

A. D. JONES.

SOUND BOX FOR TALKING MACHINES.

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1,142,883.

Patented June 15, 1915.

Fig. 1.

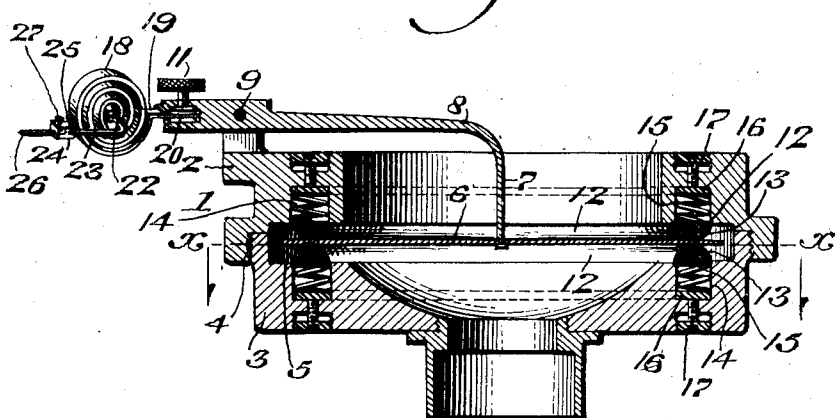


Fig. 2.

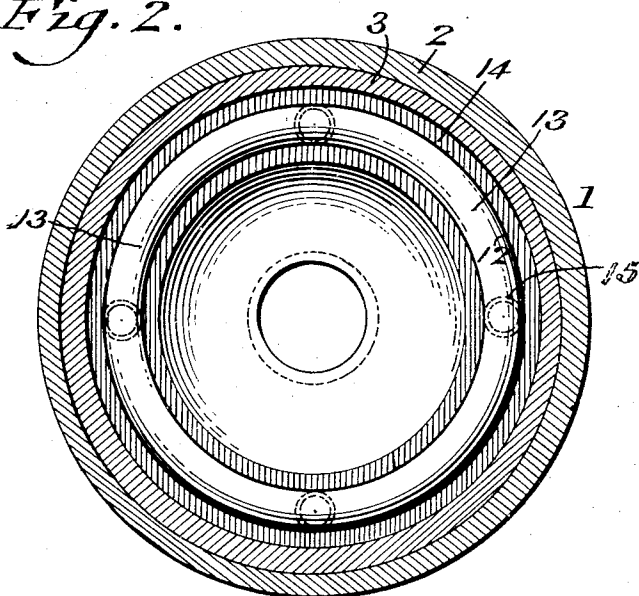
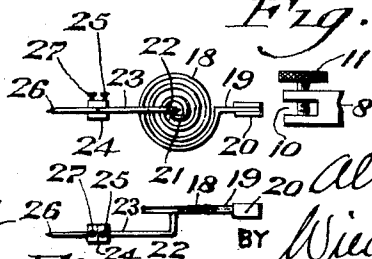


Fig. 3.



WITNESSES

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Fig. 4.

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SOUND-BOX FOR TALKING-MACHINES.

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To all whom it may concern:

Be it known that I, ALVA D. JONES, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Sound-Box for Talking-Machines, of which the following is a specification.

My invention relates to a novel construction of a sound box for talking machines, graphophones and other sound recording and reproducing machines and its object is to improve the construction of the recording and reproducing mechanism particularly that part known as the sound box and stylus supporting bar, whereby the sound delivered from the diaphragm is greatly improved and a clear and distinct articulation obtained, provision being made for the diaphragm to be yieldingly supported in the box so that it has capacity for vibration adjacent to its perimeter as well as at its center, the sound box and its adjuncts being inexpensive to construct, sensitive in action, easily and quickly repaired and readily accessible for the purpose of inspection or replacement of parts, means being thus provided for a general improvement of the tones, amelioration of the scratchy metallic or grinding sounds common in instruments of this class and for developing the delicate sounds ordinarily difficult to reproduce.

My invention further consists of a novel construction of stylus support embodying broadly the combination of a stylus and a convoluted or resilient support therefor, whereby the requisite freedom of vibration in every direction is imparted to the stylus under all conditions to accommodate or compensate for all inequalities or depressions in the groove of the disk with which the stylus coacts, whereby there is produced a general improvement of the tone reproduced and an elimination of the scratching and metallic harshness heretofore existing.

