To all whom it may concern:

Be it known that I, William Thomas Forse, a subject of the King of Great Britain and Ireland, and residing at Bendon Valley, Garrett Lane, Wandsworth, London, S. W. 17, England, have invented certain new and useful Improvements in Sound-Box Mountings, of which the following is a specification.

This invention relates to talking machines and the like with particular reference to the reproducer and method of mounting the same.

In such devices as hitherto constructed the sound-box casing, diaphragm or stylus bar has a tendency to vibrate or anti-vibrate to certain frequencies, thus distorting the sound reproduction and resulting in the metallic or muffled tone peculiar to such machines and tending also to the production of a blast or buzz at the louder or more complicated passages of music.

The object of the present invention is to remedy these defects of existing machines and to increase the volume and tonal clarity of the sound reproduction, and the invention consists in a talking machine or the like in which the sound-box and its supporting tone arm are flexibly or yieldingly connected together.

The invention also consists in a talking machine or the like in which the sound-box and stylus bar are flexibly or yieldingly connected together.

The invention also consists in other details and arrangements hereinafter described or indicated.

The accompanying drawings illustrate one mode of carrying out the invention:

Figure 1 is a side sectional elevation of one form of sound-box in accordance with the invention, the view being along the line 1—1 of Fig. 2.

Figure 2 is a rear elevation, and

Figure 3 is a plan.

In carrying my invention into effect in one convenient manner, I form my sound-box casing as a metal disc a having a projecting rim b carrying a mica or other suitable diaphragm c mounted in rubber gaskets d in the usual manner, the disc forming the back-plate of the casing and being provided with the usual outlet hole e for the sound waves. Secured upon the exterior of the back of the casing by means of two or more rivets, screws f or other fastening devices is a spring washer g which is preferably held free from contact with the case by means of metal or other distance-pieces h arranged round the fastening devices f. The washer is pierced or formed with a central aperture in line with the sound outlet from the back of the casing and is also attached by two or more screws f' or the like to a connector plate or flange i having a suitable projection k or recess for fastening it to a tone arm. The connector flange i is also preferably held free from contact with the spring washer by suitable distance-pieces h' and the fastening devices f' securing the washer to the connector flange may be staggered or alternated in relation to the fastening devices f securing the washer to the sound-box casing.

It will be seen that by such an arrangement the sound-box case is connected to the tone arm or to its support solely by means of the spring washer so that any shock on the sound-box case will first bend the spring before moving the tone arm. When such shocks occur rapidly, as when playing a record, any excessive vibrations imparted to the sound-box will be absorbed by the spring washer and will not be passed on to the tone arm as is usual, so that the sound-box and diaphragm may vibrate more freely and to a far greater extent than would be the case were such vibrations checked by imperfect contact with the non-vibratory tone arm, thus giving a proportionately greater volume and less distortion of sound reproduction than is usual with the existing types of sound-box.

The resistance to movement of the spring washer may be obtained by varying the position of the connecting or fastening devices f and f' or in any other suitable manner and I prefer to arrange a rubber or other suitable packing ring l within the central hole of the spring washer and lightly clamp it between the case and connector flange so that it does not carry any weight or perform any mechanical function other than forming an air-tight cushion joint.

The connector flange or the back of the sound-box casing may, if desired, be
flanged or otherwise made to form a cover for the spring washer and rubber ring so that they shall be more or less out of sight.

In place of the spring washer I may employ helical or spiral springs or I may adopt two or more short flat springs interposed between the tone arm and sound-box casing or, in general, any other means or devices by which the flexible connection of these two parts is obtained may be adopted in accordance with the invention.

In some cases it is desirable that the stylus bar shall be mounted so that it can oscillate freely to follow the waves in the record groove irrespective of their frequency or amplitude and this may be facilitated in one convenient manner by mounting the stylus bar between pivot points on the sound-box, care being taken that the friction between the stylus bar and the pivot points is not so great as to check the free oscillation nor so small that the stylus bar will chatter in its bearing and lose or distort most of the vibrations.

In the construction illustrated the sound-box case is provided on its outer edge with two small V-shaped or knife-edge projections m which form pivots on which a flat shelf n can rock, the stylus-bar a and stylus needle holder p being attached to this shelf at right angles thereto. On the under side of the shelf and opposite the knife-edge pivots and notches with which they engage small fluted or cup-shaped recesses q are formed and in each of which is located a small steel or other hard ball or roller r held in place by a flat spring, one end of which is attached to the sound-box case. The rollers or balls are of smaller radius than the radius of the cylindrical or cup-shaped or other recesses in which they are placed and the stylus bar is attached at its upper end to the reproducer diaphragm in the usual way, while its lower end carries the usual stylus or needle. With such an arrangement the stylus bar is free to respond to the most minute oscillations without undue friction owing to the roller bearing action at its pivots, that is when the stylus bar bearing shelf n rocks on the knife-edges m it rolls the small rollers to and fro to a minute extent in their locating recesses while the roller supporting springs s serve to hold the stylus bar in position and, owing to the curvature of the recesses, the rollers naturally tend to find their lowest position where the spring pressure is least, this action enabling the stylus bar to return to its normal position when in the nodal position in the sound groove on the record.

Alternative forms may be given to the knife-edge or pivot parts and any equivalent of the ball or roller may also be employed. Moreover, it will be understood that the foregoing details are given by way of illustration and not of limitation, since I may modify the method of flexible, yielding or resilient mounting, depending upon the type or construction of apparatus to which the invention is to be applied, the form or construction of sound-box, stylus holder and other attendant parts or any particular practical requirements that may have to be fulfilled.

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

1. In a talking-machine or the like, a sound-box casing, a tone-arm connector flange, and a thin metallic spring washer arranged between the connector flange and sound-box casing and secured to each of them.

2. A talking machine or the like according to claim 1, in which a packing ring is arranged within a central recess in the spring washer and lightly clamped between the sound-box casing and connector plate, substantially as described.

3. A sound-box, a coupling, yieldable means interposed between the sound-box and coupling, means connecting the sound-box to the yieldable means, other means connecting the coupling to the yieldable means, and means on the first connecting means for holding the yieldable means and sound-box in spaced relation.

4. A sound-box, a coupling, yieldable means interposed between the sound-box and the coupling, means connecting the yieldable means to the sound-box, other means connecting the coupling to the yieldable means, and means on each of said connecting means for holding the coupling, yieldable means, and the sound-box spaced one from the other.

5. In combination, a sound-box, a coupling, and a metallic spring washer interposed between the sound-box and coupling, means connecting them to the washer, and means spacing the washer from each of them.

6. In combination, a sound-box, a coupling, a metallic spring washer interposed between the sound-box and coupling and connected to both of them, said washer having an enlarged central recess, and a resilient cushion member arranged within the recess and clamped between the sound-box and coupling.

7. In combination, a sound-box, a coupling therefor, and a resilient centrally perforated metal plate interposed between the sound-box and the coupling and means spacing it from and other means connecting it to each of them.

In testimony whereof I have signed my name to this specification.

WILLIAM THOMAS FORSE.