

No. 877,989.

PATENTED FEB. 4, 1908.

J. C. ENGLISH.  
TALKING MACHINE.

APPLICATION FILED SEPT. 11, 1905.

2 SHEETS—SHEET 1.

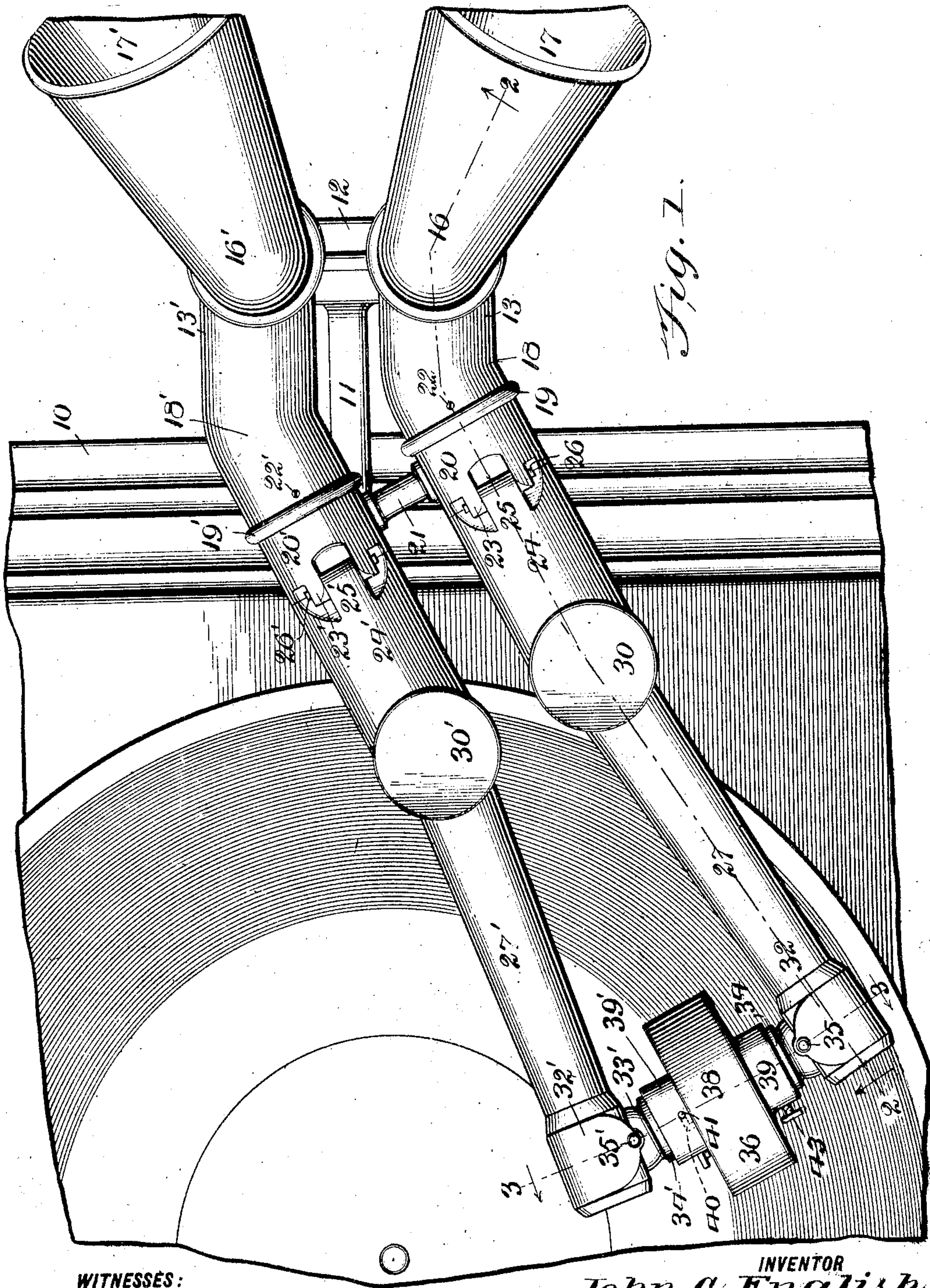


Fig. 1.

