

H. B. McNULTY.
 PHONOGRAPH.
 APPLICATION FILED JAN. 11 1909.

1,038,621.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1

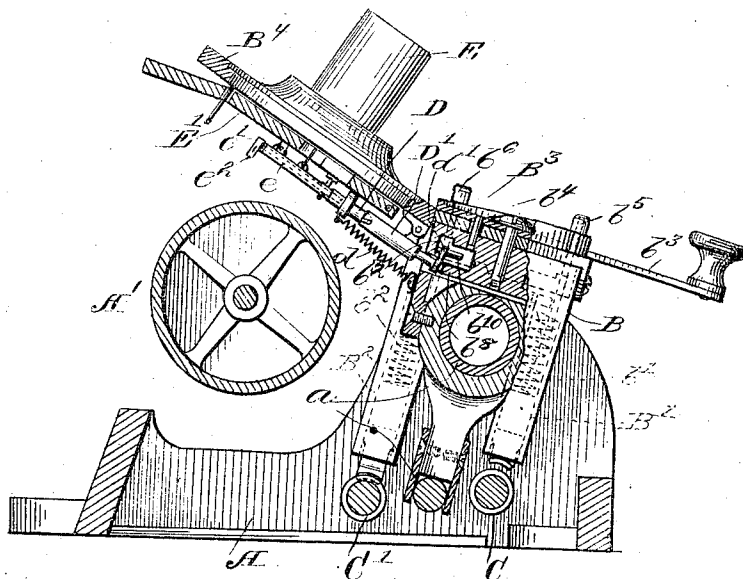


Fig. 3

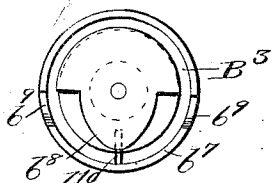


Fig. 4

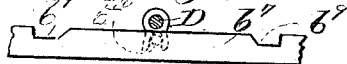


Fig. 5

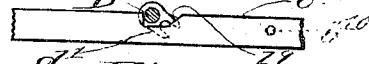


Fig. 6



Fig. 2

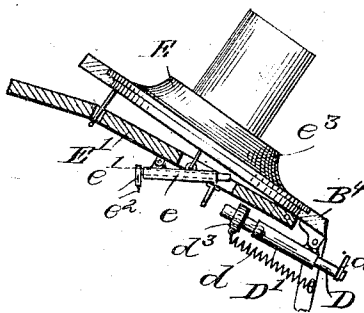
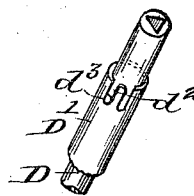


Fig. 7



Witnesses:

