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S. B. BATTEY ET AL

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REPEATING MECHANISM FOR TALKING MACHINES

Filed Dec. 5, 1919

Fig. 2.

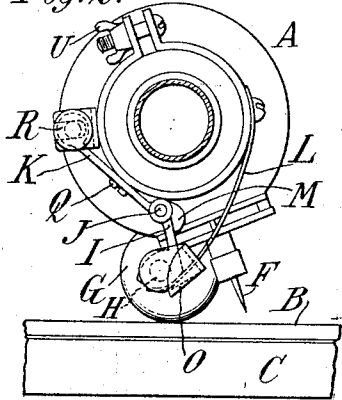


Fig. 1.

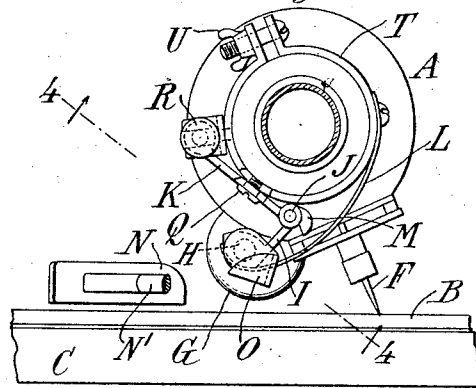


Fig. 3.

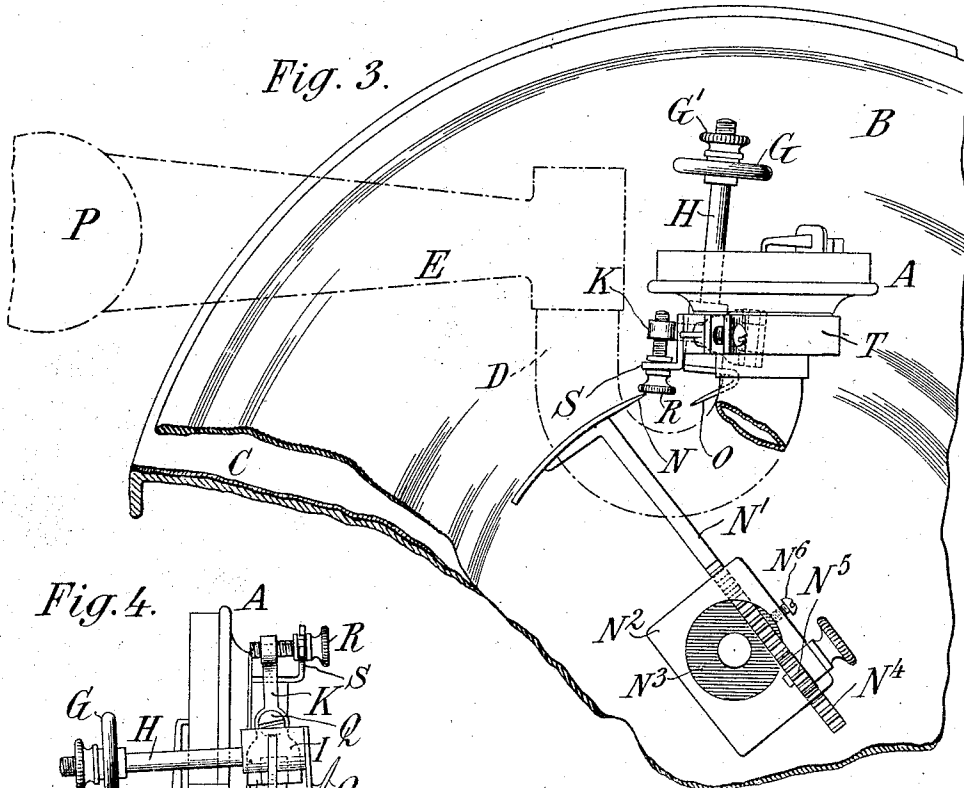


Fig. 4.

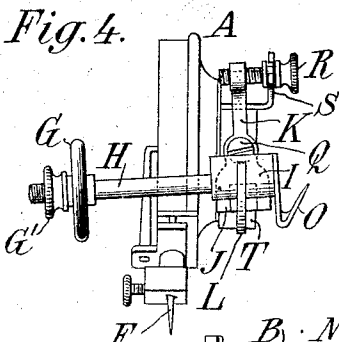
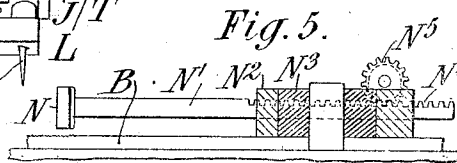


Fig. 5.



