 7, 1905.

3 SHEETS—SHEET 1.

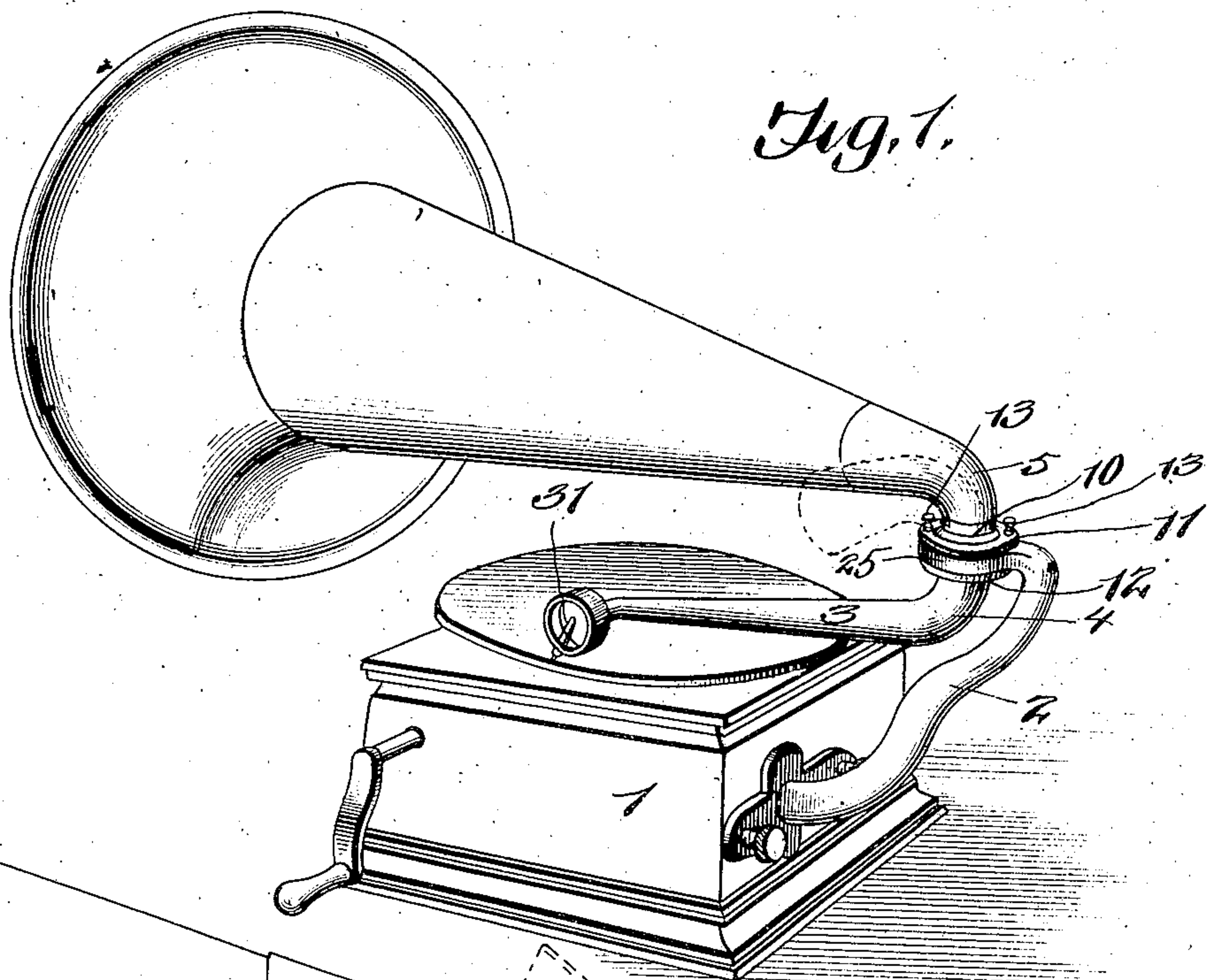


Fig. 1.