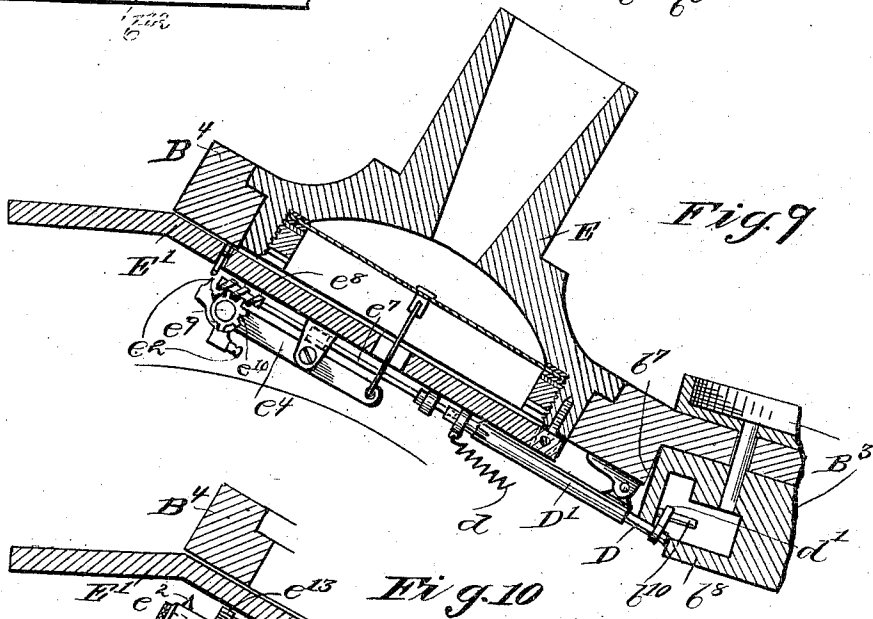
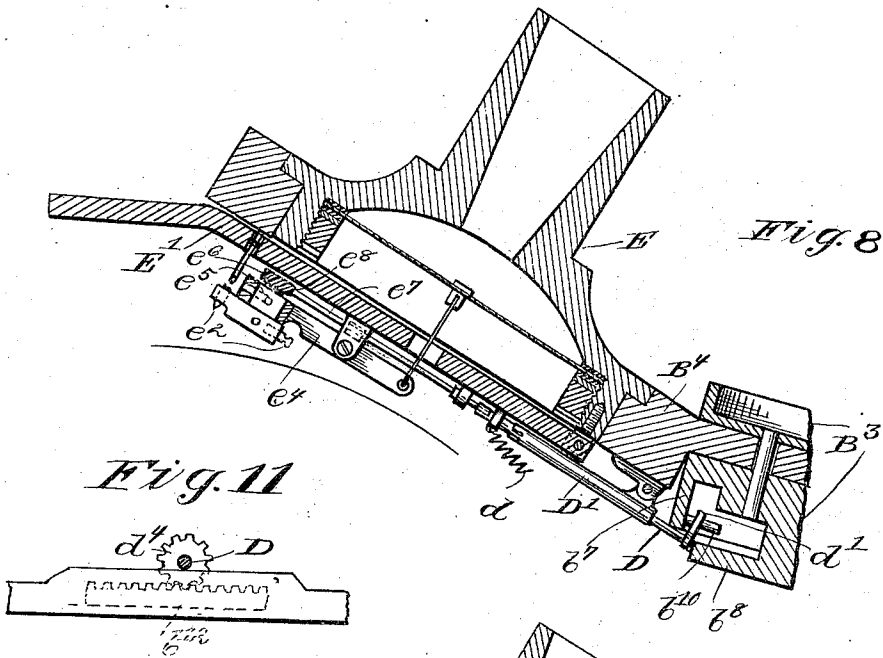
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 2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

HARRY B. McNULTY, OF EAST CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNITED STATES PHONOGRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

PHONOGRAPH.

1,038,621.

Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed January 11, 1909. Serial No. 471,657.

To all whom it may concern:

Be it known that I, HARRY B. McNULTY, a citizen of the United States, and a resident of East Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Phonographs, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention, relating as indicated, to phonographs, has more particular regard to the provision of suitable mechanism for adapting a phonograph to optionally play upon records having threads of different fineness, as for instance, upon records having 100 and 200 lines to the inch, respectively, or as they are currently known, "two minute" and "four minute" records. To effect such adaptation of the machine, it is necessary that the reproducer be fed along the record at a different rate of speed in each case, and that a stylus of a different character, corresponding to the fineness of the thread, be properly positioned in the one case to play on the fine thread, in the other upon the coarse thread. One form of mechanism for conjointly effecting the two adjustments referred to is illustrated in my co-pending application, Serial No. 463,942, filed November 23, 1908, and the present invention is in part an improvement of such earlier mechanism, and in part an adaptation of the same to several variant forms of reproducer from the preferred form there shown.

Said invention, then, consists of the means hereinafter fully described, and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but several of the various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—Figure 1 is a transverse sectional view of a phonograph embodying my several improvements in one approved form; Fig. 2 is a similar view of the reproducer and that portion of the carriage in which said reproducer is seated, showing parts of the latter in a different op-

erative position than that illustrated in Fig. 1; Fig. 3 is a bottom plan view of an actuating cam member that forms a feature of the machine; Figs. 4, 5 and 6 respectively illustrate in different operative positions, a development of one of the cam elements of such cam member; Fig. 7 is a perspective view of another detail of the machine, viz. the key whereby the adjustment of the reproducer-stylus is secured; Fig. 8 is a sectional view of the reproducer and the portion of its carriage corresponding to that of Fig. 1, but showing the adaptation of my invention to a different construction of stylus lever; Figs. 9 and 10 similarly illustrate the adaptation of such invention to other forms of stylus lever; and Fig. 11 shows a detail of the construction of Figs. 8 and 9 in modified form.

