J. HOFFAY.

PHONOGRAPH.

APPLICATION FILED JUNE 7, 1916. RENEWED JAN. 10, 1922.

1,425,966. Patented Aug. 15, 1922.

3 SHEETS—SHEET 1.

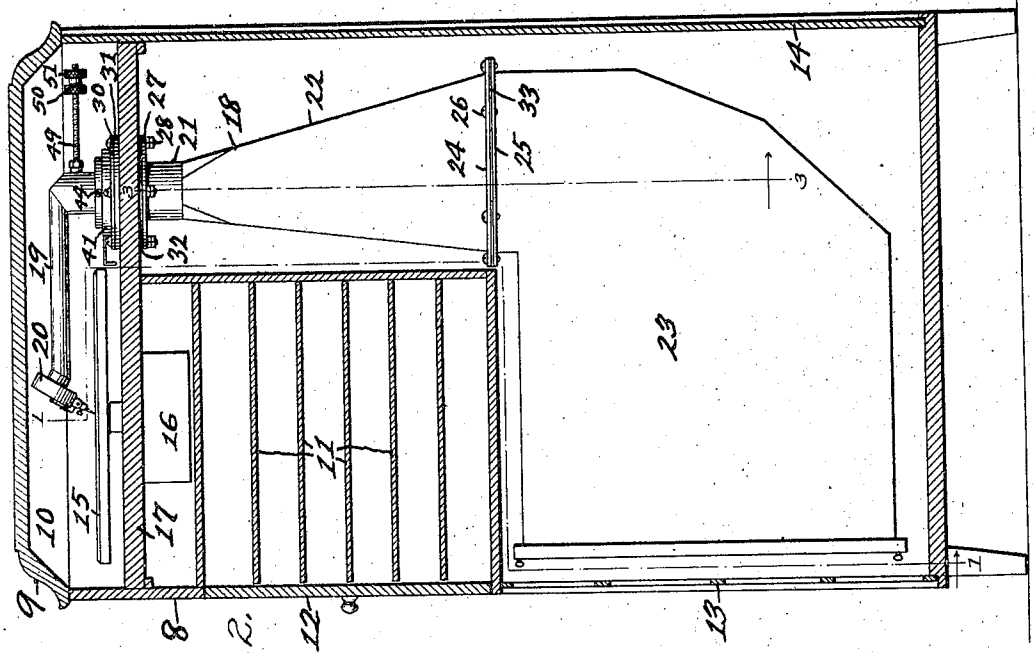


Fig. 2.

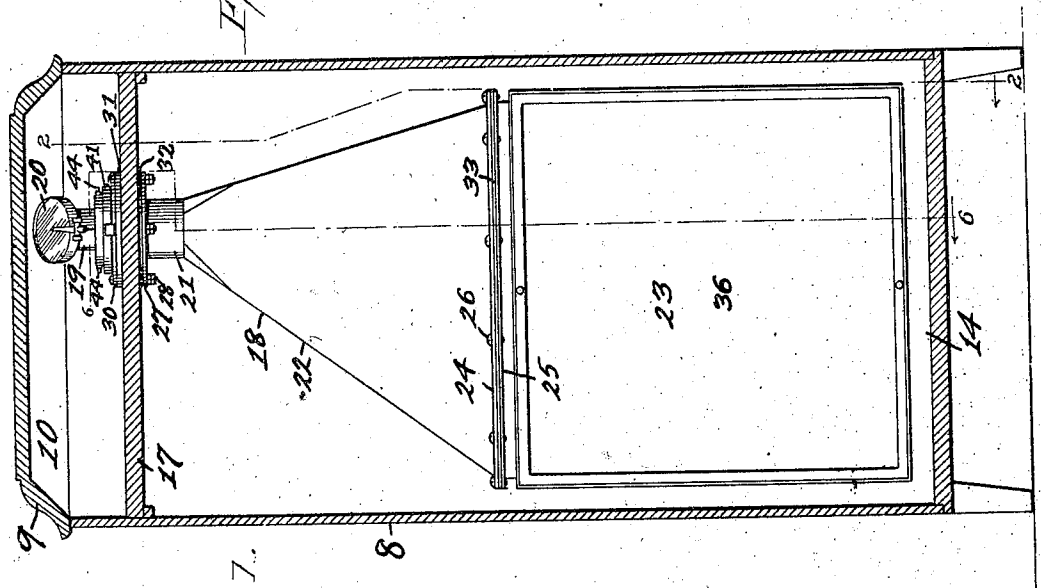


Fig. 1.