INVENTORS:

*Sumner B. Battey*  
*and* *Edwan M. Battey*  
By Attorneys,

*Frazer, Fisher & Wallace*

# UNITED STATES PATENT OFFICE.

SUMTER B. BATTEY AND BRYAN M. BATTEY, OF NEW YORK, N. Y.

## REPEATING MECHANISM FOR TALKING MACHINES.

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This invention relates to repeating mechanism for talking machines and aims to provide certain improvements therein.

Various repeating mechanism for phonographs or the like have been heretofore proposed, but so far as we are aware these have not been successful, due to a variety of causes. According to the present invention, we provide a device of this character which is certain in its operation, which does not involve any possible marring of the record which does not require any superimposed member upon the disk and which is capable of use in connection with records of all sizes.

Our invention introduces what we believe to be a new feature of repeating mechanism construction in the provision of means which is attached to the tone arm or sound box, and which by frictional contact with the face of the record causes the tone arm and sound box to travel laterally from the end of the sound grooves back to the beginning thereof. Such means are preferably so constructed that the lateral travel of the sound box is caused by an oblique arrangement of the moving means with relation to the record; that is to say, the axis of the frictional device is out of parallelism with any of the radii of the record, or in other words, the device itself is arranged with a degree of obliquity to what may be termed a tangent of the circular record. The travel of the record beneath the moving means therefore causes an outward movement of the latter so that it describes a spiral on the face of the record which with a few turns of the latter causes the sound box and tone arm to travel to the requisite starting position.

The invention also includes what we believe to be a new feature of construction, namely, the provision of means for lifting the sound box at the end of its playing travel to a position wherein the needle is out of contact with the record, such means being preferably arranged so that it is normally slightly out of contact with the record, but is moved to contact therewith by a catching or tripping device, and during such movement it elevates the sound box and holds the latter with the needle out of contact when the initial position is restored.

In carrying the invention into effect, we prefer that the frictional device shall be in the form of a small disk made of rubber, felt or other friction material, which is mounted upon the sound box so that it is capable of

swinging to a point below the latter. At the end of the playing movement a tripping mechanism located on the sound box is caught by a device located upon or above the record, thereby causing the wheel to engage the record and lift the sound box, the wheel traveling under the sound box until slightly beyond the pivotal center of the wheel, at which point the needle is sufficiently elevated to permit it to travel to the beginning of the sound grooves without engaging the record.

The invention also includes other features of improvement which will be hereinafter more fully described.

In the drawings, wherein we have shown one embodiment of the invention,—

Figure 1 is an elevation of the rear side of a sound box showing the needle in playing position;

Fig. 2 is a similar elevation after the sound box has been elevated.

Fig. 3 is a plan showing a portion of the record.

Fig. 4 is a view looking to the right in Fig. 3;

Fig. 5 is a sectional view of a detail of the tripping mechanism.

Referring to the drawings, let A indicate the sound box of a phonograph or talking machine of the disk type, B the record and C the turn-table. The sound box is supported upon the usual curved section D of the tone arm, which is pivotally mounted in the straight section E thereof, so that the sound box is capable of swinging upwardly and downwardly, the weight of the sound box being supported by the needle in contact with the record as shown in Figs. 1 and 2. These parts are of any usual construction, numerous examples of which are to be found in the art.

According to the present invention, we provide the sound box (or any portion of the swinging tone arm) with a traveling device capable of frictional engagement with the face of the record, and which is other than the needle F. This frictional traveling device may be stationary or rotative with regard to its supporting means, and may slide or roll upon the face of the record. We prefer, however, to use a rotary device which rolls on the record, such as the friction wheel G. The traveling device of whatever form is so mounted upon the sound box or section D that when brought in con-