It has not been deemed necessary for present purposes to illustrate the general construction of the phonograph in greater detail than is afforded in the sectional view of Fig. 1 wherein the support for the record receiving mandrel A' is not shown, but merely its position relatively to the base A and to the ways a upon which is slidably mounted the carriage B for the reproducer. Movement of this carriage along such ways is secured by connecting the same with one or the other of two feed screws C C' lying below and parallel with its direction of movement, such engagement being had by means of plungers B' B² reciprocally mounted in the carriage, the lower ends of which are in the form of sectional nuts adapted to coöperate with such feed-screws respectively. Springs b' b², provided in connection with the plungers, operate normally to retain the same in engagement with the corresponding feed-screw, while to control such engagement there is rotatably mounted on the upper face of the carriage, a disk B³ provided with an operating handle b³ and bearing a cam b⁴ adapted to engage the upper ends b⁵ b⁶ of the plungers respectively.

The disk B³, in the form shown, is a composite construction, being made up of an upper section bearing the cam b⁴ just referred to, and a lower section incased within the carriage body. Such lower section is, however, fixed to the upper section so as to rotate therewith, just as though said sections were integral.

The under face of the lower section of cam disk B³ (see Fig. 3) is provided with a raised edge b⁷ forming a cam adapted to laterally engage a key D that is both rotatably and longitudinally movable within a sleeve D' pivoted to the under side of the rearwardly projecting annular portion B⁴ of the carriage wherein the reproducer E is seated when in use. Disk B³ is further provided with a heart-shaped cam b⁸ that is adapted to terminally engage said key D to advance the same. A tension spring d connected with the outer end of the key serves both to retract it and to depress its outer end against the operation of the cam elements just referred to. Such raised cam edge b⁷ however, is formed at substantially opposite points in its extent with notches b⁹ that permit the lowering of the outer end of the key at the same time that its retraction is rendered possible by heart-cam b⁸, such position of the two cam elements on the under face of the disk corresponding with the position of the cam b⁴ on its upper face that permits operative engagement of one or the other of the two spring pressed plungers B' B² with its feed screw C or C'. Intermediate between the two notches b⁹ in cam b⁷, so as to correspond with the forwardly extending portion of heart-cam b⁸, is a radially disposed pin b¹⁰ that engages a forked arm d' on the rear end of the key so as to rotate the latter first in one direction, and then in the other, depending upon the direction of movement of the cam member B³. The amount of such rotation is accurately determined by means of two notches d² properly spaced about the inner end of the sleeve D', and adapted to engage a pin d³ borne on the side of the key (see Fig. 7). The portion of the sleeve lying between the two notches being suitably beveled, makes it necessary merely to carry the key in its rotative movement past the center of such pin to insure a proper positioning of the key, and of the stylus lever or actuating element with which the same engages, as, and for the purpose now to be set forth.

The general construction of the reproducer E illustrated in Figs. 1 and 2, is the same as that shown in the co-pending application previously referred to, and includes a diaphragm (not shown), a floating weight E', a tubular lever e pivoted to said weight and connected to said diaphragm, and a stylus holder e' rotatably held in said lever and provided at its forward end with a plurality of styluses e² adapted to operatively contact with a record upon the mandrel A' in different positions of said holder respectively. The rearwardly projecting end e³ of the holder is made angular to receive the end of the key D when the latter is thrust forward, or advanced, by the conjointly operated cams on the under face of

the disk B³, the preliminary oscillation of such key serving to raise the weight into the position shown in Fig. 1, whereby the key and the stylus holder are properly aligned for the purpose in question. Pending such engagement, the rotative movement of the key takes place, and as a result, one or the other of the styluses is brought into said operative position, depending upon the direction of said rotation. This movement obviously will be correlated with the movement of a spring-pressed plunger B' or B² into engagement with the corresponding feed-screw.

The modification illustrated in Fig. 8 lies, as has been previously intimated, in the construction of the stylus lever which here is shown as a bar of the prevailing form. In the outer end of the bar is rotatably mounted a vertically disposed transverse stud e⁵ that forms the stylus holder, the latter bearing the two styluses, e² one of which is suitable for operating on an ordinary record of 100 threads per inch, and the other operating on a record having 200 threads per inch. The specific construction of such stylus holder, it may be remarked, forms no part of the present invention, being shown in fact along with the two forms of Figs. 9 and 10, in U. S. Patent No. 904,884. To automatically effect rotation of such stylus holder in a manner similar to that just described in connection with the preceding form of holder, I provide the upper end of the stud e⁵ with a gear e⁶ and journal in suitable bearings on the under side of the floating weight E' a shaft or spindle e', the outer end of which bears a worm e⁸ that is adapted to mesh with said gear in the raised position of the stylus lever illustrated in the figures in question. The rear end of spindle e' corresponds with the rear end of the stylus holder in the preceding construction, and is made of similar angular form, so that the key operated by the cam member B³ is adapted to function in the same manner as before, first to raise the weight, and then to advance into engagement with, and to rotate the spindle, with the result that the stylus holder is likewise rotated to bring first the one, and then the other of the two styluses e² into desired operative position.

