G. D. ADAMS.

SOUND REPRODUCING MACHINE.

APPLICATION FILED JULY 1, 1919.

1,435,095. Patented Nov. 7, 1922.

Fig. 1.

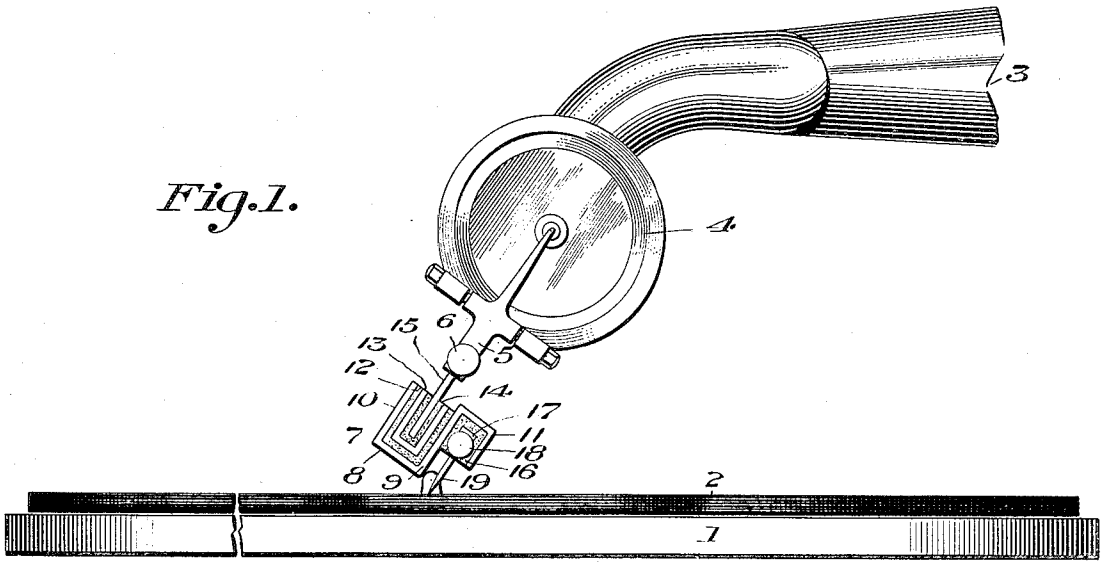


Fig. 2.

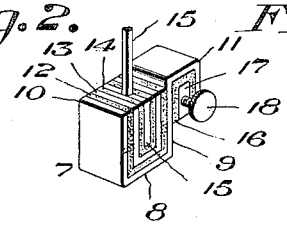


Fig. 3.

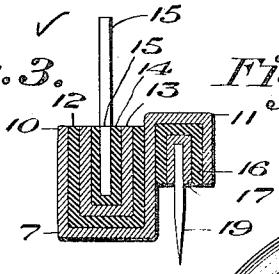


Fig. 4.

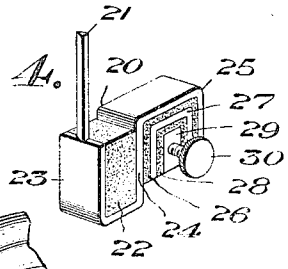


Fig. 5.

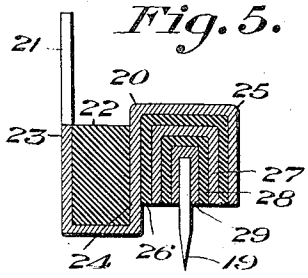


Fig. 6.

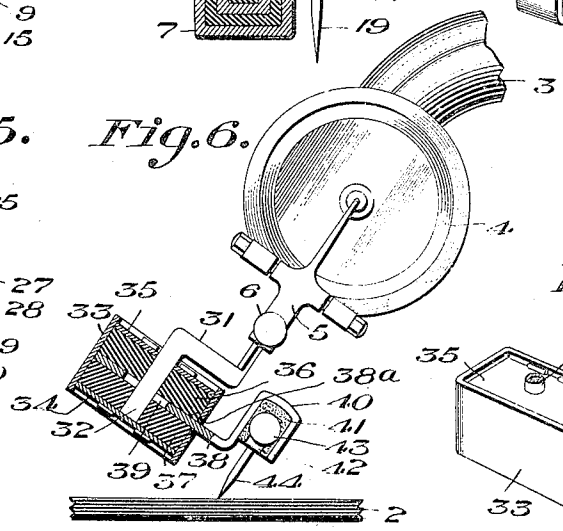


Fig. 7.

