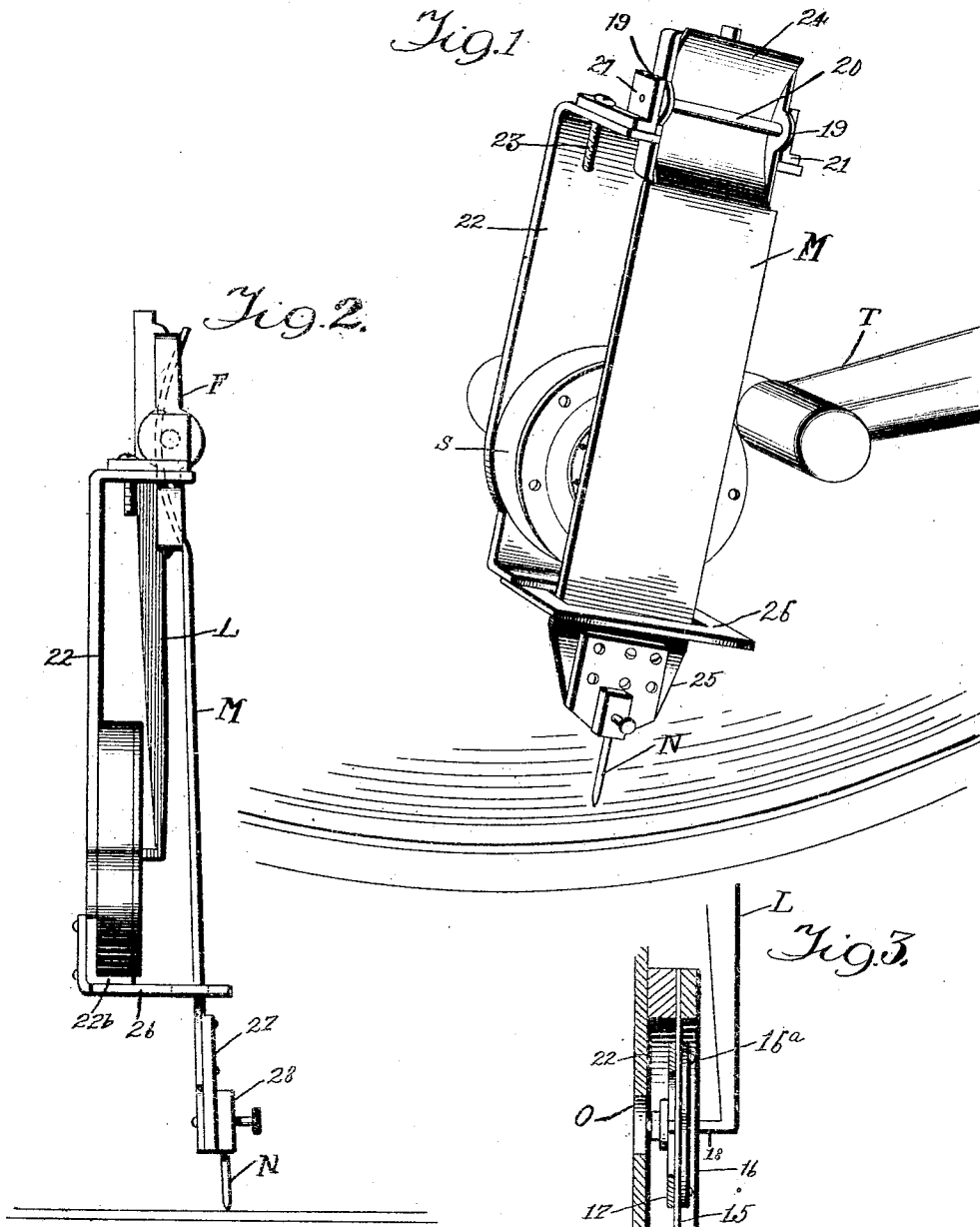


J. W. KAUFMANN.  
 REPRODUCER FOR TALKING MACHINES.  
 APPLICATION FILED AUG. 22, 1919.

1,367,979.

Patented Feb. 8, 1921.  
 3 SHEETS—SHEET 1.



