Nov. 8, 1932. W. A. HENDERSON 1,887,021

IMPROVEMENT IN REPRODUCING SOUND FROM RECORDS TRACKED BY A STYLUS

Filed Oct. 4, 1930

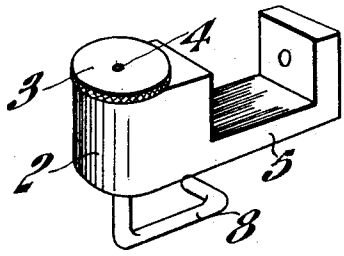


Fig. 1.

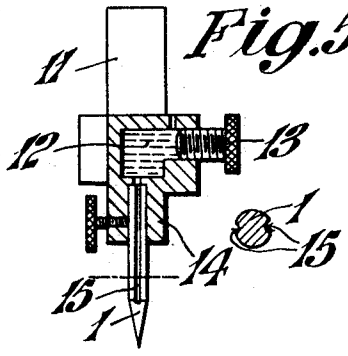


Fig. 5.

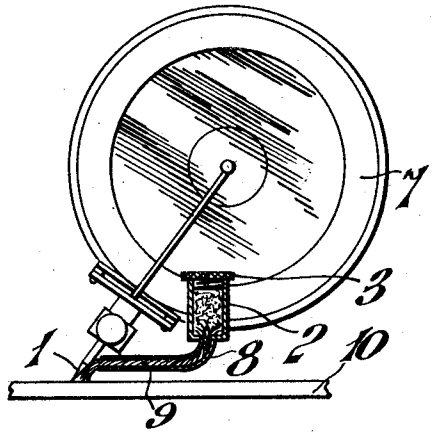


Fig. 2.

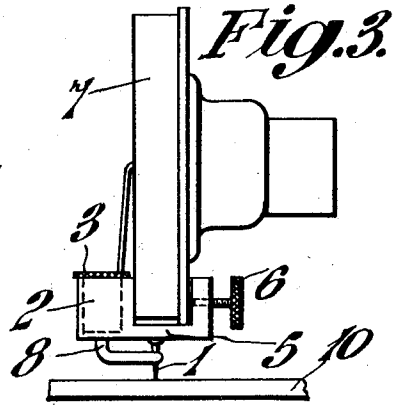


Fig. 3.

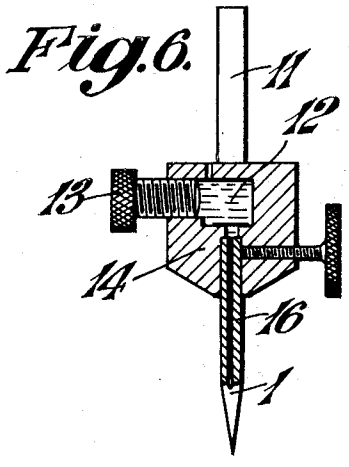


Fig. 6.

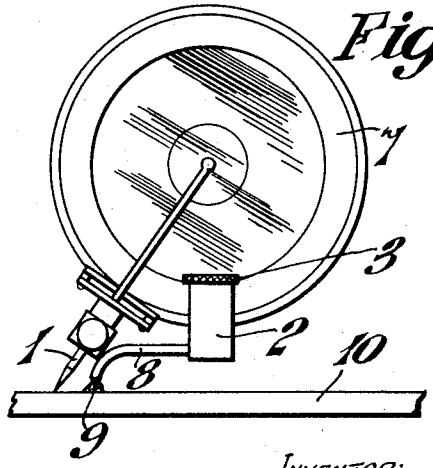


Fig. 4.

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Patented Nov. 8, 1932 1,887,021

UNITED STATES PATENT OFFICE

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IMPROVEMENT IN REPRODUCING SOUND FROM RECORDS TRACKED BY A STYLUS

Application filed October 4, 1930, Serial No. 487,259, and in Great Britain October 5, 1929.

This invention relates to apparatus for reproducing sound from engraved records, for instance gramophones or electric relay pick up devices for use in conjunction with sound records in which a needle or its equivalent engages a sound record track. One of the greatest objections to such apparatus as at present employed is the necessity to repeatedly replace the needle or its equivalent and/or the rapid deterioration of the record by reason of the wear due to the friction of the needle. Particularly is it desirable to remove this objection in connection with what are commonly called "talkies", i. e. cinematograph pictures projected simultaneously with appropriate sound, when the sound is obtained by a mechanical device employing a record track engaged by a needle of a sound box or a thermionically relayed needle pick up device. The object of this invention is to remove or reduce these objections and also to improve the purity of the sound reproduced.

Broadly my invention is characterized by the provision of means for supplying a friction absorbing or reducing medium to the point of the needle or its equivalent and/or to the sound track.

Briefly my invention can be said to consist in utilizing a device for supplying a liquid having a low friction coefficient to the free end of the needle or its equivalent during the travel of the record whereby a restricted film of lubricating liquid is maintained at the needle point.

I have found by experiment that if the needle of a gramophone sound box is supplied with a very fine film of lubricating oil of low viscosity, for instance the best engine lubricating oil, so that the oil trickles almost imperceptibly on to the sound record track, the wear on the needle and on the record is practically negligible, and the same needle can be employed without loss of tone values repeatedly over a long period, likewise the record does not deteriorate or become worn to a perceptible degree.