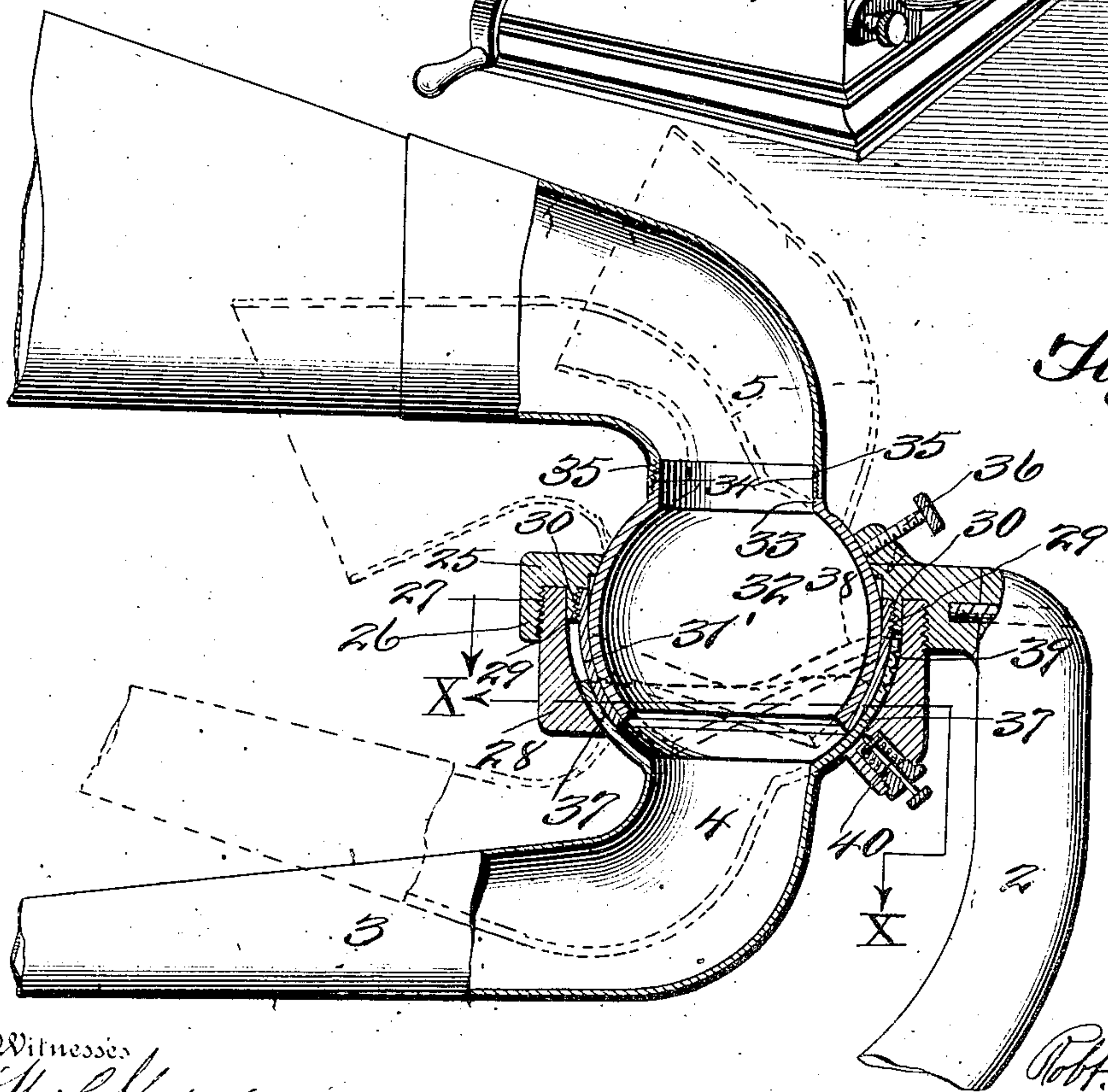


Fig. 5.