WITNESSES:

*F. C. Barry*  
*Edw. W. Tait Jr.*

INVENTOR

*John C. English*

BY

*Wm. Pelt*  
ATTORNEY.



No. 877,989.

PATENTED FEB. 4, 1908.

J. C. ENGLISH.  
TALKING MACHINE.

APPLICATION FILED SEPT. 11, 1906.

2 SHEETS—SHEET 2.

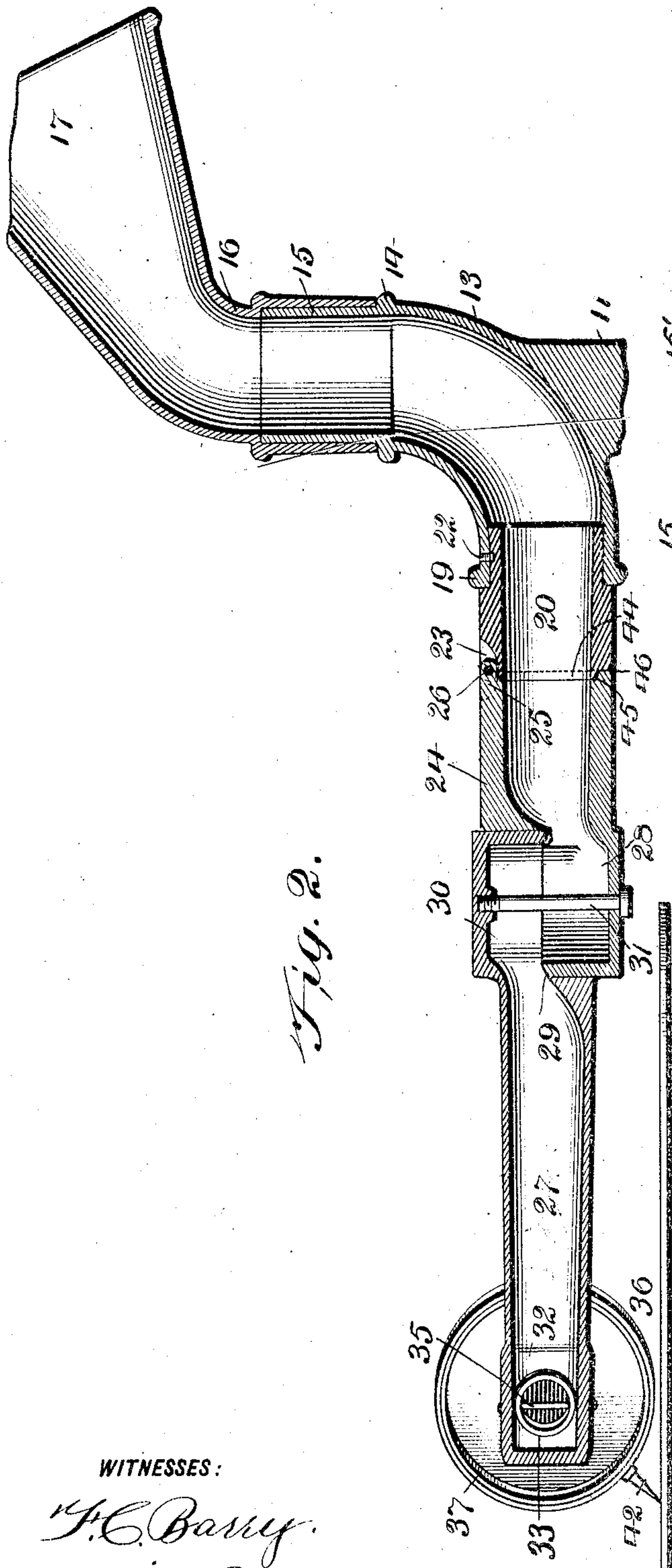


Fig. 2.