The stylus holder in the reproducer of Fig. 9 consists of a horizontally disposed transverse stud e⁹, which otherwise operates the same as that of Fig. 8, only a slight modification in the arrangement of the gear e¹⁰ on the stud and of worm e⁸ on spindle e', being necessary. The same is true of Fig. 10, wherein the holder consists of a sleeve e¹¹ rotatably mounted on the forward end of the lever and provided with a spur gear e¹² with which a pinion e¹³, taking the place of worm e⁸ on the forward end of spindle e' is adapted to mesh.

Inasmuch as it may in practice be difficult, in the case of the last described forms of reproducer, to impart a sufficient rotative movement to key D, by means of the pin b^{10} engaging with the arm d' on its rear end, I contemplate the substitution of a short rack b^{12} for the pin, and of a pinion d^4 for the arm, as shown in Fig. 11. By means of such a rack and pinion it will obviously be possible to secure a complete turn of the shaft, or even more, should this be found desirable.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, and a plurality of styluses carried by said weight and respectively movable into operative position with respect to a record; and a movable member apart from said weight adapted to raise the same and thereupon actuate said styluses.

2. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, and a plurality of styluses carried by said weight and respectively movable into operative position with respect to a record; and a movable member on said carriage adapted to raise said weight and thereupon actuate said styluses.

3. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, and a plurality of styluses carried by said weight and respectively movable into operative position with respect to a record; and a member apart from said weight, said member having two distinct movements whereby it is respectively adapted to raise said weight and thereupon to actuate said styluses.

4. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage; said reproducer including a diaphragm, a floating weight, and a plurality of styluses carried by said weight and respectively movable into operative position with respect to a record; and a member apart from said weight, said member being oscillatorily and rotatably movable, whereby it is respectively adapted to raise said weight and thereupon to actuate said styluses.

5. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; and a movable member on said carriage adapted to raise said weight and thereupon actuate said stylus holder.

6. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; and a member on said carriage, said member being oscillatorily and rotatably movable to raise said weight and thereupon to actuate said stylus holder, respectively.

7. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; and a member on said carriage, said member being oscillatorily and rotatably movable to raise said weight and actuate said stylus holder, respectively; and means for thus oscillating and rotating said member.

8. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; a sleeve oscillatorily mounted on said carriage; and a member both rotatably and longitudinally movable in said sleeve, oscillation of said sleeve being effective to raise said member against said weight, and longitudinal and rotative movement of said member being respectively effective to engage the same with, and actuate, said stylus holder.

9. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer

including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; a sleeve oscillatorily mounted on said carriage; a member both rotatably and longitudinally movable in said sleeve, oscillation of said sleeve being effective to raise said member against said weight, and longitudinal and rotative movement of said member being respectively effective to engage the same with, and actuate, said stylus holder; and conjointly operable cam means adapted successively to oscillate said sleeve, advance said member, and rotate the same.

10. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; a sleeve oscillatorily mounted on said carriage; a member both rotatably and longitudinally movable in said sleeve, oscillation of said sleeve being effective to raise said member against said weight, and longitudinal and rotative movement of said member being respectively effective to engage the same with, and actuate, said stylus holder; a tension spring connected with said member and adapted both to retract the same and to hold it out of contact with said weight; and conjointly operable cam means adapted successively to oscillate said sleeve, advance said member and rotate the same.

11. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; a sleeve oscillatorily mounted on said carriage; a member both rotatably and longitudinally movable in said sleeve, oscillation of said sleeve being effective to raise said member against said weight, and longitudinal and rotative movement of said member being respectively effective to engage the same with, and actuate, said stylus holder; a tension spring connected with said member and adapted both to retract the same and to hold it out of contact with said weight; and a rotatable plate on said car-

riage provided with a raised edge forming a cam laterally engaging said member to oscillate the same against said spring, with a disk cam terminally engaging said member to similarly advance the same, and with means for rotating said member when thus oscillated and advanced.

12. In mechanism of the class described, a reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record, and means mounted on said weight for thus moving said holder, said means being normally out of engagement with said holder but being adapted to engage the same in the raised position of said weight.

13. In mechanism of the class described, a reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record, and a member rotatably mounted on said weight, said member being normally out of engagement with said holder but being adapted to engage the same in the raised position of said weight.