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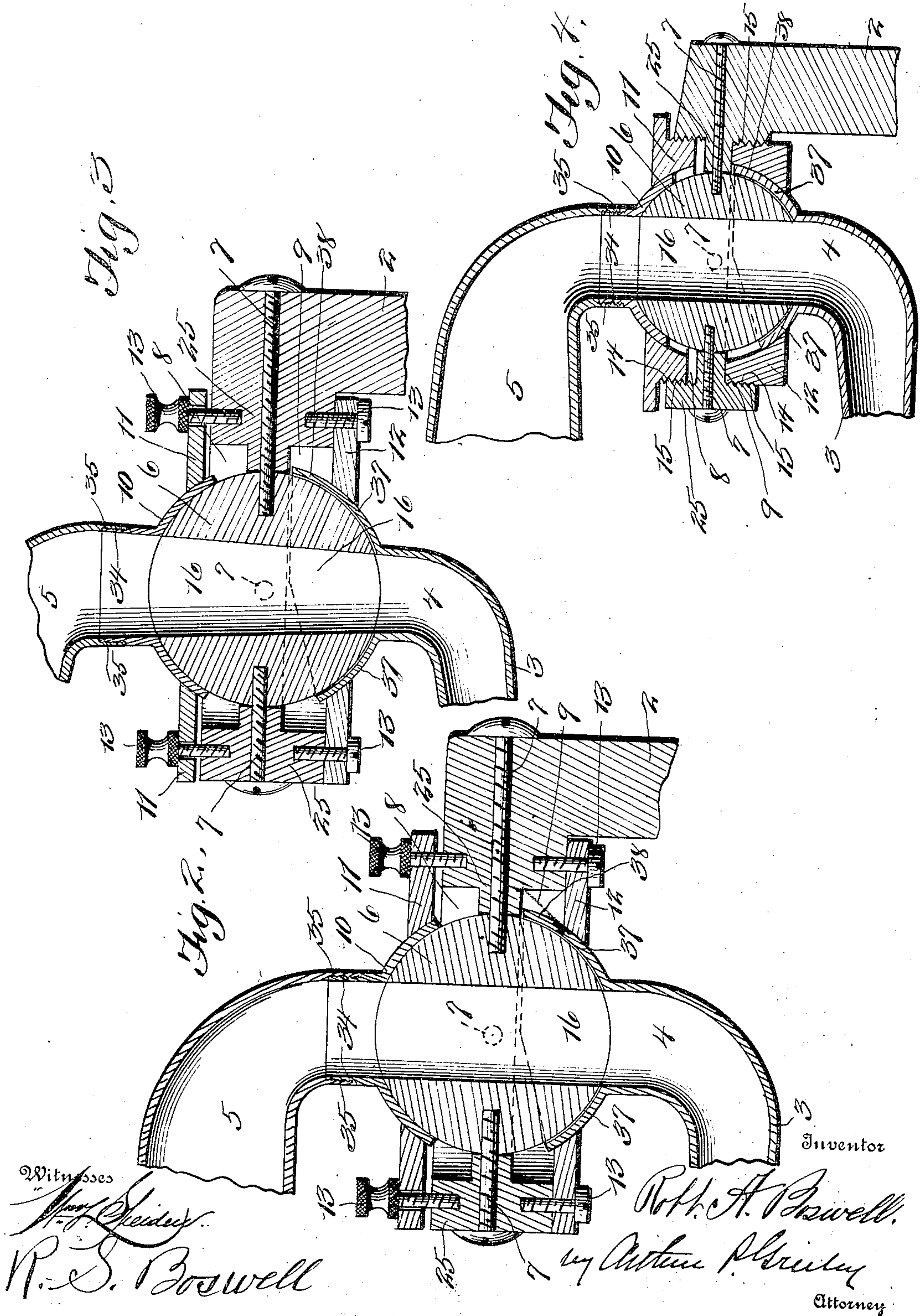
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Witnesses