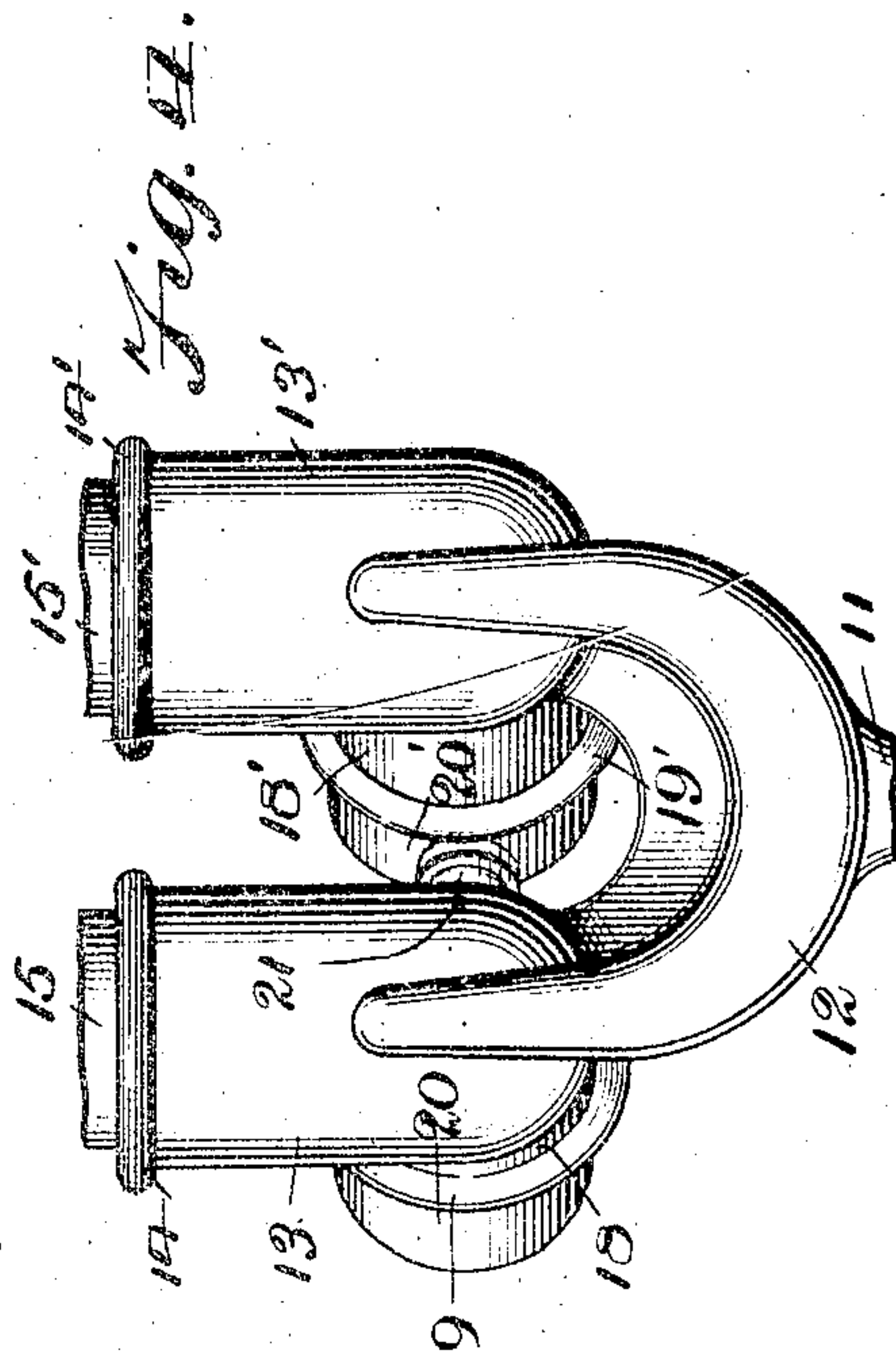


Fig. 17.

