E. R. JOHNSON.

SOUND BOX FOR TALKING MACHINES.

APPLICATION FILED FEB. 9, 1907.

951,127. Patented Mar. 8, 1910.

Fig. 1.

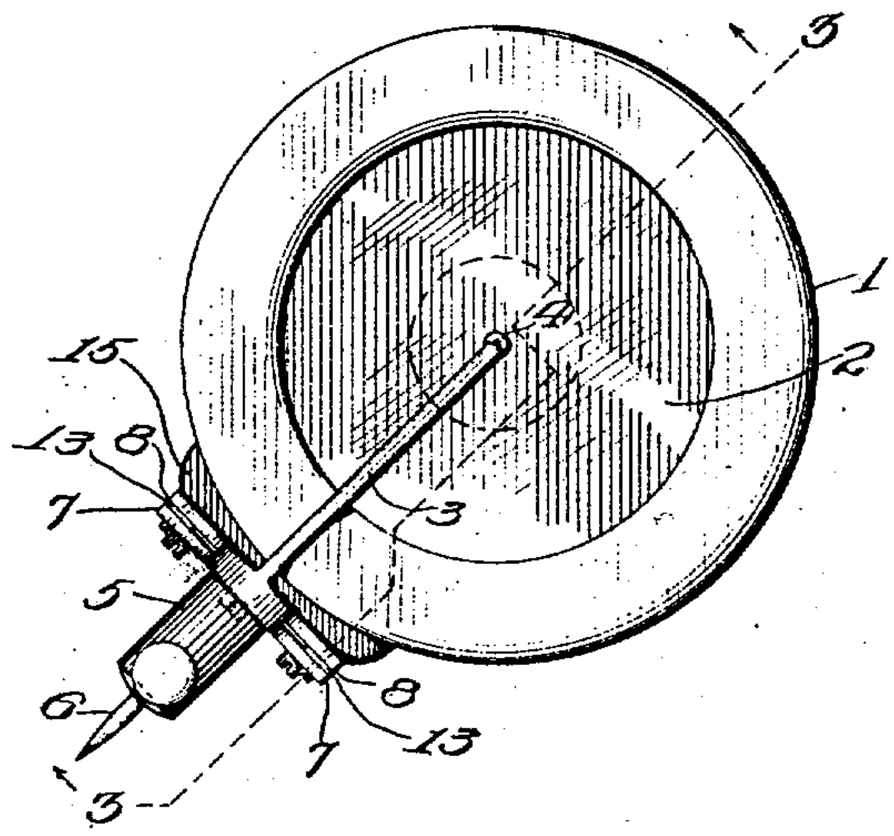



Fig. 2.

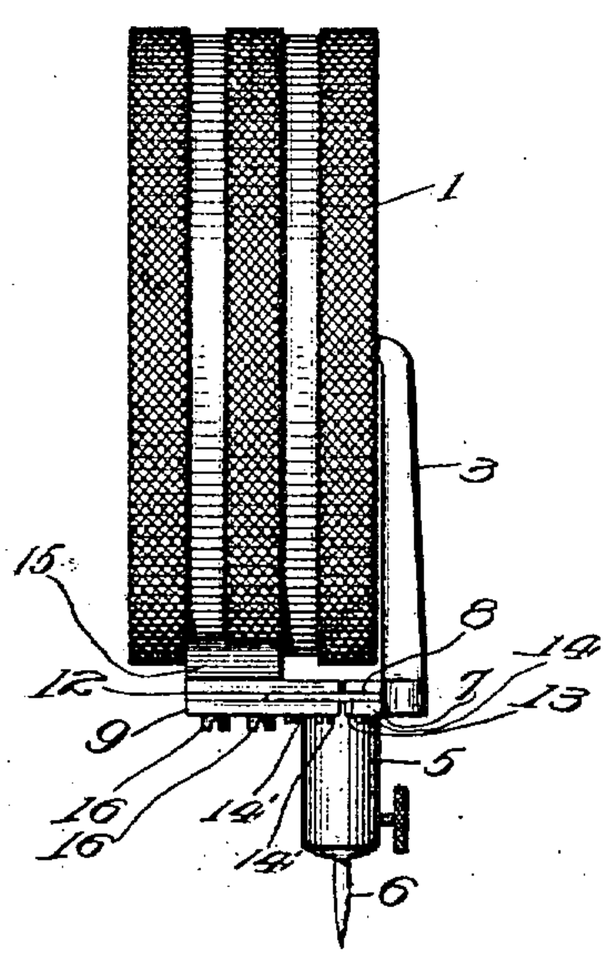



Fig. 3.