WITNESSES  
*George C. Meyer.*  
*C. S. Jones.*

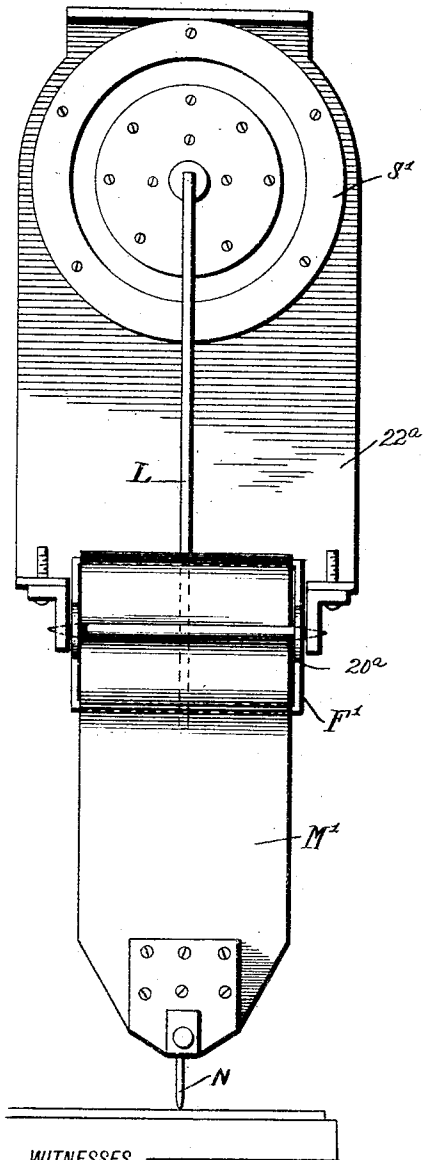
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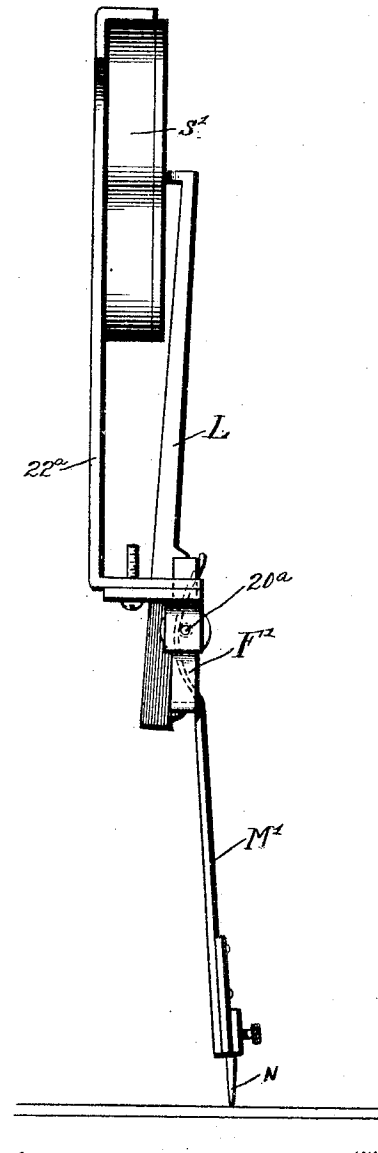
Fig. 5.



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Fig. 4.