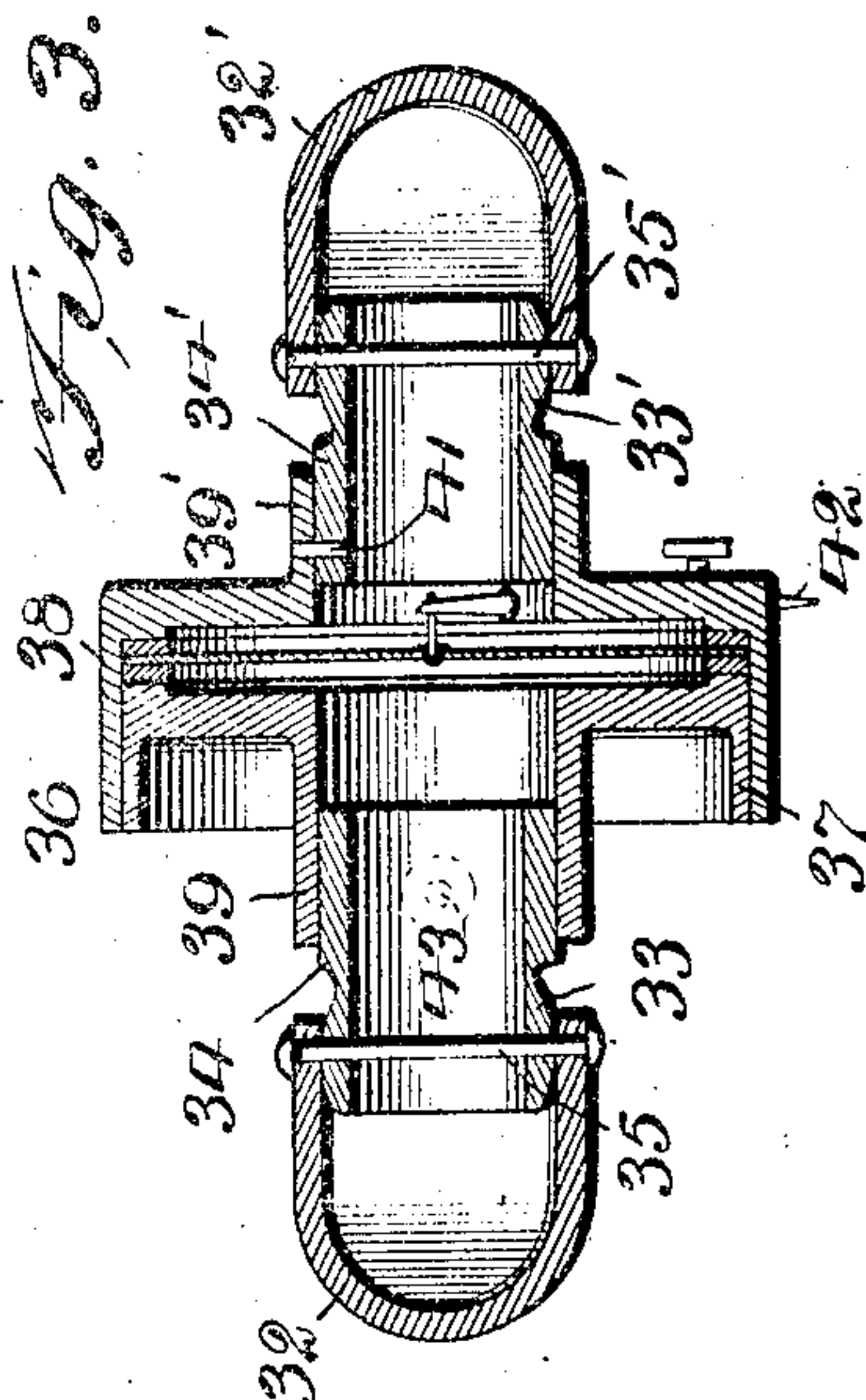


Fig. 3.