WITNESSES

Oliver W. Holmes

J. E. Larsen

INVENTOR

Joseph Hoffay

BY Munn & Co

ATTORNEYS

J. HOFFAY.

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3 SHEETS—SHEET 2.

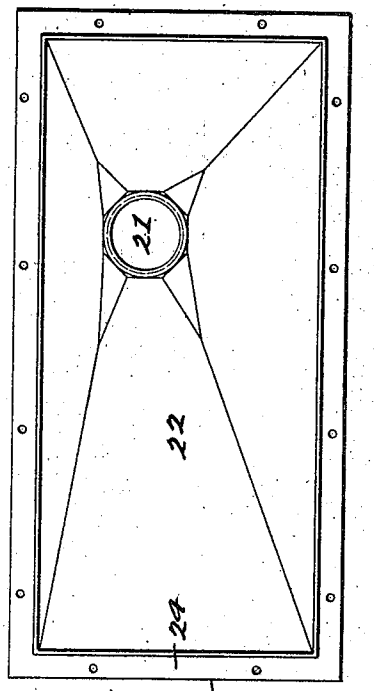



Fig. 4.

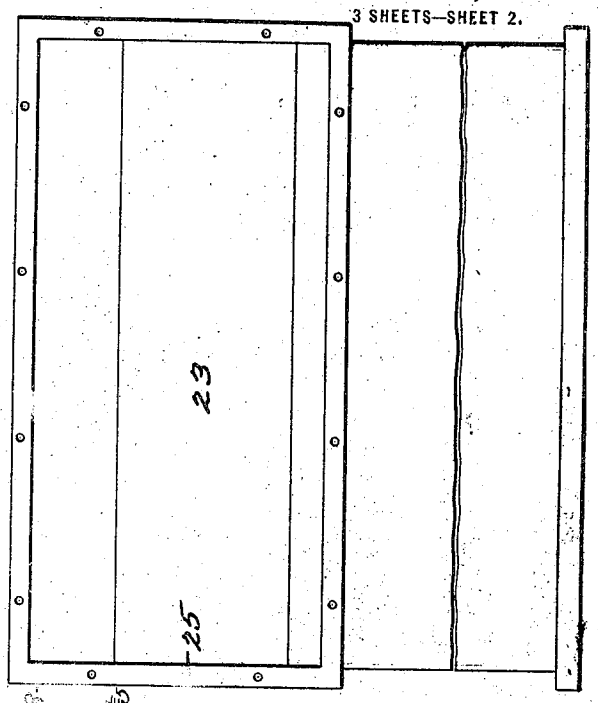



Fig. 5.