INVENTOR

*J. W. Kaufmann.*

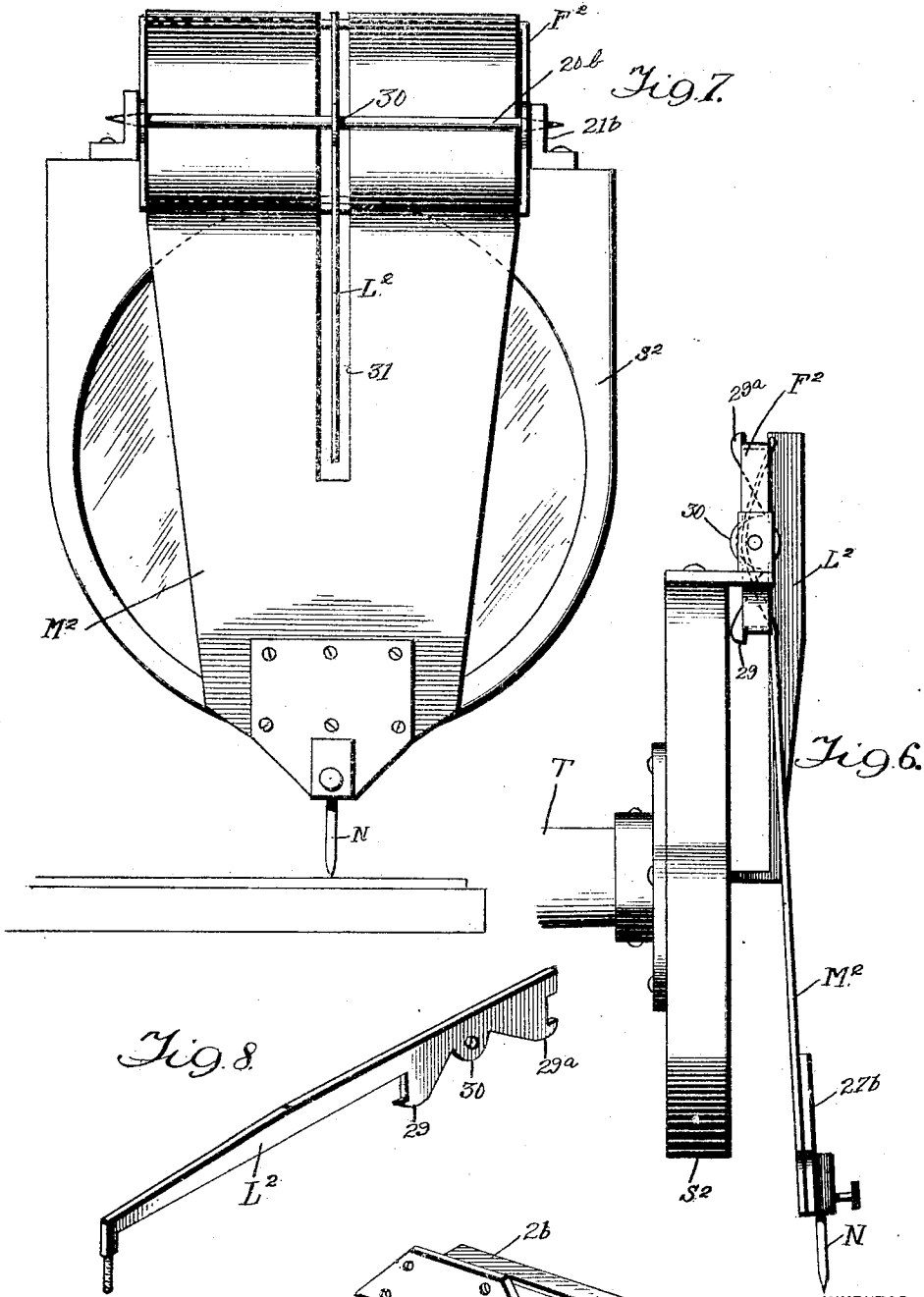
BY *Munroe Hooper*

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 3 SHEETS—SHEET 3.



WITNESSES  
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*E. J. Druel*

*Fig. 9.*

INVENTOR  
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# UNITED STATES PATENT OFFICE.

JOHN WILLIAM KAUFMANN, OF BALTIMORE, MARYLAND.

## REPRODUCER FOR TALKING-MACHINES.

1,367,979.

Specification of Letters Patent.

Patented Feb. 8, 1921.

Application filed August 22, 1919. Serial No. 319,152.

*To all whom it may concern:*

Be it known that I, JOHN W. KAUFMANN, a citizen of the United States, and a resident of the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Reproducers for Talking-Machines, of which the following is a specification.

My invention relates to reproducers for talking machines and it contemplates certain improvements in my Patent No. 1,354,197, dated September 28, 1920.

It is a purpose of my invention to provide a reproducer in which the resilient member between the needle and the diaphragm is mounted to materially increase its responsiveness to the vibrations of the needle and to amplify such vibrations by allowing the use of resilient members of greater rigidity. It is also a purpose of my invention to provide a reproducer which can be used on records having vertical undulations as well as those formed with horizontal undulations.