The lubricating oil can be supplied along the needle or to a point immediately in advance of the needle on the record, and any suitable device may be employed for this purpose. For instance the needle can be supported in a stylus bar or a holder constructed after the fashion of a small stylus fountain pen, in which a small tubular body accommodates a charge of oil which trickles in an exceedingly fine quantity to the tip of the needle, it being well known that the flow of oil will cease when there is a cessation of relative movement between the contacting needle and record.

The needle may be specially constructed so that it has a restricted central bore terminating at its lower end in a lateral opening near the point of the needle, the oil flowing along the needle from any suitable source of supply, for instance a small reservoir shaped to receive the needle and to be connected to the stylus bar of sound box or the armature or needle holder of a pick-up device.

If desired the lubricating oil can be supplied from a reservoir attached to the sound box or pick-up device and supplying the oil to the zone of the needle tip, for instance on to the record immediately in advance of the needle, or as an exceedingly fine trickle on to the exterior of the needle near its point.

In order that my invention may be clearly understood and readily carried into effect, I have appended hereto a sheet of drawings illustrating embodiments thereof and wherein,

Fig. 1 is a perspective view of an adaptor for attachment to a gramophone sound box for supplying the oil to the needle.

Fig. 2 is a part sectional side elevation view showing the device in use.

Fig. 3 is one rear elevation view of Fig. 2.

Fig. 4 is a side elevation view showing the invention as applied to a device for applying the oil directly to the record.

Figs. 5 and 6 show the use of oil passages in the needles of "pick up" devices or gramophone sound boxes.

Referring to the drawing, in Figs. 1, 2 and 3, I have shown a small cylindrical oil reservoir 2, closed by a screw cap 3 preferably having a milled periphery and if desired formed with a restricted air vent 4. This reservoir is carried by a U shaped bracket 5 which by means of a set screw 6 can be adjust-

ably clamped to the periphery of the sound box 7.

The base of the reservoir has extending from it a tube 8 the free end of which is located in juxtaposition to the needle 1. A capillary wick 9 fills the tube 8 and extends beyond each end of it, one end engaging the needle 1 as shown in Fig. 2. By this means a continual supply of oil at a slow rate is fed to the needle 1 and trickles to the point of the needle. In practice the tube 8 and wick 9 will be as restricted in diameter as practical to ensure a very slow feed.

If desired, the oil may be fed on to the record 10 just in advance of the needle 1 as shown in Fig. 4, in which event the tube 8 with its projecting wick 9 shaped as a brush will be directed towards the record, the brush shaped end of the wick 9 engaging the record.

In Fig. 5 I have shown the armature 11 of a "pick-up" device fitted with an oil reservoir 12 and a filling hole normally closed by a screw 13, the reservoir having a depending socket adapted to receive the needle 1 which is formed with one or more longitudinal grooves 15 along which the oil from the reservoir travels very slowly so as to accumulate on and trickle from the needle point. In Fig. 6, a similar arrangement is shown but in which instead of the channel or channels 15 the needle is formed with a restricted central bore 16 leading to the side of the needle point.

If desired the sound box of a gramophone or the like can be specially constructed to store the lubricating oil, for instance by fitting into the tubular neck of the sound box a mica or other suitable disc to prevent oil from flowing along the tone arm, the interior of the sound box being filled with oil, and a suitable conduit conveying the oil to the needle.

The use of lubricating oil in the manner proposed does not injure the record, and in fact I find with the normal type of gramophone record the reverse applies, as the oil improves the record and its tonal value.

My invention is useful in connection with cinematograph picture projection employing engraved sound records for reproducing appropriate sounds, because at present considerable inconvenience arises out of the necessity to fit a new needle for each record and to replace the record after a few uses.

What I claim is:—

1. In sound reproducing apparatus in which sound is reproduced by tracking a record with a needle a reservoir for lubricating oil and a restricted passage leading from said reservoir to the point of the needle.

2. In a sound reproducing apparatus in which sound is reproduced by tracking a record with a needle a reservoir for lubricating oil and a restricted passage leading from said reservoir to the point of the needle, said passage comprising a restricted bore or channel along the needle.

3. In sound reproducing apparatus in which sound is reproduced by tracking a record with a needle a reservoir for lubricating oil and a restricted passage leading from said reservoir to the point of the needle, a socket formed with said reservoir adapted to receive the needle, said socket being in the base of the reservoir.

4. In sound reproducing apparatus in which sound is reproduced by tracking a record with a needle a reservoir for oil and a small diameter tube leading from it to a point near the needle.

5. In sound reproducing apparatus in which sound is reproduced by tracking a record with a needle a reservoir for oil and a small diameter tube leading from it to a point near the needle, a wick in said tube projecting beyond the tube to a point contiguous to the needle.

6. In sound reproducing apparatus in which sound is reproduced by tracking a record with a needle a reservoir for lubricating oil and a restricted passage leading from said reservoir to the point of the needle, a socket formed with said reservoir adapted to receive the needle, said socket being in the base of the reservoir, and means for readily attaching the reservoir to the sound box of a gramophone.

In witness hereof I have signed this specification.

WILLIAM ARMSTRONG HENDERSON.