To the above ends my invention consists of a novel construction of sound box and a novel construction of resilient convoluted support for the stylus, the novel features of which will be hereinafter fully set forth and particularly pointed out in the claims.

It further consists of other novel features of construction all as will be hereinafter fully set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof which is at pres-

ent preferred by me, since the same will be found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a sectional view of a sound box embodying my invention. Fig. 2 represents a section on line $x-x$ Fig. 1. Fig. 3 represents a side elevation showing the stylus and its convoluted resilient support in detached position. Fig. 4 represents a front elevation of Fig. 3.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates my novel construction of sound box, the same comprising the members 2 and 3, which are preferably held in threaded engagement, as indicated at 4, or other suitable assembling means may be employed. The juxtaposed faces of the sound box members 2 and 3 are recessed, so as to provide a diaphragm chamber 5 when assembled, within which is located a diaphragm 6, the latter having attached to its central portion the member 7 of the stylus supporting bar or arm 8, which is fulcrumed at 9 and provided with a socket 10 at its extremity, within which either an ordinary stylus or my novel stylus supporting member may be secured by means of the fastening device 11 or its equivalent. The diaphragm 6 is of slightly less diameter than the diameter of the diaphragm chamber 5, so that its outer perimeter is capable of vibration, and the diaphragm is secured in position by means of the juxtaposed resilient rings 12, said rings or annuli having the juxtaposed convex faces 13, between which the diaphragm 6 is secured, as will be understood from Fig. 1. Each of the annular rings 12 is seated in annular juxtaposed grooves 14 in the sound box members which are of sufficient depth to receive a portion of said rings and permit a slight play thereof so that the requisite amount of play or vibrancy may be permitted to the inner as well as the outer or peripheral portion of the diaphragm, the rings 12 being pressed toward each other or against the diaphragm by means of the springs 15, which are preferably four or more in number, and spaced apart at the desired intervals, as will be

understood from Fig. 2, the tension of said springs being adjusted according to requirements by means of screws 17, whose inner extremities bear upon the annular flat follower plate or ring 16, which is preferably made of hard rubber and is of substantially the same diameter as the annular rings 12, which are preferably made of soft rubber or resilient material. By screwing the screws 17 in or out against the annular follower ring or plate 16, which can be readily done with an ordinary screw driver, it will be seen that the tension of the springs can be regulated according to requirements. If desired cushions of any resilient material may be employed in lieu of the springs 15.

In Fig. 3 I have shown in detached position my novel construction of stylus support, the same comprising a convoluted flat or round spring or resilient member 18, one terminus 19 of which is provided with the head 20 which is adapted to engage the seat or socket 10 and is held in position by means of the fastening device 11 or its equivalent. The inner end 21 of the convoluted or resilient member 18 is slightly off-set, as indicated at 22, and terminates in the member 23 carrying the chuck or holder 24 secured in position by screw 25.

26 designates a stylus point of the ordinary construction which is secured in the holder 24 by means of the fastening 27 or its equivalent.

The general operation of sound boxes for talking machines is well understood by those skilled in the art and need not be described in detail. It will, however, be understood that the sound box seen in Figs. 1 and 2 can be employed in conjunction with an ordinary stylus, or if desired the stylus holder seen in Figs. 3 and 4 may be employed. In either case the stylus or needle 26, when brought into engagement with the sound grooves of the usual disk tablet will upon rotation of the latter cause the vibrations to be communicated from the sound record through the needle 26 and arm 8 to the diaphragm 6 and the sounds are thus reproduced. As the two members 2 and 3 of the sound box are screwed together into assembled position, the resilient rings 12 will be caused to seat sufficiently in their annular recesses, so as to be retained in position and by adjusting the screws 17 against the annular flat follower ring or plate 16, the pressure of the juxtaposed rings 12 upon the opposite sides of the diaphragm can be regulated according to requirements. By the employment of the curved or convex juxtaposed faces 13 upon the annular rings 12, the requisite tight joint is formed between the diaphragm and its supporting devices so that there is no possibility of the escape of air around the outer edge of the diaphragm. It will thus be apparent that in

vibrating the diaphragm not only will the center be vibrated, but the periphery of the diaphragm will also have more or less free vibration in a direction at a right angle to the plane of the diaphragm. I have thus produced a floating diaphragm, which is free to be moved bodily in the desired or requisite directions by the stylus bar, and by the proper adjustment of the springs 15, or by making said springs of the desired tension, I have devised a structure capable of reproducing a tone rich in quality, with the elimination of metallic grinding or scratchy sounds so common in instruments of this class. It will be further understood that by the employment of the stylus holder seen in Figs. 3 and 4, I attain a very sensitive and faithful reproduction from the sound grooves of the record, it being apparent that by reason of the member 23 being out of contact with the convolutions 18, by reason of the offset portion 22, said convolutions are enabled to absorb all of the secondary sounds which occur, and in addition to augment in a marked degree the sounds reproduced from the record.