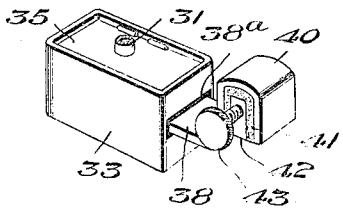
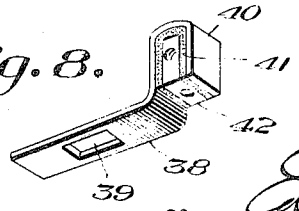


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE D. ADAMS, OF OMAHA, NEBRASKA, ASSIGNOR TO JOE ROTH, OF OMAHA, NEBRASKA.

SOUND-REPRODUCING MACHINE.

Application filed July 1, 1919. Serial No. 307,879.

To all whom it may concern:

Be it known that I, GEORGE D. ADAMS, a citizen of the United States of America, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Sound-Reproducing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to sound reproducing machines, and has more especial reference to a scratch-muffling or absorbing device to be attached thereto.

The object of the invention is to provide a simple, comparatively inexpensive, and effective device to be associated with the sound reproducing structure of the machine for muffling or absorbing the scratching and grinding noises resulting from the contact of the needle with the record as the former traverses the groove in the latter; this result being effected without seriously or undesirably affecting the tones or sounds being reproduced.

A further object of the invention is to provide a device of the kind specified which is adapted to effect a substantial diminution, if not the absolute elimination, of the scratching noise which usually prevails in sound reproducing machines while the needle is traveling in the groove of the record-disk, and, at the same time, to appreciably purify the tone or sound being reproduced.

A still further object within the contemplation of the invention is to provide an attachment for sound reproducing machines having as its primary function the reproduction of the tones in their natural form; this being achieved by eliminating the metallic ring and sound and by rounding out the tones.

A still further object within the contemplation of the invention is to provide an attachment of the kind specified which may be mounted in the usual needle socket of the sound-reproducer and which attachment is so constructed and arranged as to support the needle in a manner that eliminates undesirable vibration of the structure; this result being accomplished by insulating the needle from the reproducer by one or more scratch-absorbing or cushioning elements, whereby the grinding and scratching noises usually heard in talking machines—by reason of the traveling contact of the needle in the sound groove—are substantially diminished and, in many instances, entirely eliminated without undesirable modulation of the tone or sound being reproduced.

With these and other objects in view, the invention involves the employment of the instrumentalities, means, members and elements, and the operative aggroupment of these, as hereinafter specified and described. However, I wish it to be understood that the invention is not restricted to the three embodiments herein disclosed, since it is susceptible of varied embodiment and, thus, the exemplified structures herein illustrated are capable of a wide range of modification and variation without departing from the spirit of the invention or sacrificing any of the salient features, advantages, and underlying principles thereof.

In the accompanying drawings, which are intended to be merely illustrative of possible embodiments of the invention:

Figure 1 is a fragmentary view in elevation of a portion of a tone arm, its associated reproducer, and my attachment applied thereto;

Fig. 2 is a view in perspective of the attachment,

Fig. 3 is a view in central vertical section thereof;

Fig. 4 is a view in perspective of a modified type of structure;

Fig. 5 is a view in central vertical section thereof;

Fig. 6 is a view, partly in elevation and partly in central vertical section, of a third embodiment of the invention attached to the reproducer of a talking machine;

Fig. 7 is a view in perspective of this third embodiment; and

Fig. 8 is a view in perspective of a needle supporting arm forming a component of the attachment of this third embodiment.

Referring to the drawings, and to Figs. 1, 2 and 3, the reference numeral 1 designates the usual record disk or plate, upon which is mounted a record 2 in the usual manner. Overlying the record 2 is a tone arm 3 of usual construction for supporting a sound box or reproducer 4 also of usual construction, and which includes the usual needle receiving device 5 having a thumb screw 6 threaded thereinto.

My scratch muffler is adapted to be associated with the needle receiving device 5, and

is designated generally by the reference numeral 7: Preferably and as shown in Figs. 1, 2 and 3, it includes a supporting instrumentality or frame 8, comprising a body portion 9, and two angulated portions 10 and 11. As shown, the frame 8 is substantially S-shape, and the outer sections of the angulated portions are disposed in substantial parallelism with the body portion 9. In the angulated portion 10, and lying against its inner walls and against the inner wall of the body portion 9 is a cushioning or scratch absorbing element 12, preferably made of resilient material, such as rubber, cork, fiber or the like. The element 12 is held in position by a confining member 13, preferably of some rigid material, such as metal. Embraced by this confining member is another resilient, scratch absorbing element 14, made of a material similar to that of the element 12. Embraced by the resilient member 14 is a reproducer-connecting member 15, preferably of metal, and adapted to be inserted in the usual needle holder socket of the device 5, and rigidly held therein by the screw 6.