I will describe three forms of reproducers embodying my invention and will then point out the novel features thereof in claims.

In the accompanying drawings:

Figure 1 is a perspective view of one form of reproducer embodying my invention showing the arm in active position upon a record;

Fig. 2 is a view showing in front elevation the reproducer shown in Fig. 1;

Fig. 3 is a vertical sectional view of the sound box shown in the preceding views;

Figs. 4 and 5 are views showing in front and side elevation, respectively, another form of reproducer embodying my invention;

Figs. 6 and 7 are views showing in front and side elevation, respectively, still another form of reproducer embodying my invention;

Figs. 8 and 9 are detail views showing certain parts of the reproducers.

Similar reference characters refer to similar parts in each of the several views.

Referring specifically to the drawings and particularly to the embodiment shown in Figs. 1 to 3, inclusive, T designates a tone arm of the ordinary construction to which is connected in the usual manner a sound box designated generally at S. As shown in Fig. 3, the sound box S is of the ordinary construction, except it is provided with a

diaphragm 15, to one side of which is secured a disk 16, for distributing the vibrations of the diaphragm over a greater area and consequently materially intensifying such vibrations. This effect is obtained by making the disk 16 of such a diameter that it will cover a major portion of the surface of the diaphragm, and such disk being formed of rigid material, it is obvious that when the diaphragm is set into vibration, the vibrations will not be concentrated about the axis of the diaphragm, as is the case in those of the ordinary construction. The disk 16 is secured to the diaphragm 15 by means of rivets 16<sup>a</sup> which extend through the disk and diaphragm and through an annulus 17 disposed upon the opposite side of the diaphragm and of a diameter corresponding to that of the disk. By employing an annulus, the vibrations of the diaphragm are in no way restricted by this member, while, at the same time, it forms a securing means for the disk 16.

As shown in Fig. 3, L designates an actuating lever for the diaphragm 15, and is formed at its lower end with an offset arm 18 which is threaded and extends axially through the disk 16 and diaphragm 15. This arm 18 is secured to the disk in the usual manner.

The upper end of the actuating lever L is rigidly connected to a rockable frame designated generally at F, such frame being of substantially rectangular formation and having the side portions thereof provided with ears 19 for receiving a shaft 20. The shaft 20 is journaled in brackets 21 which are secured to a supporting plate 22 by means of screws 23. In this manner the frame F is capable of rocking movement about the shaft 20 as a center, and because the lever L is rigidly connected thereto, it will be obvious that when the frame is rocked a corresponding movement is imparted to the lever and from there to the diaphragm 15.

As shown in Fig. 3, the supporting plate 22 is provided with an opening 22<sup>a</sup>, to the walls of which the end of the tone arm T is adapted to be connected in any suitable manner, and when the sound box S is secured in proper position upon the plate 22 the axis of the diaphragm 15 will coincide with the opening O so as to properly transmit the sound waves to the tone arm.

M designates a resilient member for trans-

mitting and intensifying the vibrations from a needle N to the actuating lever L, and, as shown in Figs. 1 and 2, such member M comprises an elongated sheet of resilient metal having an upper end 24 and a tapered lower end 25. The upper end 24 of the member M is rigidly secured to the rockable frame F by arranging such portion as shown to advantage in dotted lines of Fig. 2. The lower end 25 of the member M extends through a suitable opening formed in an arm 26 and has secured thereto a plate 27 upon which is fixed a clamp 28 for rigidly supporting the needle N. From this arrangement it will be seen that the member M is formed to vibrate longitudinally and may swing about the shaft 20 as an axis. This arrangement is in contradistinction to that shown and described in the pending application above referred to, and the advantage of this arrangement is to eliminate the pivotal supporting of the member at more than one point, so that the vibrations of the needle N act directly upon the member and without necessitating an actual bending of the member as in my pending application. As a result of this arrangement the member M can be made of stronger and thicker material, thus materially increasing the intensity of the vibrations transmitted by the needle N and, in turn, correspondingly increasing the vibrations of the diaphragm 15. In this way a better reproduction of the undulations in a record is secured both as to volume and clearness of tone.