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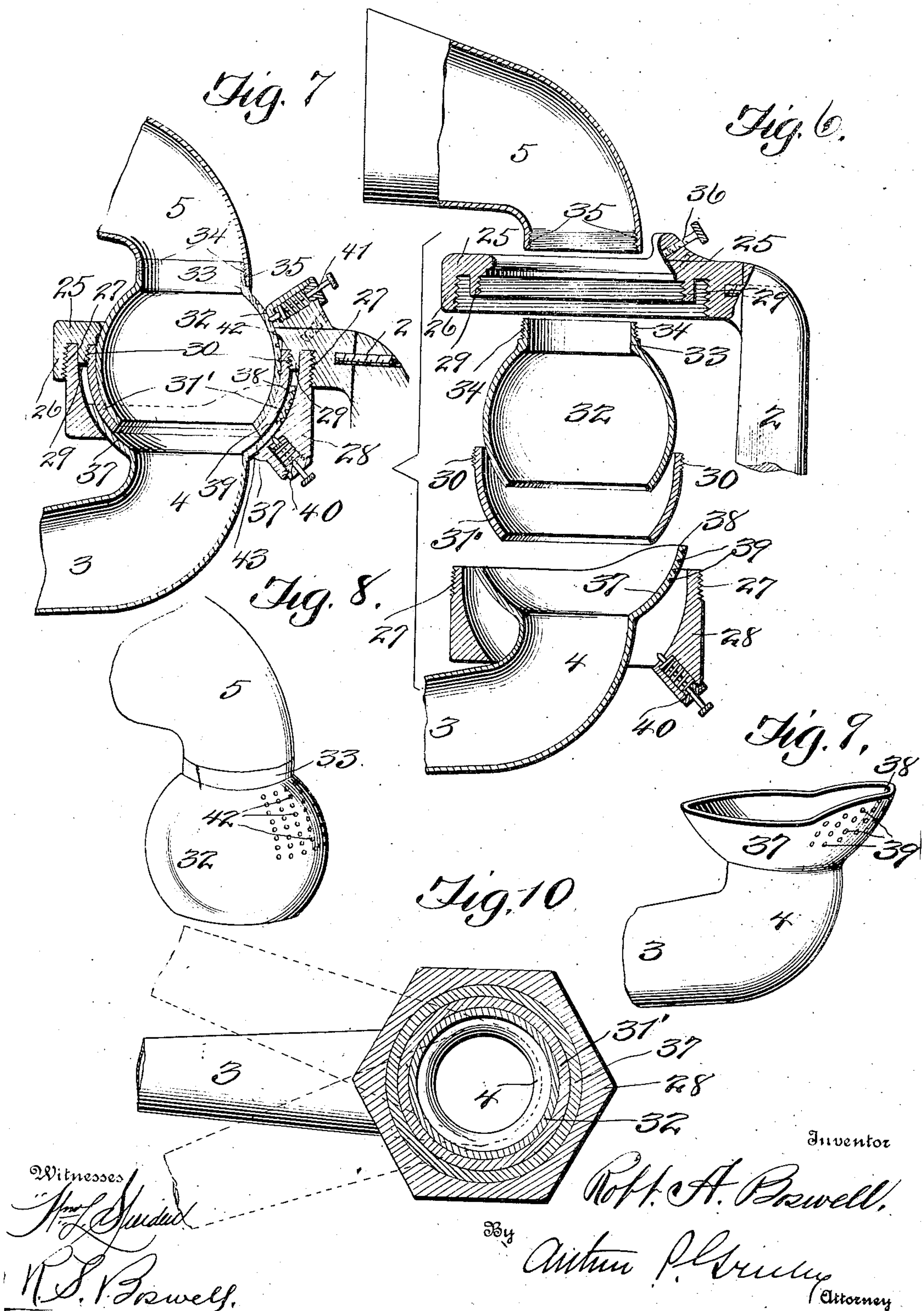
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

ROBERT A. BOSWELL, OF WASHINGTON, DISTRICT OF COLUMBIA.

SOUND-CONVEYING TUBE FOR TALKING-MACHINES.

No. 859,165.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed October 7, 1905. Serial No. 281,765.

To all whom it may concern:

Be it known that ROBERT A. BOSWELL, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a certain new and useful Sound-Conveying Tube for Talking-Machines, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

This invention relates to sound conveying tubes for talking machines, particularly talking machines of the disk type, and has for its object to provide a simple, inexpensive and efficient construction of the joint or connection between the reproducer arm and the delivery or amplifying horn of such sound conveying tubes, by which the necessary movements of both the reproducer arm and the horn, both horizontal and vertical, may all be effected from substantially the same point or center.

A further object of the invention is to provide a construction of joint or connection between the reproducer arm and the horn by which these parts may have freedom of movement independent of each other, so that whatever may be the position of the horn the free end of the reproducer arm may move freely as may be required to permit the stylus to follow the record groove.