tact with the record, or its equivalent, it will, by movement of the record, be caused to travel in a direction which will carry the sound box from the end of the sound record toward the beginning thereof. In the record shown at B it is assumed that the beginning of the sound grooves is at the outer edge thereof, and that the end is toward the center thereof. In records wherein the reverse arrangement is adopted, the sound box will, of course, travel inwardly to reset it in playing position. Assuming, however, that the record B is of the character first described, and is rotating in the direction of the arrow in Fig. 3, it will be observed that the wheel G, being arranged with its axis obliquely to one of the radii of the record, will describe a spiral path which will carry it and the sound box and the tone arm outwardly until the wheel finally rolls off the edge of the record. Assuming that during the travel of the device outwardly to resetting position the needle is elevated as shown in Fig. 2, it will be observed that when the wheel G reaches the periphery of the record, the sound box will be dropped until the needle again engages the record. It will be also observed that because of the fact that the wheel G travels in a spiral path it will roll off the record gradually so that the sound box will be lowered gradually instead of being dropped, thus avoiding a forcible contact of the needle with the record. The same general operation will take place if the wheel G is replaced by a non-rotative member, such as a skid. The wheel G is preferably adjustably mounted upon the shaft as by being mounted on a nut G' which screws snugly in a screw-thread formed upon the shaft. By this means the needle may be adjusted to drop into any predetermined groove or to accommodate different margins on the records.

Having thus described the main feature of operation by which the reverse movement of the sound box is secured, we will now refer more in detail to the means whereby the operation of the traveling member is governed.

Referring to Fig. 3, it will be seen that the wheel or disk G is mounted upon a shaft H. This shaft H is carried upon a hinged section I (Figs. 1 and 2) which is pivoted at J to a plate or bar K. The pivotal mounting of the shaft H hence permits the wheel to assume the position shown in Fig. 1, wherein it is raised out of contact with the record, and wherein the needle F is in playing position, to the position shown in Fig. 2, where the wheel is in contact with the record, and the needle has been raised out of the sound groove. During this movement the sound box and swinging portion D of the tone arm have been elevated, this being permitted by the swivel connection

of the portion D with the portion E of the tone arm. A spring L is provided as best shown in Figs. 1 and 2 which normally tends to keep the wheel G in its elevated position, which position it occupies during the entire playing movement. It is hence inoperative, in the construction shown, until the end of the sound groove is reached.

We provide means whereby when the end of the sound groove is reached, the wheel is swung around its pivotal axis into contact with the record, thereby elevating the sound box. The swinging movement carries the wheel into the position of Fig. 2 where its axis is moved slightly past the pivotal axis J of its hinge, at which point it is arrested by some suitable means, such as the stop M. When this movement is effected, the wheel will maintain its operative position against the action of the spring. This is due to the weight of the sound box which holds the arm I against the stop M. The means we prefer to employ for moving the wheel is best shown in Fig. 3 and comprises a knife edge N carried upon a bar N', which is mounted to slide on the block N<sup>2</sup>, preferably containing a rubber washer N<sup>3</sup> which fits over the stud of the turntable and holds its position on the record by friction. Preferably the bar N' is formed with ratchet teeth N<sup>4</sup> which are engaged by a pinion N<sup>5</sup>, by means of which the knife edge N may be adjusted easily in a direction which is substantially radial to the record, whereby the precise point of operation is adjusted to the ending of the sound groove in the individual record. A screw, or similar device N<sup>6</sup> is preferably arranged in the block N<sup>2</sup> by the adjustment of which the rubber washer N<sup>3</sup> can be compressed both for the purpose of increasing its grip on the central stud and for the purpose of producing a frictional hold on the ratchet bar N'. The holding of the knife edge member by the rubber washer is important, since a firm frictional connection is thereby secured. The washer and its socket may be tapered, if desired, and the rubber washer introduced into its socket under pressure.

The knife edge N, which rotates with the record, is engaged by a similar knife edge O fixed to the sound box, which knife edge is best connected to the arm I as illustrated in Figs. 1 to 3. The knife edge N is preferably curved at its engaged end as shown, and is engaged by the knife edge O when the needle is traveling at the end of the sound groove with the effect that the knife edge O rides up on the curved surface of the knife edge N, thereby forcing the wheel G from the position of Fig. 1 to the position of Fig. 2 and elevating the sound box. When this is done the sound box immediately begins to travel in the opposite direction, with the result that before the record has

again turned to bring the knife edge O into juxtaposition to the knife edge N, these two will be laterally separated so that further engagement is impossible. We have found that by the use of knife edges as a setting mechanism, we can very accurately gauge the precise point of setting and any missing of connection or stoppage of the record is avoided.