WITNESSES:

F. C. Barry.  
Edw. W. Vail Jr.

INVENTOR  
John C. English  
BY  
H. M. Peltz,  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

JOHN C. ENGLISH, OF CAMDEN, NEW JERSEY.

## TALKING-MACHINE.

No. 877,989.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed September 11, 1905. Serial No. 277,805.

*To all whom it may concern:*

Be it known that I, JOHN C. ENGLISH, a citizen of the United States, and resident of the city of Camden, State of New Jersey, have invented certain new and useful improvements in Talking-Machines, of which the following is a full, clear, and complete disclosure.

One object of my invention is to provide a construction in connection with talking machines, whereby the plane of the stylus, which is perpendicular to the record and at right angles to the axis of the reproducer sound box, is maintained at all times substantially tangential to the direction of the rotation of the turn-table and consequently to the grooves of a disk record.

A further object of my invention is to so construct the above described means that it performs the additional function of taking of vibrations from both sides of the diaphragm to produce thereby a more exact reproduction of the record.

A further object of my invention is to convey the sounds from opposite sides of the sound box to two independent arms or other sound augmenting devices whereby the resulting reproduction is louder, clearer and more faithful to the original sounds or tones recorded than has hitherto been obtained.

A further object of my invention is to mount each horn or other sound augmenting devices in such a manner that it may be turned or swung at different angles with respect to the other in order to distribute the sounds in a manner to produce the best and most effective results.

A further object of my invention is to make the sound tubes, the sound box, and the parts connected thereto of such proportions that the said parts are sufficiently rigid to resist the tendency to vibrate in sympathy with the vibrations of the air inclosed thereby, and therefore from imparting their own vibrations and undesirable qualities to the sound which is being reproduced. In other words, the parts are made so heavy that they do not partake of the vibrations of the air inclosed, but permit the vibrations from the diaphragm to be transmitted through the same in a much more perfect manner than has heretofore been accomplished.

Briefly, my invention consists in providing a talking machine with two sound con-

veying tubes of heavy and rigid construction, each of which is composed of a rigid or fixed portion secured to the side of a cabinet, or other fixed part of a talking machine, and two hinged portions free to be swung upwardly on horizontal pivots away from the plane of the record, and also to be swung about vertical pivots in a horizontal plane over the face of the record; the swinging ends of said sound tubes being pivoted to the opposite sides of the reproducer or sound box; whereby the said sound tubes are caused to convey the vibrations of the diaphragm from both sides of the sound box to independently movable horns or any other sound amplifying device, and at the same time to maintain the sound box, and the stylus carried thereby, in a fixed relation with respect to the groove of the record as the reproducer or sound box travels across the same.

For a full, clear and exact description of one embodiment of my invention, reference may be had to the accompanying drawings forming a part thereof, in which

Figure 1 is a plan view of my improved device, mounted upon a cabinet of a talking machine. Fig. 2 is a sectional view of the line 2, 2, Fig. 1; Fig. 3 is a section of the line 3, 3, Fig. 1; Fig. 4 is an elevation view of the bracket or fixed support of my device.

Referring to the drawings, 10 indicates the cabinet of a talking machine to one side of which a bracket is rigidly secured. The bracket (plainly shown in Figs. 1 and 4) consists of a web 11, terminating in a U shaped yoke 12, the upper arms of which are provided with elbows 13, 13', forming parts of the sound conveying tubes. The upper ends of the elbows are provided with shoulders, 14, 14', and upwardly projecting cylindrical sleeves 15, 15' which are adapted to smoothly fit the smaller ends 16, 16' of the sound amplifying horns 17, 17'. By means of this connection between the horns and the upper ends 15, 15' of the rigid elbows 13, 13', the horns may be independently swung around in a horizontal plane to form any desired angle with respect to each other and to distribute the sound in a much more perfect and effective manner than has heretofore been accomplished. The elbows 13, 13' extend backwardly for a short distance toward the center of the talking machine, are then bent as at 18, 18' and terminate in flanges 19, 19'.