14. In mechanism of the class described, a reproducer including a floating weight, a diaphragm, a lever pivoted to said weight and connected with said diaphragm, a stylus holder carried by said lever and provided with a plurality of styluses, said holder being further provided with a gear and being movable to bring either of said styluses into operative position with respect to a record, and a spindle rotatably mounted on said weight and bearing a gear adapted to mesh with the gear on said holder.

15. In mechanism of the class described, a reproducer including a floating weight, a diaphragm, a lever pivoted to said weight and connected with said diaphragm, a stylus holder carried by said lever and provided with a plurality of styluses, said holder being further provided with a gear and being movable to bring either of said styluses into operative position with respect to a record, and a spindle rotatably mounted on said weight and bearing a gear adapted to mesh with the gear on said holder in the raised position of said weight.

16. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus

holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; means mounted on said weight for thus moving said holder adapted to operatively engage the same in the raised position of said weight; and a movable member on said carriage adapted to raise said weight and thereupon to actuate said stylus moving means.

17. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being movable so as to bring either of said styluses into operative position with respect to a record; a member rotatably mounted on said weight and adapted operatively to engage said holder in the raised position of said weight; and a member on said carriage, said member being oscillatorily and rotatably movable thus to raise said weight and thereupon to rotate the member thereon.

18. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being further provided with a gear and being movable so as to bring either of said styluses into operative position with respect to a record; a spindle rotatably mounted on said weight and bearing a gear adapted to mesh with the gear on said holder; and a member on said carriage, said member being oscillatorily and rotatably movable to raise said weight and rotate said spindle respectively; and means for thus oscillating and rotating said member.

19. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being further provided with a gear and being movable so as to bring either of said styluses into operative position with respect to a record; a spindle rotatably mounted on said weight and bearing a gear adapted to mesh with the gear on said holder; a sleeve oscillatorily mounted on said carriage; and a member both rotatably and longitudinally movable in said sleeve, oscillation of said sleeve being effective to raise said member against said weight, and longitudinal and

rotative movement of said member being respectively effective to engage the same with, and rotate, said spindle.

20. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being further provided with a gear and being movable so as to bring either of said styluses into operative position with respect to a record; a spindle rotatably mounted on said weight and bearing a gear adapted to mesh with the gear on said holder; a sleeve oscillatorily mounted on said carriage; a key both rotatably and longitudinally movable in said sleeve, oscillation of said sleeve being effective to raise said key against said weight, and longitudinal and rotative movement of said key being respectively effective to engage the same with, and rotate, said spindle; and conjointly operable cam means adapted successively to oscillate said sleeve, advance said key, and rotate the same.

21. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being further provided with a gear and being movable so as to bring either of said styluses into operative position with respect to a record; a spindle rotatably mounted on said weight and bearing a gear adapted to mesh with the gear on said holder; a sleeve oscillatorily mounted on said carriage; a key both rotatably and longitudinally movable in said sleeve, oscillation of said sleeve being effective to raise said key against said weight, and longitudinal and rotative movement of said key being respectively effective to engage the same with, and rotate, said spindle; a tension spring connected with said key and adapted both to retract the same and to hold it out of contact with said weight; and conjointly operable cam means adapted successively to oscillate said sleeve, advance said key and rotate the same.

22. In mechanism of the class described, the combination of a carriage; a reproducer mounted on said carriage, said reproducer including a diaphragm, a floating weight, a lever pivoted to said weight and connected with said diaphragm, and a stylus holder carried by said lever and provided with a plurality of styluses, said holder being further provided with a gear and being movable so as to bring either of said styluses into operative position with

respect to a record; a spindle rotatably mounted on said weight and bearing a gear adapted to mesh with the gear on said holder; a sleeve oscillatorily mounted on
5 said carriage; a key both rotatably and longitudinally movable in said sleeve, oscillation of said sleeve being effective to raise said key against said weight, and longitudinal and rotative movement of said key being
10 ing respectively effective to engage the same with, and rotate, said spindle; a tension spring connected with said key and adapted both to retract the same and to hold it out of contact with said weight; and a rotatable

plate on said carriage provided with a raised 15 edge forming a cam laterally engaging said key to oscillate the same against said spring, with a disk cam terminally engaging said key to similarly advance the same, and with means for rotating said key when thus os- 20 cillated and advanced.

Signed by me this 7th day of January, 1909.

HARRY B. McNULTY.

Attested by—

MARY GLADWELL,
JNO. F. OBERLIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."