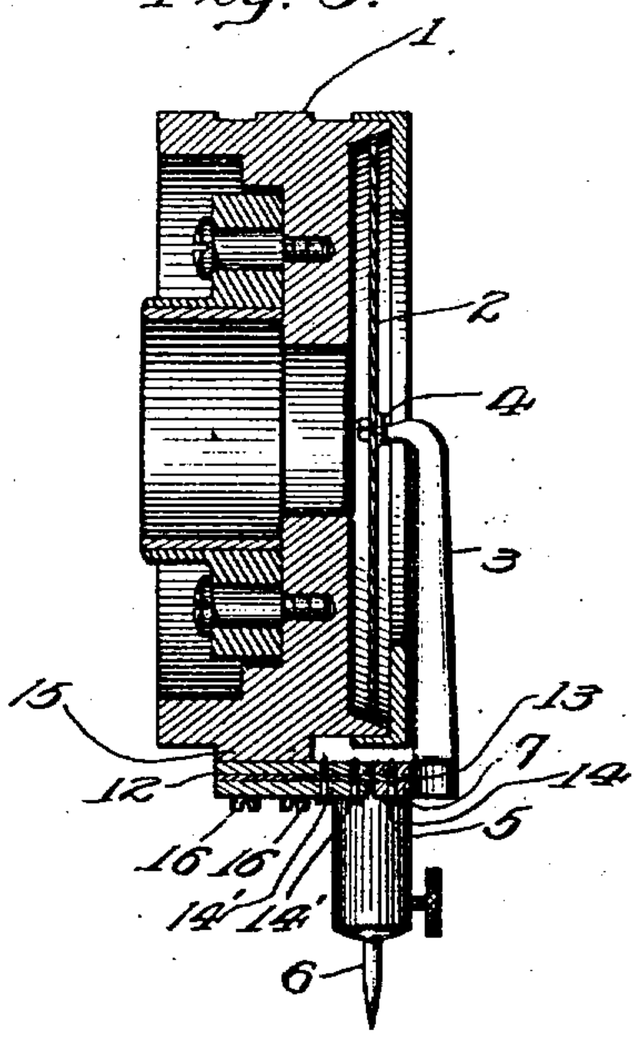
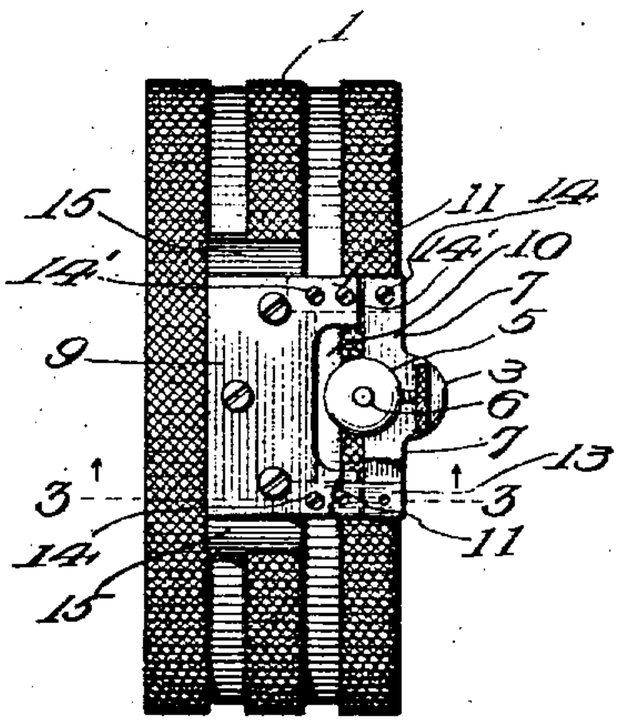



Fig. 4.




WITNESSES

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# UNITED STATES PATENT OFFICE.