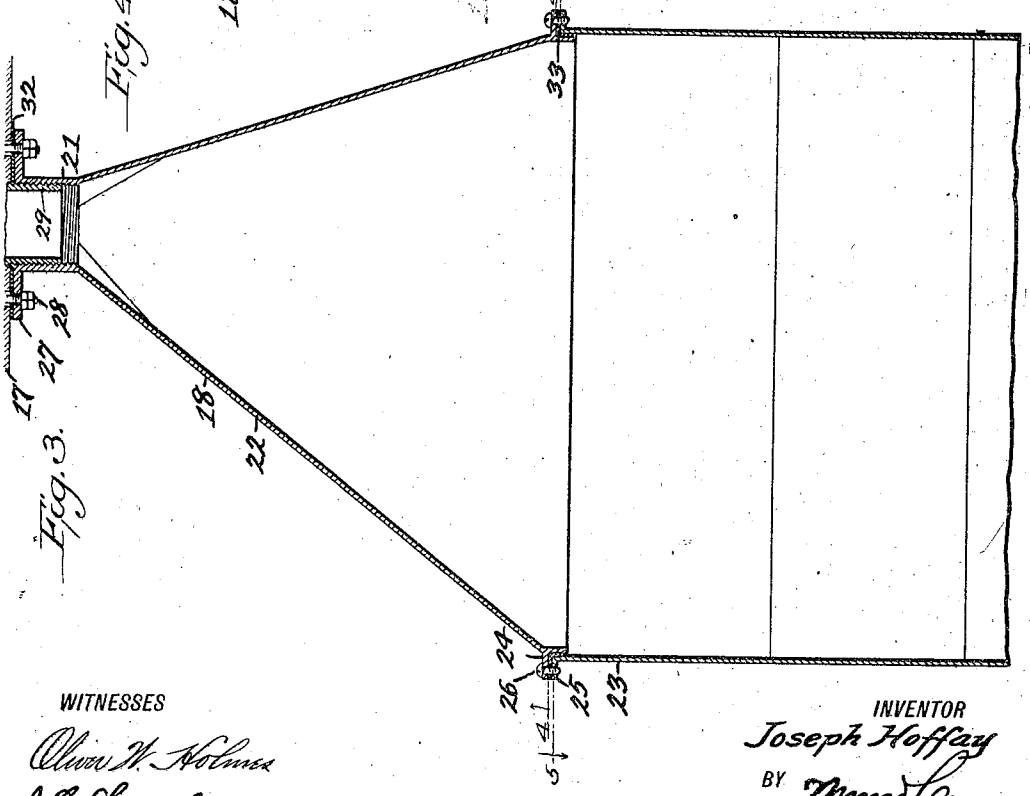



Fig. 3.

WITNESSES

Oliver W. Holmes

J. C. Lassen

INVENTOR

Joseph Hoffay

BY Munn & Co

ATTORNEYS

J. HOFFAY.

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3 SHEETS—SHEET 3.

Fig. 6.

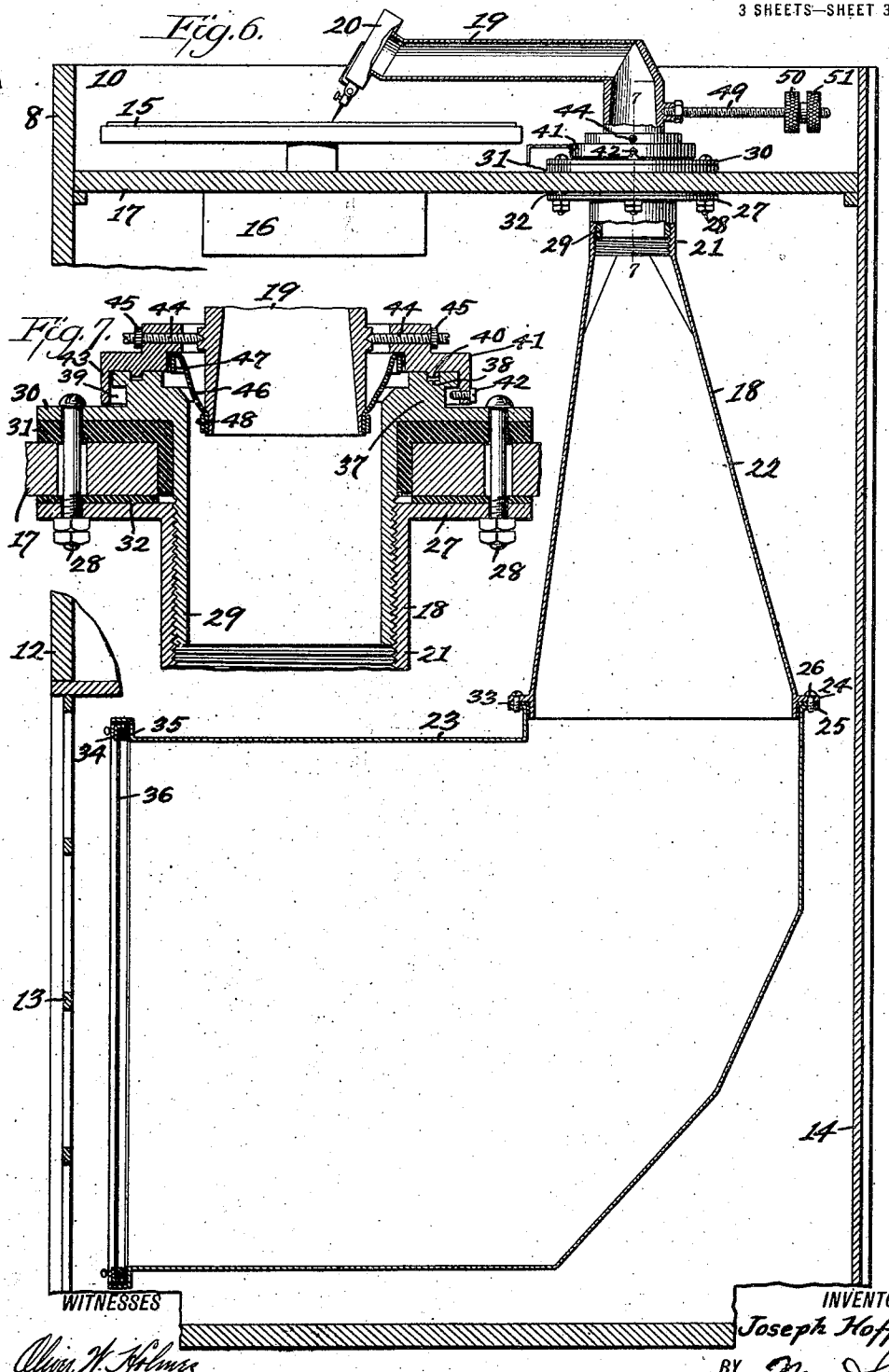



Fig. 7.