A further object of the invention is to provide means by which the horn may be held in any position in which it may be placed so as to direct the sound in any desired direction and to provide means by which the free end of the reproducer arm may be held in raised position when it is desired to lift it from the record to permit the record to be removed and a new one placed in position.

A further object of the invention is to provide means by which the free end of the reproducer arm will be prevented from sagging if swung to one side off the record.

With the above described objects in view as well as others hereinafter set forth, the invention consists in the construction and combination of elements hereinafter described and pointed out in the claims.

Referring to the drawings: Figure 1 is a perspective view of a talking machine having the invention applied thereto; Fig. 2 is a vertical sectional view through the joint between the reproducer arm and the horn; Fig. 3 is a view similar to Fig. 2 but showing a slightly modified form of joint; Fig. 4 is a view similar to Fig. 2 but showing a further modification; Fig. 5 is a view similar to Fig. 2 showing a further modification; Fig. 6 is a detail sectional view of the construction shown in Fig. 5, but showing the parts in position to be assembled; Fig. 7 is a view similar to Fig. 2, showing a construction similar to that shown in Figs. 5 and 6, but with slight modifications; Fig. 8 is a detail perspective view of the joint end of the horn shown in Fig. 7; Fig. 9 is a detail perspective view of joint end of the reproducer arm shown in Figs. 5, 6 and 7; and Fig. 10 is a horizontal sectional view on line $x-x$ of Fig. 5.

In the drawings, 1 is the casing of a talking machine containing the usual mechanism for rotating the table carrying the record disk.

2 is a bracket secured to one side of the casing for supporting the reproducer arm and horn.

3 is the reproducer arm carrying at its free end the usual sound box 3', and having at its other end the upward curve or elbow 4.

5 is the horn which is of usual form having at the end opposite its mouth the downward curve or elbow as shown.

The bracket 2 is provided at its upper end with a ring 25, which in the several forms of the invention hereinafter described serves to support, through intermediate means, both the reproducer arm and the horn. This ring may be integral with the bracket as shown in Figs. 2, 3 and 4, or may be separately constructed and connected with the bracket as shown in Figs. 5, 6 and 7.

In the construction shown in Figs. 2, 3 and 4, the ring 25 is centrally bored to receive a ball 6 which is held in position by any convenient means as by screws 7. In the upper and lower faces of the ring 25 are formed recesses 8 and 9 respectively. To the end of the horn 5 is secured an extension 10 preferably detachably connected to the end of the horn as by a screw joint 34-35, this extension being adapted to fit and move readily upon the upper surface of the ball 6 and to be held in place by a ring 11 bearing upon its upper face.

The curved end or elbow 4 of the reproducer arm is provided with a flange 37, adapted to fit and move readily upon the lower surface of the ball 6 and to be held in place by a ring 12 bearing against its lower surface. The rings 11 and 12 may be held in place as shown in Figs. 2 and 3, by means of thumb screws 13, or the rings may be screw-threaded as shown at 14, to engage screw threads 15, formed in the recesses 8 and 9. The ball 6 is provided with a central vertical bore 16 which may be substantially cylindrical as shown in Figs. 2 and 4, or may be tapered as shown in Fig. 3, so as to form with the reproducer arm and the horn a passage of gradually increasing diameter from the sound box to the mouth of the horn.

The flange 37 on the end of the reproducer arm is preferably of greater width on the side opposite the free end of the reproducer arm as shown at 38 so as to form a stop adapted to strike the bottom of the recess 9, when the free end of the reproducer arm is off the record disk and thus prevent the free end of the arm from dropping far enough to injure the stylus or sound box.

In operation, the ring 12 will be so set as to hold the flange 37 against the lower surface of the ball 6, but at the same time to permit it to move freely in either a horizontal direction as may be necessary to

permit the stylus to follow the record groove, or in a vertical direction when the free end of the reproducer arm is lifted to permit a record disk to be removed or replaced. The ring 11 will be firmly pressed upon the upper face of the extension 10 by the thumb screws or by the engagement of the screw threads 14—15, so as to hold the horn in any desired position, it being possible to shift the position of the horn by slightly loosening the thumb screws or by unscrewing the ring.