ELDRIDGE R. JOHNSON, OF MERION, PENNSYLVANIA, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

## SOUND-BOX FOR TALKING-MACHINES.

951,127. Specification of Letters Patent. **Patented Mar. 8, 1910.**

Application filed February 9, 1907. Serial No. 356,530.

*To all whom it may concern:*

Be it known that I, ELDRIDGE R. JOHNSON, a citizen of the United States, and a resident of Merion, county of Montgomery, State of Pennsylvania, have invented certain new and useful Improvements in Sound-Boxes for Talking-Machines, of which the following is a full, clear, and complete disclosure, reference being had to the accompanying drawings, forming part of this specification.

The main objects of this invention are; to provide a stylus bar and mounting therefor of simple construction and of few parts, and having no parts subject to wear due to the oscillation of the bar, or likely to become loose and to permit of lost motion of the bar; to provide an improved mounting for a stylus bar that will permit the bar to oscillate in a single plane about a substantially fixed axis but which will hold the bar rigidly against any other movement with respect to its mounting; to provide an improved mounting for a stylus bar which will counteract any undesirable momentum or movement of the bar; to provide in a sound box an improved stylus bar and mounting therefor in combination with a diaphragm, in which the axis of oscillation of the stylus bar will be in the plane of the diaphragm, so that the movement of the end of the stylus bar connected to the diaphragm will be in a direction perpendicular to the diaphragm so as not to exert any oblique stress upon the diaphragm tending to buckle it; and to provide other improvements as will appear hereinafter.

In the accompanying drawings, Figure 1 is a front elevation of a sound box constructed in accordance with this invention; Fig. 2 is a side elevation of the same; Fig. 3 a longitudinal section on lines 3—3 of Figs. 1 and 4; and Fig. 4 a fragmentary bottom plan view of the sound box.

Referring to the drawings, the improved sound box comprises the usual cylindrical casing 1 supporting the usual diaphragm 2. The stylus bar 3 is connected at its upper end 4 to the diaphragm by any suitable means, and the lower end 5 of the stylus bar is offset and provided with a central socket adapted to receive the stylus 6. The stylus bar is provided with a pair of oppositely projecting rigid lateral extensions 7—7 each of which has at its outer end a slot 8. The stylus bar mounting comprises a rigid laminated supporting plate 9, which is substantially rectangular in general outline, and is provided upon its edge adjoining the stylus bar with a recess 10 adapted to receive the offset portion of the bar, leaving a rigid bifurcated arm 11 projecting rigidly outwardly on each side of the supporting plate. The rigid supporting plate is preferably formed of three thicknesses or laminations, the central thickness being less in width than the width of the other thicknesses and extending from the inner edge of the recess 10 to the opposite edge of the plate, leaving open spaces or slots 12 between the outer thicknesses of the arms of said plate, thus forming the said bifurcated arms 11.

The stylus bar is yieldingly connected to the rigid supporting plate 9 by means of a pair of spaced yielding members 13, each one of which is fastened at one end in one of the said slots 8 of the lateral extensions of the stylus bar, by means of a single screw 14, and at its opposite end in the corresponding slot 12 in the arm of the supporting plate, by means of two screws 14. The yielding members are preferably arranged parallel to each other, to secure strength and simplicity of construction, but the arrangement might be varied for instance by having the members converge or diverge, and the members would still perform their functions. These yielding members 13 are preferably made of comparatively thin spring steel, oblong in cross section, and preferably tempered; but it is obvious that practically any flexible material may be used instead of steel. When steel or any other resilient material is used for the yielding members, the resiliency of the material acts to counteract the momentum of the bar when it oscillates. Steel springs for this purpose can be made as thin and yielding as desired, and tempered to any degree of resiliency preferred, and owing to the simplicity of their design, the springs may be made cheaply in quantities with great uniformity. To restrain the stylus bar to oscillate upon a substantially fixed axis, the bar and its fixed supporting plate are spaced only a very short distance apart, the distance being only sufficient to permit of the necessary oscillation of the bar, without bringing the bar into contact with the plate, and the yielding members supporting the bar are therefore permitted to flex only

about a substantially fixed axis constituting the axis of oscillation of the bar.