WITNESSES

Alice H. Kolmer

J. C. Larsen

INVENTOR

Joseph Hoffay

BY Munn & Co

ATTORNEYS

# UNITED STATES PATENT OFFICE.

JOSEPH HOFFAY, OF NEW YORK, N. Y.

## PHONOGRAPH.

1,425,966. Specification of Letters Patent. Patented Aug. 15, 1922.

Application filed June 7, 1916, Serial No. 102,189. Renewed January 10, 1922. Serial No. 528,139.

*To all whom it may concern:*

Be it known that I, JOSEPH HOFFAY, a citizen of the Republic of Mexico, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

My invention relates to phonographs, particularly of the built-in horn type, and one of the main objects thereof is to provide means for preventing the escape of sound waves at any point between the sound box and the outer end of the horn while at the same time allowing full freedom of movement to the tone arm during reproduction.

Another object is to accomplish this result by permanent means instead of the present uncleanly and temporary method of utilizing liquids or grease to obtain air-tight connections.

Another object is to provide tone arm supporting means over a relatively great surface and in such manner as to take the weight of the tone arm, during the rendition of a record, in a positive and untilting way, whereby strains are avoided to the delicate mechanism, full freedom of movement results for the tone arm, and any tendency to vibrate is avoided.

Another object is to provide means for preventing the transmission of vibration to the tone arm from the motor, as by resilient insulation.

Another object is to provide simple and practical means for connecting the tone arm and horn with the cabinet whereby the assembling is expeditiously accomplished and without the need of a skilled workman, it being possible to so assemble the parts in only one way and that of the maximum functional efficiency in reproduction.

A further object is to provide a diaphragm for the outer end of the horn whereby the purity and naturalness of tones are ensured.

Another object is to provide tone arm supporting means whereby the axis of movement in a vertical plane will traverse the axis of movement in a horizontal plane, thereby ensuring unrestricted movement on lines of least resistance.

My invention is fully described in the following specification, of which the accompanying drawings form a part, in which like characters refer to like parts in each of the views, and in which:—

Fig. 1 is a vertical section through a phonograph embodying my several features, as on the line 1—1 of Fig. 2;

Fig. 2 is a similar section taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged section, fragmentarily, through the horn which I employ, as on the line 3—3 of Fig. 2;

Fig. 4 is a bottom plan view of the upper horn member, as on the line 4—4 of Fig. 3;

Fig. 5 is a top plan view of the lower horn member, as on the line 5—5 of Fig. 3;

Fig. 6 is a fragmentary view similar to Fig. 2, enlarged, and showing the horn in section, as well as the tone arm; and

Fig. 7 is an enlarged section taken on the line 7—7 of Fig. 6, showing the manner of mounting the tone arm and of suspending the horn.

Referring to the drawings, 8 represents a cabinet having a hinged top 9 normally closing a chamber 10, having a plurality of record storing shelves 11 adjacent the top of the cabinet and protected by a door 12, having a grill 13 at the lower front through which the sounds pass, having a removable back 14, and having a record table 15 and a motor therefor enclosed in a box 16, the position of the grill 13 being a marked characteristic of my phonograph.

The cabinet is provided with a shelf 17 supporting the record table and the motor, and serving also as a support for the horn 18 and for the tone arm 19 having a sound box 20 at its outer end, the horn 18 being rigidly held but the tone arm being freely movable in both vertical and horizontal planes whereby the stylus may follow the groove in a record.

The horn is composed of a relatively small cylindrical upper end 21, a downwardly flaring member 22 leading therefrom, and a forwardly directed member 23 secured thereto by flanges 24 and 25 and bolts 26, the member 22 being arranged within the member 23 to avoid any shoulder which might obstruct the movement of the sound waves outwardly through the horn, the upper end 21 having a flange 27 thereon whereby the horn may be secured in position, as by bolts 28, and being interiorly threaded to receive a tube 29 depending from an annular plate 30 also held by the

bolts 28, rubber gaskets 31 and 32 being interposed between the plate 30 and shelf 17 and between the said shelf and the flange 27, respectively. The gasket 31 is formed with an integral sleeve and flange whereby the tendency of the plate 30 and depending tube 29 to move vertically or horizontally is resisted in a cushioned manner, both these gaskets tending to maintain the tone arm and connecting means, as well as the horn, free from any vibrations due to motor operation, and I also provide a packing gasket 33 between the horn members 22 and 23.