By the construction above described, a simple, inexpensive form of joint is secured which permits the reproducer arm to move freely in any direction and permits the horn to be readily adjusted in any position either horizontally or vertically, and holds it firmly in adjusted position, whatever the movement of the reproducer arm may be, without materially varying the form or character of the sound passage and without interrupting its continuity.

In the construction shown in Figs. 5 to 10 inclusive, instead of the ball 6 fixedly held in the ring 25 as in Figs. 1 to 4 inclusive, a hollow ball 32 is provided having a ring 33 thereon provided with screw threads 34 to engage the screw threads 35 of the end of the horn. This hollow ball 32 fits and is adapted to move readily in a bowl 31' which is provided at its upper end with screw threads 30 to engage screw threads formed on the inner face of a depending flange 29 of the ring 25. The flange 37 of the end of the reproducer arm fits and is adapted to move freely on the outer surface of the bowl 31' and is held thereon by a ring 28 screw-threaded at 27 to engage screw threads formed on the inner face of a depending flange 26 of the ring 25, the inner surface of the ring 28 being so shaped as to form between it and the outer surface of the bowl 32 a recess in which the flange 37 may move freely.

For the purpose of providing means by which the free end of the reproducer arm may be held in raised position if desired the wider portion 38 of the flange 37 is provided on its outer surface with series of indentations 39 adapted to receive the pointed end of a spring pin 40 carried by the ring 28. For the purpose of holding the horn 5 at any desired angle relative to a horizontal plane, the ring 25 may be provided with a set screw 36 carried in a suitable lug on the upper face of the ring and adapted to bear against the outer face of the hollow ball 32 as shown in Fig. 5 or the hollow ball 32 may be provided on its outer face as shown in Figs. 7 and 8 with series of indentations 42 with which the pointed end of a spring pin 41 carried by a lug on the upper face of the ring 25 is adapted to engage.

In assembling the invention in the form shown in Figs. 5 to 10 inclusive, the end of the horn 5 is inserted in the ring 25 from the upper side and the hollow ball 32 is inserted from below and the screw threads 34—35 are caused to engage. The bowl 31' is then secured in position by causing the screw threads 30 to engage the screw threads of the flange 29. The reproducer arm is then placed in position with its flange 37 resting against the outer surface of the bowl 31' and the ring 28 is then secured in position.

It will be noted that in all of the constructions shown, one member of the joint, the ball 6, in Figs. 2, 3, 4 and the bowl 31', in Figs. 5 to 10 inclusive, is fixed, and

forms with the members formed on the ends of the reproducer arm and the horn, a ball and socket joint, the fixed or stationary member in each case having surfaces on which the members carried at the ends of the reproducer arm and the horn have the free movement in any desired direction which is characteristic of the ball and socket joint.

It will also be noted that in all of the constructions shown, the movements of the reproducer arm and horn on the fixed or stationary member are about a common center both as regards their movements in horizontal planes as well as in vertical planes. And it will also be noted that in none of the constructions shown is the sound passage obstructed the sound passage in the construction shown in Fig. 3 being tapered regularly from the reproducer arm to the horn.

In the drawings the applicant has illustrated the basic idea of breaking substantially the center of an amplifying horn, with a flexible joint, so as to allow the free ends thereof to have a vertical movement as well as a horizontal movement; in view of which it is to be understood that the construction of the device may be varied if desired without hindering the commercial value thereof; the right being reserved to use said variations and to use, manufacture and vend, either the connection of the horn, or the connection of the arm separately, if desired, without departing from the spirit of the invention, so long as they are embraced within the scope of the appended claims.