From this description it will be apparent that the ends of the steel springs 13 are entirely inclosed and clamped between the laminations of the rigid supporting plate 9 on the sound box casing and the rigid lateral extensions 7 of the stylus bar. These clamping means render the entire length of the said springs rigid except that a very minute portion of the same which forms the axis of the oscillation of the stylus bar. As has been pointed out the distance between the clamping members of the casing and of the stylus bar is preferably only sufficient to permit the stylus bar to oscillate without effecting any engagement or contact between said clamping members. By this construction the stylus bar is restrained to oscillate upon a fixed axis, or in other words the axis of oscillation of the stylus bar is always in the same position with respect to the casing and to the stylus bar irrespective of the weight of the sound box or the pressure to which it may be subjected on account of any inequalities or irregularities in the record which is being produced.

The supporting plate 9 is rigidly but removably secured to a lug or support 15 upon the casing of the sound box 1, by means of screws 16, and is arranged so that the axis of oscillation of the stylus bar and the longitudinal axis of the stylus socket are substantially in the central plane of the diaphragm. When the stylus bar is thus mounted, the movement of the end of the bar connected to the diaphragm will be in a direction perpendicular to the plane of the diaphragm.

Although this invention has been illustrated only in its preferred form, many changes might be made in the construction shown without departing from the spirit of this invention or the scope of the following claims.

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

1. The combination with a stylus bar, of spaced yielding members free to bend but held against torsion, said members extending transversely of said bar, forming the sole support thereof, and restraining said bar to oscillate upon a substantially fixed axis.

2. The combination with a stylus bar, of spaced spring members free to bend but held against torsion, said springs extending transversely of said bar, forming the sole support thereof, and restraining said bar to oscillate upon a substantially fixed axis.

3. The combination with a stylus bar, of spaced flat spring members free to bend but held against torsion, said spring members extending transversely of said bar, forming the sole support thereof, and restraining said bar to oscillate upon a substantially fixed axis.

4. The combination with a stylus bar provided with rigid lateral extensions, of yielding members connected to said extensions and extending transversely of said bar, said yielding members forming the sole support for said bar, and restraining said bar to oscillate upon a substantially fixed axis.

5. In a sound box, a stylus bar provided with rigid lateral extensions and yielding members connected to said extensions and extending transversely of said stylus bar forming the sole support for said stylus bar, said bar being retained to oscillate upon a substantially fixed axis.

6. In a sound box, the combination with a diaphragm, of a stylus bar having a stylus socket, and spaced yielding supports for said bar extending in substantially the same direction therefrom and transversely thereof, the longitudinal axis of said socket being substantially in the plane of the diaphragm.

7. In a sound box, the combination with a diaphragm, of a stylus bar having a stylus socket, and spaced yielding supports for said bar extending in substantially the same direction therefrom, the longitudinal axis of said socket and the axis of oscillation of the said bar being substantially in the plane of the diaphragm.

8. In a sound box, the combination with a diaphragm, of a stylus bar, rigid lateral extensions arranged upon opposite sides of said bar and rigid therewith, and yielding supports for said bar secured transversely of said bar to said extensions and projecting in substantially the same direction therefrom, said bar being restrained to oscillate upon a substantially fixed axis.

9. In a sound box, the combination with a diaphragm, of a stylus bar, rigid lateral extensions arranged upon opposite sides of said bar and rigid therewith, and flat spring supports for said bar secured transversely of said bar to said extensions and projecting in substantially the same direction therefrom, said bar being restrained to oscillate upon a substantially fixed axis.

10. In a sound box, the combination with a diaphragm, of a stylus bar having a stylus socket, rigid lateral extensions arranged upon opposite sides of said bar and rigid therewith, and yielding supports for said bar secured transversely of said bar to said extensions and projecting in the same direction therefrom, the longitudinal axis of said socket being in a plane perpendicular to the axis of oscillation of said bar, and said axis of oscillation being substantially fixed.

11. In a sound box, the combination with a diaphragm, of a stylus bar having a stylus socket, rigid lateral extensions arranged upon opposite sides of said bar and rigid

therewith, and yielding supports for said bar secured transversely of said bar to said extensions and projecting in the same direction therefrom, the longitudinal axis of said socket being in the plane of the diaphragm.