It will be apparent that I may employ a flat coiled or convoluted spring, as seen in Fig. 1, or, if desired, I may make the convoluted or spiral stylus holder of round metallic or similar material, preferably steel wire which may be properly tempered and provided with the requisite spirals or convolutions according to requirements.

By the employment of the spiral or convoluted stylus holder, it will be apparent that I have eliminated the usual mechanism employed to take care of the side thrust upon the stylus, caused by the sound grooves or grooves produced by the sound waves in the making of the record. In certain types of records it is a well known fact that the sound waves produce a line or groove in the surface of the disk which varies in depth, and for an increased volume of sound, the depth of the groove is increased, so that it will be seen that my spiral or convoluted resilient stylus holder will allow the point of the stylus to freely follow the shallower and deeper portions of the bottom of the groove, and the stylus can thus readily accommodate itself to either side or up and down movement without enlarging, impairing or injuring the groove of the record in any way, and by reason of its spiral shape it will reproduce a sound wave more perfectly than any other form of stylus holder with which I am acquainted.

It will be further observed that by my employment of two rings 12, one on either side of the diaphragm 6, which encompass its complete circumference on a line concentric with the diaphragm center, said rings among other important functions serve the function of a muffler as they are of a soft

resilient material which serves as a non-conductor of sound waves. By my invention the usual harsh, dead and mechanical sounds produced from the diaphragm of a sound box resting on a solid ledge or support have been overcome and substantially perfect reproductions of the human voice are attainable by my novel sound box, in combination with my novel spiral stylus holder.

It will now be apparent that I have devised a novel and useful construction of a sound box for talking machines which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

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

1. In a device of the character stated, a sound-box having a diaphragm chamber and annular grooves in the opposed faces of said chamber and near the edges of the same, yielding rings in said grooves and having convex opposed sides, a floating diaphragm interposed between said rings, annular followers in said grooves, and cushioning devices interposed at intervals between said rings and followers.

2. In a device of the character stated, a sound-box having a diaphragm chamber and annular grooves in the opposed faces of said chamber and near the edges of the same, yielding rings in said grooves and having convex opposed sides, a diaphragm interposed between said rings, annular followers in said grooves, cushioning devices interposed at intervals between said rings and followers, and adjusting devices located to bear at intervals against said followers.

3. In a device of the character stated, a sound box comprising a pair of members detachably secured together and having a diaphragm chamber therein, said members having annular grooves therein, resilient annular rings located in said grooves and

having convex juxtaposed faces, a diaphragm located in said chamber and secured in position between said convex faces, an annular follower plate seated in the base of each of said grooves, cushioning devices intermediate said plates and said diaphragm supporting rings, and adjusting devices for said follower plates.

4. In a device of the character stated, a sound-box having a diaphragm chamber and annular grooves in the opposed faces of said chamber and near the edges of the same, yielding rings in said grooves and having convex opposed sides, a diaphragm interposed between said rings, annular followers in said grooves, cushioning devices interposed at intervals between said rings and followers, and adjusting devices located to bear at intervals against said followers and accessible from the exterior of said box.

5. In a device of the character stated, a stylus support comprising a convoluted resilient member having an offset portion projecting from an inner convolution thereof, and means carried thereby for supporting a stylus.

6. In a device of the character stated, a stylus device comprising a resilient and flat helical portion adapted to have its end connected to the diaphragm of a sound-box, and a portion laterally offset from the inner convolution of said helical portion to extend radially at the side of the same and to have a stylus at its outer end.

7. In a device of the character stated, a stylus support comprising a resilient and flat helical portion having its outer end projecting to be secured in a stylus bar, and a straight portion laterally offset from the inner convolution of said helical portion to extend outward at one side of the same and having a stylus-clamp at its outer end.

8. A sound box comprising a plurality of members having annular grooves therein, follower plates in said grooves, annular rings located in said grooves and having convex juxtaposed faces, a diaphragm located between said convex faces, and cushioning devices between said plates and rings.

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Witnesses:

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