Having thus described the invention what is claimed as new with the protection of Letters Patent is:—

1. In a talking machine a reproducer arm and horn a ball and socket joint connection therebetween to permit both the reproducer arm and horn to have a universal movement.
2. In a talking machine, the combination with the reproducer arm and the horn of a joint connecting the reproducer arm and the horn, comprising a stationary member adapted to form spherical bearings for both the reproducer arm and the horn.
3. In a talking machine, a reproducer arm and horn a ball and socket joint connection between them, comprising a stationary spherical member, a member carried by the reproducer arm cooperating with the stationary member and a member carried by the horn also cooperating with the stationary member.
4. In a talking machine, the combination with the reproducer arm and the horn of a flexible joint connecting the reproducer arm and the horn, comprising a stationary spherical member having separate bearing surfaces adapted to form spherical bearings for the reproducer arm and horn respectively.
5. In a talking machine, the combination with the reproducer arm and the horn of a joint connecting the reproducer arm and the horn comprising a stationary member having separate spherical bearing surfaces for the reproducer arm and the horn respectively and means for holding the horn against movement on the stationary member.
6. In a talking machine, the combination with the reproducer arm and the horn of a joint connecting the reproducer arm and the horn comprising a stationary member having separate spherical bearing surfaces for the reproducer arm and the horn respectively, a ring supporting the stationary member and serving as an abutment to limit the vertical movement of the reproducer arm.
7. In a talking machine, the combination with the reproducer arm and the horn of a joint connecting the reproducer arm and the horn, comprising a stationary member having spherical bearing surfaces, means carried by the horn adapted to fit one of the bearing surfaces, a flange on the end of the reproducer arm adapted to fit the other bearing surface, a ring supporting the stationary member

and means carried by the ring for engaging the flange of the reproducer arm to hold the free end of said arm in raised position.

8. In a talking machine, the combination with the reproducer arm and the horn of a joint connecting the reproducer arm and the horn, comprising a stationary member having spherical bearing surfaces, means carried by the horn adapted to fit one of the bearing surfaces, a flange on the end of the reproducer arm adapted to fit the other bearing surface, a ring supporting the stationary member consisting of a spring pressed pin, and means carried by the ring for engaging the flange of the reproducer arm to hold the free end of said arm in raised position.

9. In a talking machine, the combination with the reproducer arm and the horn, of a joint connecting the reproducer arm and horn comprising a stationary member having spherical bearing surfaces, means carried by the horn adapted to fit one of the bearing surfaces, a flange on the end of the reproducer arm adapted to fit the other bearing surface, and having opposite the free end of the reproducer arm an extension, and a ring supporting the stationary member adapted to form an abutment for the extension of said flange whereby the downward movement of the free end of the reproducer arm is limited.

10. In a talking machine the combination with the reproducer arm and the horn, of a joint connecting the reproducer arm and horn, comprising a stationary ball, means carried by the ends of the reproducer arm, and the horn respectively, adapted to fit and move on opposite bearing surfaces of the ball and means for holding the ends of the reproducer arm and horn against said ball.

11. In a talking machine, the combination with the reproducer arm and the horn, of a joint connecting the reproducer arm and horn, comprising a stationary ball, having an opening therethrough, means carried by the ends of the reproducer arm and the horn respectively adapted to fit and move on opposite surfaces of said ball, and means for holding the ends of the reproducer arm and horn against said ball.

12. In a talking machine, the combination with the reproducer arm and the horn, of a joint connecting the reproducer arm and the horn comprising a stationary spherical shaped member, means carried by the ends of the reproducer arm and the horn adapted to fit opposite bearing surfaces of the spherical shaped member, and means for holding the ends of the reproducer arm and horn against said spherical shaped member.

13. In a talking machine, a reproducer arm and horn, a joint flexibly connecting the arm and horn about a common center.

14. In a talking machine, a reproducer arm and horn, and a flexible common center joint connecting between them, said joint having means to limit the downward movement of the horn.

15. In a talking machine, an amplifying horn and a flexible ball joint breaking at a point between the ends.

16. In a talking machine, an amplifying horn and a common center joint breaking at a point between the ends thereof, so as to allow the free ends to have vertical and horizontal movements.

17. In a talking machine, the combination with the reproducer arm and horn, of a joint connecting the reproducer arm and the horn comprising a stationary member having separate spherical bearing surfaces for the reproducer arm and the horn respectively and means to prevent downward movement of the horn.

18. In a talking machine, a reproducer arm and horn having a joint pivotally connecting them about a common center so as to permit them vertical and horizontal movements.

19. In a talking machine, a reproducer arm and horn, a joint pivotally connecting them about a common center, comprising a stationary member having spherical bearing surfaces, means carried by both the arm and horn to move universally upon the spherical bearing surfaces, and said means of the arm having means to limit the downward movement thereof.