To prevent accidental striking of the member M during the ordinary use of the reproducer I utilize the arm 26, the walls of the opening formed therein restricting the lateral movement of the member M, as will be readily understood. The arm 26 is secured to the supporting plate 22 and lies contiguous to a rib 22<sup>b</sup> formed on the lower end of the plate 22.

Referring now to Figs. 4 and 5, I have here shown a modification of the reproducer just described wherein the sound box S is arranged at the upper end of the supporting plate 22<sup>a</sup>, while the actuating lever L extends downwardly from the sound box and is connected to a frame F' pivotally mounted upon the supporting plate by means of a shaft 20<sup>a</sup>. It will be obvious from the drawing that the manner of mounting the frame F' upon the supporting plate and the manner in which the actuating lever is connected to the frame is identical to that shown in the first form of my invention. However, in the present embodiment, the resilient member M' instead of overlying the actuating lever L is a continuation of and extends below the actuating lever. The advantage of this arrangement is to permit the use of the reproducer on records

in which the undulations extend horizontally of the record, and wherein the reproducer generally assumes the position shown in Fig. 1. It is also a purpose to permit the reproducer to be used on records in which the undulations extend vertically of the records and wherein it is necessary to arrange the reproducer in a position at right angles to that shown in Fig. 1. It will, therefore, be seen that this form of reproducer is capable of application to any form of tone arm and for reproducing the sound waves in records of both the "Edison" and "Victor" types.

Referring now to Figs. 6 and 7, I have here shown a further modification in which the employment of a supporting plate is eliminated and the frame F<sup>2</sup> is supported upon a shaft 20<sup>b</sup>, which latter is journaled in brackets 21<sup>b</sup> secured directly to the sound box S<sup>2</sup>. In this embodiment of my invention the actuating lever L<sup>2</sup> extends along the outer side of the frame F<sup>2</sup> and is provided on the confronting edge thereof with notched extensions 29 and 29<sup>a</sup> between which is formed a pivot ear 30, as shown in Fig. 8.

As illustrated to advantage in Fig. 7, the pivot ear 30 receives the intermediate portion of the shaft 20<sup>b</sup>, while the extensions 29 and 29<sup>a</sup> receive the upper and lower horizontal portions of the frame F<sup>2</sup>. In this manner the actuating lever L<sup>2</sup> is rigidly connected to the frame F<sup>2</sup> and is pivoted for rocking movement upon the shaft 20<sup>b</sup>, as will be readily understood.

As shown in Fig. 6, the frame F<sup>2</sup> carries a resilient member M<sup>2</sup> which is tapered from its upper end to its lower end and is provided centrally thereof with a slot 31 through which extends the actuating lever L<sup>2</sup>. The upper end of the member M<sup>2</sup> is connected to the frame F<sup>2</sup> in the same manner as in the other forms of my invention, and the lower end of this member is somewhat pointed, as shown in Fig. 7.

Although I have herein described only three forms of reproducer showing my invention, it is to be understood that various changes and modifications may be made without departing from the spirit of the invention and the spirit and scope of the appended claims.

What I claim is:

1. A reproducer comprising a sound box including a diaphragm, a rockable frame, an actuating lever connecting said frame and diaphragm, a resilient member secured to the frame and capable of swinging bodily with said frame, and a needle carried by said member.

2. A reproducer comprising a sound box, a frame rockable upon the sound box, a resilient member rigidly connected to said frame and having a slot formed therein,

and an actuating lever extending through said slot and connected to the diaphragm of said sound box.

3. A reproducer comprising a sound box,  
5 an actuating lever mounted for vibratory movement thereof and connected to the diaphragm of the sound box, a resilient member fulcrumed adjacent one of its ends only and having a rigid connection with said  
10 lever and a needle carried by the member.

4. A reproducer comprising a sound box, an actuating lever depending from said sound box and connected to the diaphragm of the sound box, a pivotally mounted frame  
15 rigidly connected to said lever, a resilient

member depending from and rigidly connected to said frame, and a needle carried by the member.

5. A reproducer comprising, a sound box including a diaphragm, a frame rockably 20 supported upon the sound box, an actuating lever connecting said frame and diaphragm, and a resilient member secured to the frame and slotted to accommodate said lever.

JOHN WILLIAM KAUFMANN.

Witnesses:

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JNO. A. NOLAN.