12. In a sound box, the combination with a diaphragm, of a stylus bar having a stylus socket, rigid lateral extensions arranged upon opposite sides of said bar and rigid therewith, and yielding supports for said bar secured transversely of said bar to said extensions and projecting in substantially the same direction therefrom, the longitudinal axis of said socket being perpendicular to the axis of oscillation of said bar.

13. In a sound box, the combination with a diaphragm, of a stylus bar having a stylus socket, rigid lateral extensions arranged upon opposite sides of said bar and rigid therewith, and yielding supports for said bar secured to said extensions and projecting in substantially the same direction therefrom, the longitudinal axis of said socket and the axis of oscillation of said bar being in the plane of the diaphragm.

14. In a sound box, the combination with a diaphragm, of a fixed member, a stylus bar spaced therefrom and provided with a stylus socket and spaced flat spring connections between the said fixed member and the stylus bar, said stylus bar being so arranged that the longitudinal axis of its outer end and its axis of oscillation are in the plane of the diaphragm.

15. In a sound box, the combination with a diaphragm, of a fixed member, a stylus bar spaced therefrom and provided with an offset and a stylus socket, and spaced flat springs connecting the said fixed member and said stylus bar, the longitudinal axis of said socket and the axis of oscillation of the said bar being in the plane of the diaphragm.

16. In a sound box, the combination with a diaphragm, of a fixed member, a stylus bar spaced therefrom and provided with an offset and with lateral extensions, and yielding connections extending toward the plane of the diaphragm between the said lateral extensions and the said fixed member, the axis of oscillation of said stylus bar being substantially in the plane of the diaphragm.

17. In a sound box, the combination with a diaphragm of a fixed member provided with a recessed edge, a stylus bar spaced therefrom and provided with an offset extending within said recess but spaced from said fixed member, said stylus bar being further provided with lateral extensions, and yielding connections between the said extensions and the said fixed member, the axis of oscillation of said stylus bar being substantially in the plane of the diaphragm.

18. In a sound box, the combination with a diaphragm, of a fixed member provided with a recessed edge, a stylus bar spaced therefrom and provided with an offset extending within said recess but spaced from said fixed member, said stylus bar being further provided with lateral extensions, and resilient connections between the said extensions and the said fixed member, the axis of oscillation of the stylus bar being substantially in the plane of the diaphragm.

19. In a sound box, the combination with a diaphragm, of a fixed member, a stylus bar spaced therefrom and provided with an offset and with lateral extensions, and flat spring connections extending transversely of said bar and substantially perpendicular to the diaphragm between the said lateral extensions and the said fixed member, the axis of oscillation of said stylus bar being substantially in the plane with the diaphragm.

20. In a sound box, the combination with a diaphragm, of a fixed member, a stylus bar spaced therefrom and provided with an offset, and with a stylus socket, and lateral extensions, and yielding connections between the said lateral extensions and the said fixed member, the longitudinal axis of said socket and the axis of oscillation of said bar being substantially in the plane of the diaphragm.

21. The combination in a sound box of a diaphragm, a fixed member provided with a recessed edge, a stylus bar spaced therefrom and provided with an offset extended within said recess but spaced from said fixed member, said stylus bar being further provided with a stylus socket and lateral extensions, and yielding connections between said extensions and the said fixed member, the longitudinal axis of said socket and the axis of oscillation of said bar being substantially in the plane of the diaphragm.

22. The combination in a sound box of a diaphragm, a fixed member provided with a recessed edge, a stylus bar spaced therefrom and provided with an offset extended within said recess but spaced from said fixed member, said stylus bar being further provided with a stylus socket and lateral extensions, and yielding connections between said extensions and the said fixed member, the longitudinal axis of said socket and the axis of oscillation of said bar being substantially in the plane of the diaphragm, and said springs being arranged in a plane perpendicular to the plane of the diaphrgam, and in a plane of the axis of oscillation of the stylus bar.

23. In a sound box, the combination of a stylus bar, a fixed member constructed of laminations to form spaced slots, and flat springs secured in said slots and to said stylus bar to form a support for said bar.

24. In a sound box, a fixed member, a stylus bar having extensions formed of laminations arranged to form slots, and spaced flat springs secured in said slots and con-

nected to said fixed member to support said bar.