Within the inner ends of the elbows 13, 13' are sleeved short tubes 20, 20', rigidly united by cross-bar 21 and secured within the elbow by set screws, 22, 22'. Each tube 20, 20' is provided on its upper side with lugs 23, 23' forming parts of a hinge, to which extensions 24, 24' are secured by lugs 25, 25' and pivot 26, 26'. To the other ends of the extensions 24, 24' are pivoted the tubular horizontally swinging arms 27, 27', of the sound tubes, the connection between the said swinging arms and the extensions being clearly shown in Fig. 2, in which said extensions 24—24' are each provided with a hollow, vertically disposed cylindrical portion 28, beveled on top as at 29, while the horizontal swinging arm 27—27' each have a similar cylindrical portion 30, the lower edge of which is beveled to correspond to the beveled edge 29. A screw 31, securely clamps said cylindrical portions together, but permits the arm 27 to swing in a horizontal plane around the pin 31, as a pivot, as Figs. 1 and 2 plainly illustrate. One end of each horizontal swinging arm 27, 27' is enlarged as at 32, 32', and the adjacent sides of said enlargement are provided with openings within which the spherically shaped ends 33, 33', of the connections 34, 34', are secured by vertical pins 35, 35'.

The reproducer sound box 36 differs from the usual construction of the same in that both the interior cylindrical portion 37, and the exterior cylindrical portion 38, are provided with outwardly extending cylindrical sleeves 39, 39' respectively, and within said sleeves the connecting tubes 34, 34' are fitted. The connection 34' and sleeve 39' are secured together by a bayonet slot 40, and pin 41, by means of which the stylus 42 is quickly and accurately adjusted so that its axis forms the proper or correct angle with the face of the record. The other connection, 34, is secured to the sleeve 39 by means of a set screw, 43.

In order to permit the extensions 24, 24' to be swung upwardly on their horizontal pivots 26, 26' and yet to form a tight connection between said extensions and the short tubes when the arms are in their horizontal position, I have provided the short tubes 20, 20' with flanges, the outer surfaces of which are curved to conform to an arc, the center of which is in a line through the axis of the pivots 26, 26'. The connection between the short tube 20 and the extension 24 is plainly shown in Fig. 2, and is identical with that for the short tube 20' and the extension 24'. In said Fig. 2, 44 represents the flange on the short tube 20, and its outer surface 45 from the shoulder 46 to the top of the flange is curved in a vertical plane to form an arc of a circle swung from pivot 26. As will be seen, I have provided the extension 24 with a corresponding recess, within which the flange 44 fits. The horizontal pivots 26 then permit

the sound box mounted on the inner ends of the sound conveying tubes, to be lifted for any purpose as for instance, for inserting or replacing the stylus, while the flanges 44 permit the sound box and inner ends of the sound conveying tubes to oscillate slightly, without binding and without breaking the continuity of the sound conveying tube, to conform to any inequalities or irregularities of the surface of the record.

In order to maintain the plane of the stylus substantially tangential to the groove as the stylus is swung on an arc over the record, I have made the pivots at each end of the tubes substantially at the corners of a parallelogram. In actual practice, however, I have found that the distance between the axes of the cylindrical portions 30, 30' should be slightly less than that between the pivots 35, 35', connecting the outer end of the swinging arms with the connecting tubes 34, 34' and by reason of this shortening of one side of the parallelogram, the axis of the sound box or reproducer is not maintained at all times absolutely parallel to a determined vertical plane as would be the case if said distances were equal, but the direction of the said axis is slightly changed as the reproducer travels over the record. By a careful determination of the relation of the distances between said pivots, the plane of the stylus is maintained at all times in approximately perfect relation to the grooves in the record. In addition, then, to performing the function of taking the vibrations from both sides of the diaphragm, my sound conveying tubes also operate to so change the direction of the axis of the sound box that the stylus is always in a plane substantially tangential to the groove of the record, and as a result of the combination of these two features in one structure the sound is reproduced with greater intensity and accuracy than has heretofore been possible in ordinary forms of construction. It will be also observed that I have made the arms, and connections of a very firm and rigid construction, and by reason of this and the manner of securing them together and to the fixed parts of the machine to mutually strengthen and firmly hold each other, the vibrations produced by the diaphragm are not transmitted through the material of the sound tubes, but only through the air inclosed in the tubes. In other words, by making the construction of my parts exceedingly rigid and practically non-vibratory, I have been enabled to limit the transmission of vibrations to the air inclosed in the tubes, and the vibrations are not imparted to or transmitted through, the connected parts of the machine, with the result that the tones originally recorded upon the record are reproduced with great accuracy and purity.