20. In a talking machine, a reproducer arm and horn, a joint pivotally connecting them about a common center, comprising a stationary member having spherical bearing surfaces, means carried by both the arm and horn to move

universally upon the spherical bearing surfaces, said joint having means to limit the downward movement of both the reproducer arm and horn.

21. In a talking machine, a reproducer arm and horn, a joint connecting them together, comprising a stationary spherical bearing member and means carried by the horn to move universally upon said stationary spherical bearing member.

22. In a talking machine, a reproducer arm and a horn, a joint connecting them together, comprising a stationary spherical bearing member, and means carried by the reproducer arm to move universally upon said stationary spherical bearing member.

23. In a talking machine, a reproducer arm and horn, a joint connecting them together, comprising a spherical bearing member, means carried by the reproducer arm to move universally upon said spherical bearing member, and said means having means to limit the downward movement of the reproducer arm.

24. In a talking machine, a reproducer arm and horn, a joint connecting them together, comprising a spherical bearing member, means carried by the horn to move universally upon said spherical bearing member, and said joint having means to limit the downward movement of the horn.

25. In a talking machine, a reproducer arm and horn, a flexible joint connecting them together, comprising a stationary bearing member, said arm and horn having means to move universally upon said stationary bearing member.

26. In a talking machine, a reproducer arm and horn, a flexible joint connecting them together comprising a stationary bearing member, said arm and horn having means to move universally upon said stationary bearing member and said joint having means to limit the downward movements of the arm and horn.

27. In a talking machine, an amplifying horn having a flexible joint breaking at a point between the ends thereof comprising a stationary bearing member and the sections of the said horn on opposite sides of said bearing member having means to move universally upon said stationary bearing member.

28. In a talking machine, a sound conveying tube having a flexible joint breaking at a point between the ends thereof comprising a stationary bearing member, the sections of the said sound conveying tube upon opposite sides of said bearing member having means to move universally upon said stationary bearing member and said joint having means to limit the downward movement of the free ends of the sound conveying tube.

29. In a talking machine, a sound conveying tube having a joint breaking at a point between the ends thereof, comprising a spherical stationary bearing member and the sections of the said sound conveying tube on opposite sides of said bearing member having means to move universally upon said spherical stationary bearing member.

30. A talking machine comprising a relatively stationary member having separate bearings and a reproducer arm and horn operatively connected to said bearings, each to swing horizontally and vertically thereon.

31. A talking machine comprising a relatively stationary member having separate bearings and a reproducer arm and horn flexibly connected to said bearings, each to swing universally thereon.

32. In a flexible amplifying horn, a joint located at a point between the free ends thereof comprising a stationary bearing member, said free ends of the horn having universal movements upon said stationary member.

33. In a flexible jointed amplifying horn, a joint located between the free ends thereof comprising a stationary spherical bearing member operative to allow for universal movements of the free ends of the horn, and means to limit the downward movement of the horn.

34. In a flexible jointed amplifying horn, a joint located between the free ends thereof comprising a spherical bearing member so as to allow for universal movements of the free ends of the horn, and means for holding the free ends to said spherical bearing member.

35. A talking machine comprising a relatively stationary member having a spherical bearing, and a horn flexibly connected to said bearing so as to have a universal movement.

36. A talking machine comprising a reproducer arm and horn; an operative connection therebetween; each of said parts having a universal movement about said connection.

5 37. In a talking machine; a horn support; a reproducer arm and horn connected thereto upon a common center to have universal movements.

10 38. A reproducer arm and horn; comprising a connection therebetween to permit both the arm and horn to move universally about said connection upon a common center.

39. A talking machine comprising a reproducer arm and horn; an operative connection therebetween; each of said

parts having a universal movement about said connection; said connection having means to limit the downward movement of the arm and horn.

15 40. In a talking machine, a reproducer arm and horn; and a ball and socket joint therebetween.

In witness whereof, the applicant's signature is hereunto affixed in the presence of two witnesses.

ROBERT A. BOSWELL.

Witnesses:

ROBERT S. BOSWELL,
FRANK A. HARRISON.