25. In a sound box, a diaphragm, a stylus bar having one end thereof in acoustic contact with said diaphragm and spaced springs projecting in substantially the same direction substantially perpendicular to the diaphragm upon which said stylus bar is supported upon the sound box casing, said stylus bar being located substantially midway between said springs in a plane at right angles to the plane of the said springs, said springs being free to bend but held against torsion and said bar being restrained to oscillate upon a substantially fixed axis.

26. In a sound box, a diaphragm, a stylus bar having one end thereof in acoustic contact with said diaphragm, and spaced springs located on opposite sides of said stylus bar projecting in the same direction, upon which said stylus bar is supported upon the sound box casing, the said stylus bar being located in a plane at right angles to the plane of the said springs, said springs being free to bend but held against torsion and said bar being restrained to oscillate upon a substantially fixed axis.

27. The combination with a sound box, of a diaphragm, spaced springs connected with said casing and projecting in the same direction therefrom, and a stylus bar having one end thereof in acoustic contact with said diaphragm, said stylus bar having a stylus socket, and being mounted between and upon said springs, the longitudinal axis of said socket being at right angles to the axis of oscillation of said bar.

28. In a sound box, a stylus bar having a stylus socket, and spaced yielding members forming the sole support of said bar extending transversely of said bar, the longitudinal axis of the said socket being perpendicular to the axis of oscillation of the bar.

29. In a sound box, the combination with a fixed member, of a diaphragm, a stylus bar having a stylus socket, and spaced yielding members forming the sole support for said bar, the longitudinal axis of said socket and the axis of oscillation of the stylus bar being substantially in the plane of the diaphragm.

30. In a sound box, the combination with a fixed member, of a diaphragm, a stylus bar having a socket, and spaced yielding members forming the sole support for said bar, the longitudinal axis of the said socket and the axis of oscillation of the stylus bar being substantially in line with the plane of the diaphragm, and the longitudinal axis of the socket being in a plane perpendicular to the axis of oscillation.

31. In a sound box, a diaphragm, a stylus bar, having one end thereof in accoustic contact with said diaphragm and having a longitudinal stylus socket, spaced yielding members projecting in the same direction from said stylus bar between which said stylus bar is located and upon which it is supported upon the sound box, the point of contact between the stylus bar and diaphragm and the axis of said socket being in alinement in a plane at right angles to the plane of the diaphragm, substantially midway between said springs.

32. In a sound box, the combination with a diaphragm, of a stylus bar phonetically connected thereto and provided with rigid lateral extensions, and spaced flat springs oblong in transverse section connected to said extensions and forming the sole support for said stylus bar, said bar being movable about a substantially fixed axis only.

33. In a sound box, the combination with a diaphragm, of a stylus bar phonetically secured thereto, and spaced spring members oblong in cross section and holding each other against torsion forming the sole support for said bar, said bar being movable about a substantially fixed axis only.

34. In a sound box, the combination with a fixed member, of a diaphragm, a stylus bar spaced from said fixed member and phonetically connected to said diaphragm, and spaced yielding members extending transversely of said bar and toward the plane of said diaphragm connecting said fixed member and said bar, said bar being movable about a substantially fixed axis only.

35. The combination with a rigid member, of a stylus bar, and yielding means connecting said stylus bar to said rigid member, said stylus bar being restrained to oscillate upon a substantially fixed axis.

36. The combination with a rigid member, of a stylus bar, and yielding means connecting said rigid member and said bar and forming the sole support for said bar, said bar being restrained to oscillate upon a substantially fixed axis.

37. The combination with a stylus bar, of spaced yielding members forming the sole support thereof, said members being free to bend but held against torsion and said bar being restrained to oscillate upon a substantially fixed axis.

38. The combination with a stylus bar, of spaced yieldifig members free to bend but held against torsion forming the sole support of said bar, and restraining said bar to oscillate upon a substantially fixed axis, each of said yielding members being fixed at one end and free to yield at its other end and connected at its free end to said stylus bar.