The outer end of the horn member 23 is recessed to receive two telescoped frames 34 and 35 holding a diaphragm 36 therebetween, said diaphragm extending entirely over the outer end of the horn and being substantially air-tight prevents the escape of sound waves from the horn through transmitting the action thereof to the outer air by means of the diaphragm and, while this might be considered to act as a dampener, I have found the tones emanating from my phonograph to be pure, true, and natural, with the diaphragm 36 in use, and the volume of sound is not reduced, but actually increased.

The plate 30 is provided with a raised annular member 37 provided with a groove 38 in its upper surface and with a circumferential groove 39, the former receiving a rib 40 on a tone arm carrier 41 resting squarely upon the upper surface of the annular member 37, and the groove 39 receives a screw 42 in desired position to ensure against accidental displacement of the carrier 41, several of these screws being provided, if desired, and being carried in a depending flange 43 on the carrier.

The carrier is provided with two diametrically opposite pivot screws 44 adjustable toward and from the vertical axis of the carrier and locked in adjusted positions by nuts 45, these pivots being on an axial plane of the carrier and of the plate 30 thereunder and serving to carry the tone arm 19 to permit movement thereof in a vertical plane whereas the rotary carrier permits tone arm movement in a horizontal plane. From the foregoing it will be observed that the weight of the tone arm is supported by the relatively wide member 37 of the plate 30 whereby the tone arm carrier is maintained in horizontal position at all times with the consequent freedom of the tone arm to move on a horizontal plane about a vertical axis traversing the horizontal axis of the tone arm.

The carrier 41 is recessed in its lower inner surface to receive the upper end of a flexible annular member 46 and a locking ring 47, the lower end of said member 46 being held to the lower end of the vertical portion of the tone arm by means of a locking ring 48, this annular member preventing the passage of air upwardly around the sides of the tone arm though not interfering in any way with the movement of said tone arm on the pivots 44. While a lubricant will probably be provided beneath the tone arm carrier and on the raised member 37 of the plate 30 there is no possibility of its reaching the flexible sleeve or member 46 to cause the rubber of which it is formed to harden or to otherwise deteriorate.

As shown in Figs. 2 and 6, I provide a screw 49 extended rearwardly from the tone arm and provided with nuts 50 and 51 locked together but capable of axial adjustment on said screw to serve as a counterweight for resisting any tendency of the tone arm to vibrate and also acting as a brake against sudden vibratory movements of the tone arm about its vertical axis.

From the foregoing it will be seen that the movement of the sound waves from the sound box to the end of the horn is entirely unobstructed, that there is no possibility of any escape thereof, and that the relatively enormous capacity of the horn permits a volume of sound not possible with smaller horns, while the shape of the horn permits a gradual increase in volume from the tone arm outwardly.

The above advantages and characteristic features have been determined by actual reduction to practice and, while I have shown a preferred embodiment of the invention, I may make changes in the details shown and described without departing from the spirit of my invention or sacrificing its advantages, provided such changes come within the scope of the appended claims.

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

1. In a phonograph, the combination with a tone arm and a horizontally rotatable support in and upon which said tone arm is mounted to rock, of a flexible sealing sleeve surrounding and fixed at one end to said tone arm and fixed at its other end to said support with sufficient slack between said fixed ends so as not to interfere with the vertical swinging movements of said tone arm.

2. In a phonograph, the combination with a pivoted tone arm and a stationary support into which said tone arm extends, of a flexible sealing sleeve surrounding and fixed at one end to said tone arm, and a member extending about said tone arm, rotatably mounted upon said support and to which the other end of said sleeve is fixed.

3. In a phonograph, the combination with a tone arm, of a rotatable ring into which said tone arm extends and upon which it is

pivoted to rock, of a support for said ring, one of said last mentioned parts having an annular groove concentric with the axis of rotation of said ring, the other of said parts having an annular rib fitting into said groove.

4. An air tight phonograph construction comprising an air tight sound box and tone arm, and a horn having an air tight diaphragm sealing its sound delivery end, all joints between relatively movable parts being also sealed air tight.

JOSEPH HOFFAY.