Should it for any reason be found desirable



to remove the sound box, it is only necessary to loosen the set screw 43 and turn the sound box to allow the pin 41 to be withdrawn from the bayonet joint 40. Thus I have provided  
 5 the stylus of a double armed talking machine with the accurate adjustment afforded by the bayonet joint and pin heretofore employed in connection with single rigid arm sound tubes.

10 Having thus described one embodiment of my invention, what I claim and desire to protect by Letters Patent of the United States, is:—

1. In a talking machine, the combination  
 15 with the sound box and stylus, of means for maintaining the plane of the stylus substantially tangential to the record grooves as the sound box swings across the record and for taking vibrations from each side of the  
 20 sound box.

2. In a talking machine the combination in a single structure of means for taking the  
 vibrations from each side of the sound box and for maintaining the plane of the stylus  
 25 substantially tangential to the record grooves as the sound box swings across the record.

3. In a talking machine, the combination with the sound box and stylus, of means for  
 30 taking vibrations from each side of a sound box and maintaining the plane of the stylus substantially tangential to the record grooves as the sound box swings across the record, the said parts being of heavy and  
 35 rigid construction to limit the transmission of vibrations to the air confined in said tubes.

4. In a talking machine, the combination with a sound box and stylus, of pivoted  
 40 sound tubes connected with the sides of the sound box for taking vibrations from each side thereof and for maintaining the plane of the stylus substantially tangential to the record grooves as the sound box swings  
 across the record.

45 5. In a talking machine, the combination with a sound box of a plurality of swinging reproducer arms independently pivoted to opposite sides of said reproducer and to a fixed part of the machine.

50 6. In a talking machine, the combination of a reproducer and a swinging reproducer arm secured to said reproducer and to a fixed part of said machine, said reproducer and arm being of heavy and rigid construction  
 55 to prevent said parts from vibrating in sympathy with the diaphragm.

7. In a talking machine the combination with a reproducer, two swinging reproducer arms independently pivoted at one end to a  
 60 fixed part of the machine and having their opposite ends pivoted to the opposite sides of said reproducer, the said reproducer and arms being of heavy and rigid construction to prevent sympathetic vibrations therein.

65 8. In a talking machine, the combination

with a reproducer and a swinging reproducer arm mounted on a stationary pivot, a second swinging reproducer arm mounted on a similar but independent stationary pivot, means  
 70 for pivoting the outer ends of said arms to the sides of said reproducer for taking vibrations from each side of said reproducer and for maintaining the plane of the stylus substantially tangential to the record groove as the reproducer moves across the record.

9. In a sound recording or reproducing machine the combination with a reproducer, of a sound conveying arm pivoted at one end to a stationary part of the machine and having  
 its other end in communication with and  
 80 pivoted to one side of said reproducer, a second sound conveying arm mounted similarly to the first mentioned arm and having its corresponding end communicating with and  
 85 pivoted to the opposite side of said reproducer, the relative positions between said pivots and said pivoted ends of said arms being substantially at the corners of a parallelogram.