It is advisable to provide means whereby the reverse travel of the tone arm across the face of the record will not be too rapid, since if this is permitted, the wheel will run off the edge of the record more abruptly and the full advantages of the easy and gentle restoration of the needle into the sound groove will not be obtained. While such easy restoration is not strictly necessary, we prefer, nevertheless, to secure it in order to avoid any possibility of injury to the record or needle. It will be observed that as the sound box moves toward the edge of the record it swings around a point P at the end of the straight section of the tone arm. This tends to bring the shaft H in a strictly radial position, in which the wheel G would no longer act to move the sound box outwardly. Before this point is reached, however, it is desirable that the wheel G shall run gently off the edge of the record and thus lower the needle into the sound groove. However, if the shaft H be arranged with a degree of obliquity which is ideal for a large record, it is obvious that for a small record the wheel will run off too abruptly, while if it be arranged for a small record it may not reach the edge of the larger records.

We hence prefer to provide means for adjusting the angle of the shaft H to the radius of the record disk and this is done in the construction shown by pivoting the plate K so that it swings around a stud Q, the opposite end of which is engaged by an adjusting thumb screw R swiveled in a bracket S. By manipulating the thumb screw the angle of the shaft H is adjusted to suit the individual records.

It will be understood that at the time that the wheel G runs off the edge of the record, the needle F will be at approximately the beginning of the sound groove. Upon the lowering of the sound box the spring L comes into operation and restores the wheel G to the inoperative position of Fig. 1, in which position it is maintained until the needle F has reached the end of the sound groove, whereupon the knife edges N and O will again engage to bring the wheel into operation and again raise the sound box.

In Figs. 1 and 2 the degree of separation of the needle and wheel from the record are somewhat exaggerated. The actual clearances may be considerably less than that shown.

The device is best attached to the phono-

graph by a split collar T which is clamped around the sound box by a thumb screw U. It may, however, be arranged in any suitable manner, the precise connecting structure depending upon the precise construction of the phonograph to which it is attached. It will be understood that we use the term "connected to the sound box" to include a connection with the tone arm or other suitable member.

While we have shown and described the preferred embodiment of the invention, it will be understood that many changes may be made therein without departing from the spirit of the invention.

What we claim is:—

1. A repeating mechanism for talking machines having a movable sound box, including a member independent of the needle adapted to be engaged with the record, said member co-operating with the record to support and move the sound box in a direction toward the beginning of the sound record, said member comprising means engaging the record and moving along the surface thereof, and adapted to co-operate with the edge of the record, and while still supporting said sound box to lower the sound box until the needle rests upon the record.

2. A repeating mechanism for talking machines comprising a frictional device adapted to contact with the record and by the movement of the latter move the sound box across the record, and said device cooperating with the edge of the record to lower the needle into the sound groove, and means for fixedly adjusting the angularity of the frictional device with relation to the record.

3. A repeating mechanism for talking machines comprising a frictional device adapted to contact with the record and by the movement of the latter move the sound box across the record, and means for adjusting the angularity of the frictional device with relation to the record, said means comprising a pivoted support for the frictional member and an adjusting screw for moving said support.

4. A repeating mechanism for talking machines comprising a frictional wheel, a shaft therefor, means for connecting the shaft to the sound box and comprising a hinge member adapted in one position to hold the wheel out of contact with the record, and in another position to hold it in contact with the record, and actuating means rotating with the record and cooperating with said hinge member to bring the wheel into contact with the record to lift the sound box.

5. A repeating mechanism for talking machines comprising a frictional wheel, a shaft therefor, means for connecting the shaft to the sound box and comprising a hinge member adapted in one position to hold the wheel

out of contact with the record, and in another position to hold it in contact with the record, and said hinge member being mounted upon a pivoted plate and means for tilting said pivoted plate.

6. A repeating mechanism for talking machines, having means for engaging the record for moving the sound box across the

ord toward the beginning of the sound grooves, a support for said means, and means for horizontally adjusting the engaging means along said support.

In witness whereof, we have hereunto signed our names.

SUMTER B. BATTEY.  
BRYAN M. BATTEY.