The angulated portion 11 is adapted to embrace a scratch absorbing or cushioning element 16, made of some resilient material, such as that described with reference to the resilient element 12. This element 16 encompasses a needle holding member 17 in which is threaded a needle holding screw 18 adapted to secure a needle 19 in the holder 17.

From the foregoing, it will be observed that the needle holder 17 is insulated and cushioned from the metallic portion 11 of the frame 8; and that, likewise, the reproducer connecting member 15 is insulated and cushioned from the element-confining member 13 by the resilient element 14, while the member 13 is, itself, insulated and cushioned from the metallic portion 10 of the frame 8. In consequence, the needle 19 is, by a series of cushioning elements, insulated from the needle holding device 5, such that mechanical vibrations produced on the needle 19 by the record 2 are absorbed and prevented from being transferred to or translated into the sound box 4. As a result, the scratching and grinding noises incident to the travel of the needle 19 in a groove in the record 2 are effectively absorbed by the resilient elements 16, 12 and 14 and are thereby substantially if not entirely eliminated, in consequence of which nothing but the true and purified tone or sound being reproduced is transferred into the sound box and thereby reproduced, and this without undesirable modulation of the tone or the loss of tone qualities.

As shown in Fig. 1, for instance, the attachment is so supported in the reproducer that it shall always be maintained in a defined relation to the axis of the record; hence, it arches the record from the outside portion thereof all the way into its axis. This is in order that the needle carried by the attachment shall travel at the proper angle with reference to the record-groove and in proper operating relation to the diaphragm of the reproducer.

In Fig. 4, I have shown a modified form of structure: This includes a frame or supporting instrumentality 20 of a construction somewhat like that of the preferred embodiment of Figs. 1, 2 and 3, except that the reproducer connecting element 21, in this instance, is integral with the frame, in consequence of which I interpose a block 22 of resilient material between the angulated element-holding portion 23 of the frame and the body portion 24 thereof. The oppositely-formed, angulated element holding portion 25 of the frame 20, in this instance, embraces a layer of resilient material 26 and this in turn is held by a confining member 27, of angular construction to encompass a second layer 28 of resilient material, within which is seated a needle holder 29 into which a needle holding screw 30 is threaded. In this particular exemplification of the invention, a plurality of cushioning or scratch absorbing elements are disposed in the part of the supporting frame which sustains the needle holder; whereas, in the embodiment of Figs. 1, 2 and 3, the plurality of cushioning elements is disposed in the part of the supporting instrumentality in which the reproducer connecting member is secured. In practice, I have found in some instances that it is advantageous to insulate the reproducer connecting member from the frame 8 in a larger measure than is the insulation of the needle holder from the frame; but, in both of these instances, the needle 19 is, by a series of the insulating elements, effectively cushioned from the needle holder 5.

In Figs. 6, 7 and 8, I have shown a third embodiment: This includes a reproducer connecting member 31 which, preferably and as shown, is angulated to provide a stem 32 connected to project into a casing or housing 33 and being adapted therein to confining washers 34 and 35, between which are disposed resilient elements 36 and 37. Interposed between the resilient elements 36 and 37 is an arm 38 provided with an aperture 39 of larger diametral dimensions than those of the stem 32 so that said arm is maintained out of contact with the stem at all times. This arm projects from the housing 33 and is angulated to provide a support 40 in which a layer of scratch absorbing material 41 is disposed and which embraces a needle holding member 42 carrying a needle holding screw 43. In this third embodiment of the invention, the housing 33 and the arm 38 constitute a

frame, and operate as the equivalent of the frame 8 of Fig. 1 and of the frame 20 of Fig. 4. In this instance, the arm 38 will have a certain amount of vibratory movement relative to the casing 33, but such movement will be more or less absorbed by the cushioning elements 36 and 37 so that only the purified tone is transmitted from the needle 44 to the needle holding device 5. Encompassing the arm 38, at a point thereon adjacent to the end of the casing 33, is an insulating element 38ª, the purpose of which is to insulate the arm 38 from the casing and thereby prevent the arm, during its vibration, from contacting with the casing. The flexibility also provided by the resilient elements in the action of the needle on the record tends to preclude wear of the record and, thus, prolongs the life thereof.

From the foregoing, it will be observed that I have provided an efficient device for completely removing metallic grind and scratch developed by the direct contact of the metal needle with the record, and with incidental cushioning members provided by the resilient elements described, the tendency of the device is to purify the tones. By reason of the manner of operatively relating the needle to the sound box, it is found that a record having either the laterally-cut groove, or one with the hill-and-dale groove may be used without necessitating the changing of the position of the reproducer arm of the machine.