39. The combination with a sound box casing and a stylus bar, of yielding means for attaching said stylus bar to said casing, means mounted upon the casing for rendering one end of said yielding means rigid, means carried by the stylus bar for render-

ing the other end of said yielding means rigid, the said means for holding the ends of said yielding means rigid being spaced apart from each other for only a sufficient distance as will allow the said stylus bar to oscillate without effecting an actual engagement of said means for holding said ends rigid.

40. The combination with a stylus bar provided with rigid lateral extensions, of yielding members connected to said extensions and extending transversely of said extensions, forming the sole support for said stylus bar, said stylus bar being restrained to oscillate upon a substantially fixed axis.

41. The combination with a stylus bar provided with rigid lateral extensions, of yielding members connected to said extensions and extending transversely of said extensions, and transversely of said stylus bar forming the sole support for said stylus bar, said stylus bar being restrained to oscillate upon a substantially fixed axis.

42. The combination with a stylus bar, of a fixed member constructed of laminations to form space slots, and yielding members secured in said slots and to said stylus bar to form a support for said bar.

43. The combination with a stylus bar, of a member constructed of laminations to form a slot, and a yielding member secured in said slot and forming a support for said bar.

44. The combination with a stylus bar of spaced yielding members forming the sole support of said bar, said members being free to bend but held against torsion, and said bar being restrained to oscillate upon a substantially fixed axis.

45. The combination with a support, of a supporting member, attaching means detachably connecting said support, and said supporting member, yielding means, means independent of said attaching means for securing said yielding means to said supporting member, and a stylus bar secured to said yielding means.

46. The combination with a support, of a supporting member, attaching means detachably connecting said support and said supporting member, spaced yielding members, means independent of said attaching means for securing said yielding members to said supporting member and a stylus bar secured to said yielding members.

47. The combination with a member having a pair of spaced rigid arms rigid therewith, of a stylus bar projecting in the space between said arms and a yielding connection between each of said arms and said stylus bar.

48. The combination with a stylus bar, of spaced yielding members free to bend but held against torsion, each of said members being fixed at one end and free at its opposite end and said members being connected at their free ends to said stylus bar.

49. The combination with a stylus bar, of spaced yielding members free to bend but held against torsion, each of said members being fixed at one end and free at its opposite end and said members being connected at their free ends to said stylus bar forming the sole support of said bar.

50. The combination with a stylus bar, of spaced yielding members free to bend but held against torsion, each of said members being fixed at one end and free at its opposite end and said members being connected at their free ends to said stylus bar forming the sole support of said bar and restraining said bar to oscillate upon a substantially fixed axis.

In witness whereof I have hereunto set my hand this seventh day of February, A. D. 1907.

ELDRIDGE R. JOHNSON.

Witnesses:

ALSTON B. MOULTON,

HARRY COBB KENNEDY.

Corrections in Letters Patent No. 951,127.

It is hereby certified that in Letters Patent No. 951,127, granted March 8, 1910, upon the application of Eldridge R. Johnson, of Merion, Pennsylvania, for an improvement in "Sound-Boxes for Talking-Machines," errors appear in the printed specification requiring correction as follows: Page 4, line 28, after the word "box" the word *casing* should be inserted; same page, line 54, before the word "socket" the word *stylus* should be inserted; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of April, A. D., 1910.

[SEAL.]

C. C. BILLINGS,

*Acting Commissioner of Patents.*

ing the other end of said yielding means rigid, the said means for holding the ends of said yielding means rigid being spaced apart from each other for only a sufficient distance as will allow the said stylus bar to oscillate without effecting an actual engagement of said means for holding said ends rigid.

40. The combination with a stylus bar provided with rigid lateral extensions, of yielding members connected to said extensions and extending transversely of said extensions, forming the sole support for said stylus bar, said stylus bar being restrained to oscillate upon a substantially fixed axis.

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46. The combination with a support, of a supporting member, attaching means detachably connecting said support and said supporting member, spaced yielding members, means independent of said attaching means for securing said yielding members to said supporting member and a stylus bar secured to said yielding members.

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50. The combination with a stylus bar, of spaced yielding members free to bend but held against torsion, each of said members being fixed at one end and free at its opposite end and said members being connected at their free ends to said stylus bar forming the sole support of said bar and restraining said bar to oscillate upon a substantially fixed axis.

In witness whereof I have hereunto set my hand this seventh day of February, A. D. 1907.

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