10. In a talking machine, the combination  
 90 with a reproducer having a stylus, of a tube pivoted to one end of the stationary part of the machine and having its other end connected with one side of said reproducer; a second tube mounted similarly to the first  
 95 tube and having its corresponding end connected with the opposite side of said reproducer, the relative positions between said pivots and said pivoted ends of said tube being substantially at the corners of a parallelogram, the outer end of which is slightly  
 100 greater than the inner end.

11. In a sound recording and reproducing machine, the combination with a reproducer, of two sound conveying arms having their  
 105 outer ends respectively communicating with and pivotally connected to the opposite sides of said reproducer and having their inner ends mounted to swing on horizontal pivots, to maintain the stylus in a plane sub-  
 110 stantially tangential to the record groove.

12. In a talking machine the combination with a reproducer, of two sound conveying tubes pivoted on opposite sides of said reproducer, and means for oscillating the inner  
 115 ends of said sound conveying tubes, said means consisting of a horizontal pivot, a flange, the outer surface of which is curved to conform to the arc of a circle struck from the axis of said pivot and a recess on the  
 120 movable portion of said tube to cooperate with said flange.

13. In a talking machine, the combination with a sound box having lateral extensions on each side of the diaphragm, the tubular  
 125 connections sleeved within said extensions, one extension being secured to said tubular connection by a bayonet joint which positions the stylus, and the other extension being secured to the other tubular connection  
 130



by set-screw, and two horizontal swinging reproducer arms pivotally connected to said extensions.

14. In a talking machine, the combination  
5 with the reproducer, of sound conveying tubes connected to the opposite sides of said reproducer, and a horn connected with each of said sound conveying tubes each horn being mounted to swing in a substantially horizontal plane independently of the sound conveying tubes and each other.  
10

15. In a talking machine, the combination with a reproducer, of sound conveying tubes, connected at their inner ends to the opposite  
15 sides of said reproducer, and mounted to maintain the reproducer at all times substantially tangential to the record groove, and a horn, mounted on the outer end of each sound tube, adapted to be swung horizontally in any direction.  
20

16. In a talking machine, the combination with a reproducer, of two sound conveying tubes, connected to opposite sides of said reproducer, the said tubes being mounted to  
25 maintain the reproducer at all times substantially tangential to the record groove, the outer ends of said tubes being provided with independent horizontally swinging horns.

17. In a talking machine, the combination  
30 with the stylus, and a sound box having an inclosed diaphragm, sleeves extending outwardly from said diaphragm, and connections secured within said sleeves; of means located on one of said connections for accurately determining the position of said  
35 stylus; and a sound tube pivotally secured to each said connection.

18. In a talking machine, the combination with the stylus, and a sound box having an  
40 inclosed diaphragm, outwardly extending sleeves, and connections provided with spherically shaped ends secured within said

sleeves; of means located on one side of said connections for accurately determining the position of said stylus; and swinging sound  
45 tubes having their movable ends pivoted to the spherical ends of said connections, and their other ends independently pivoted to a fixed part of the machine.

19. In a sound recording and reproducing  
50 machine, the combination with a sound box, of a plurality of sound conveying arms connected thereto and pivoted to maintain the stylus in a plane substantially tangential to the record groove.  
55

20. In a sound recording and reproducing machine, the combination with a sound box, of a pair of sound conveying arms communicating therewith, the said sound box being mounted to move in a direction transverse to  
60 the face of the record.

21. In a sound recording and reproducing machine, the combination with a sound box, of a pair of sound conveying arms communicating therewith, the said arms being pivoted  
65 at their respective extremities to maintain the plane of the stylus substantially tangential to the grooves of the record.

22. In a sound recording and reproducing machine, the combination with a sound box  
70 and a stylus, of a plurality of sound conveying arms connected to said sound box, said sound box being mounted to move in a plane parallel to the face of the record, and means for locking the sound box to one of said  
75 arms and at the same time positioning the stylus at the proper angle to the record.

In testimony whereof, I have signed my name to the specification in the presence of two subscribing witnesses.

JOHN C. ENGLISH.

Witnesses:

ALSTON B. MOULTON,  
ALEXANDER PARK.