In practice, I have found that copper tends to clarify vibrations more than other metals; in consequence, I prefer to make the attachment, in most of its parts, of that metal. The needle holder may, however, be made of soft brass. The resilient elements, as already explained, may be made of various materials; but comparatively soft rubber has been found in practice to produce the best results. In thus specifying these materials, I do not, however, wish to limit myself thereto except in so far as such limitations may be expressed in the appended claims.

What I claim is:—

1. A muffler-device for talking machines, including a supporting-instrumentality, a needle-holder member associated therewith, a reproducer-connecting member sustained by the supporting-instrumentality, and a resilient member associated with the supporting instrumentality and with one of said members and insulating one from the other, the axes of the holder and the connecting-member normally occupying relatively different spaced-apart planes.

2. A muffler-device for talking machines including a reproducer-connecting member, a supporting instrumentality associated therewith and sustained thereby, a needle-holding member associated with and sustained by the instrumentality and having its axis disposed in a relatively different plane from that of the connecting-member, and an insulating element interposed between the exterior wall of one of said members and the interior wall of the instrumentality whereby that member is insulated from the instrumentality.

3. A muffler-device for sound-reproducing machines including a suporting-instrumentality comprising a body-portion and a plurality of oppositely-disposed element-holding portions, each angulated to the body-portion, a reproducer-connecting member associated with one of the angulated portions, a needle-holder associated with another of the angulated portions, the angulated portions constituting a plurality of supports for maintaining the connecting-member and holder in spaced-apart relation, and a resilient element mounted in one of the angulated portions and in association with said holder and connecting-member for absorbing vibrations transmitted from said holder and through said member.

4. A muffler-device for sound-reproducing machines including a supporting-instrumentality comprising a body-portion and a plurality of angulated element-holding portions, a reproducer-connecting member associated with one of the element-holding portions, a needle-holding member associated with another of the angulated portions, and vibration-cushioning means disposed against the wall of the supporting-instrumentality and in association with at least one of said members.

5. A scratch-muffling device for sound-reproducing machines including an angulated supporting-instrumentality comprising two element-holding portions, a reproducer-connecting member associated with one of said portions, a needle-holding member associated with the other portion, and a muffling-element in insulating association with the holding-member and sustained by the supporting-instrumentality.

6. A scratch-muffling device for sound-reproducing machines including an angulated supporting-instrumentality comprising a plurality of element-holding portions, a reproducer-connecting member associated with one of said portions, a needle-holding member associated with another portion, a cushioning element associated with the holding-member and confined between it and the supporting-instrumentality.

7. A scratch-muffling device for sound-reproducing machines including an angulated supporting-instrumentality comprising two element-holding portions, a reproducer-connecting member associated with one of said portions, a needle-holding member associated with the other portion, the connecting member and holder being sustained by the

instrumentality in spaced-apart relation, a muffling-element associated with the holding-member and confined between it and the supporting-instrumentality, and a needle secured in the holding member and extending in a direction approximately opposite to that of the connecting member.

8. A scratch-muffling device for sound-reproducing machines including a supporting-device having angulated portions in substantial parallelism with each other, a reproducer-connecting member associated with one of said portions, a needle-holding member associated with another of said angulated portions, a muffling-element sustained by the device and associated with one of said members, and an element-separating member in contact with said muffling-element.

9. A scratch-muffling device for sound-reproducing machines including a supporting instrumentality having a plurality of angulated element-holding portions extending therefrom in opposite directions, muffling means sustained by the instrumentality, an element-confining device associated with the muffling means, a reproducing connecting member also associated with the supporting instrumentality and muffling means, a needle holder associated with and sustained by the supporting instrumentality, and a needle-engaging screw threaded into the holder.

10. The combination with a sound-reproducing machine of an attachment associable therewith and comprising a supporting instrumentality including a plurality of element-holding portions occupying relatively different spaced-apart planes, a connector-member associated with one of said holding-elements, a needle holder associated with another of said holding-elements, and a resilient element in engagement with the instrumentality and cushioning the holder from the supporting instrumentality.

11. A scratch-muffling device for sound-reproducing machines including an approximately S-shaped supporting instrumentality, a connector-member associated with one portion thereof, a needle-holder associated with another portion of the instrumentality, and a muffling-element associated with and sustained by the instrumentality; said holder and connector-member normally occupying a spaced-apart relation.

12. A scratch-muffling device for sound-reproducing machines including a needle-holding member, a connector-member, a supporting instrumentality having a plurality of angulated portions for sustaining said members in spaced-apart relation and in relatively different planes and a cushioning element disposed between the supporting instrumentality and one of said angulated portions and functioning to absorb vibrations transmitted from the holding member.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE D. ADAMS.

Witnesses:
FRANCES JOHNSON,
W. R. SCOTT.