

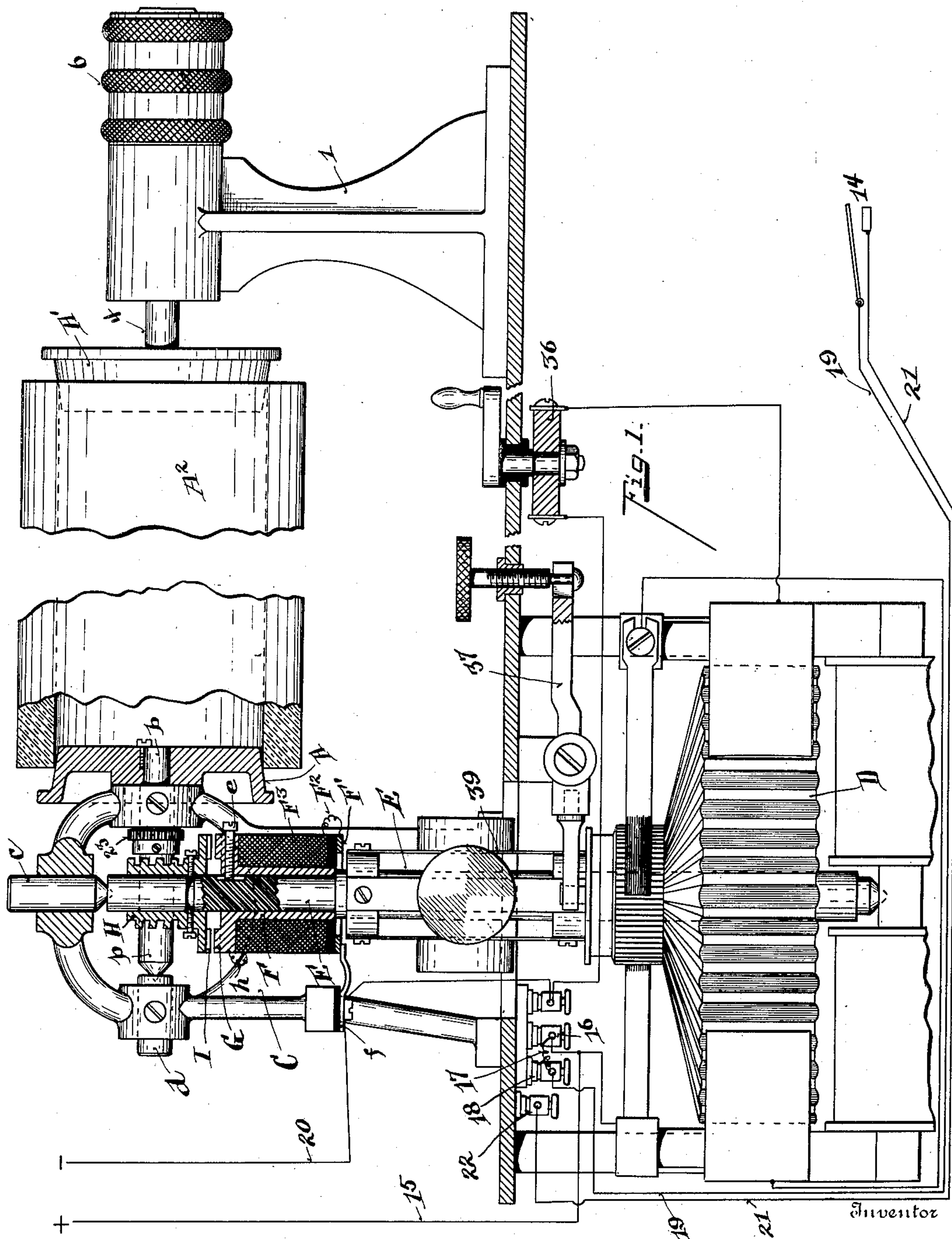
No. 836,940.

PATENTED NOV. 27, 1906.

C. W. NOYES.  
PHONOGRAPH.

APPLICATION FILED DEC. 15, 1903. RENEWED OCT. 17, 1906.

3 SHEETS—SHEET 1.



Witnesses

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Luisa Beck

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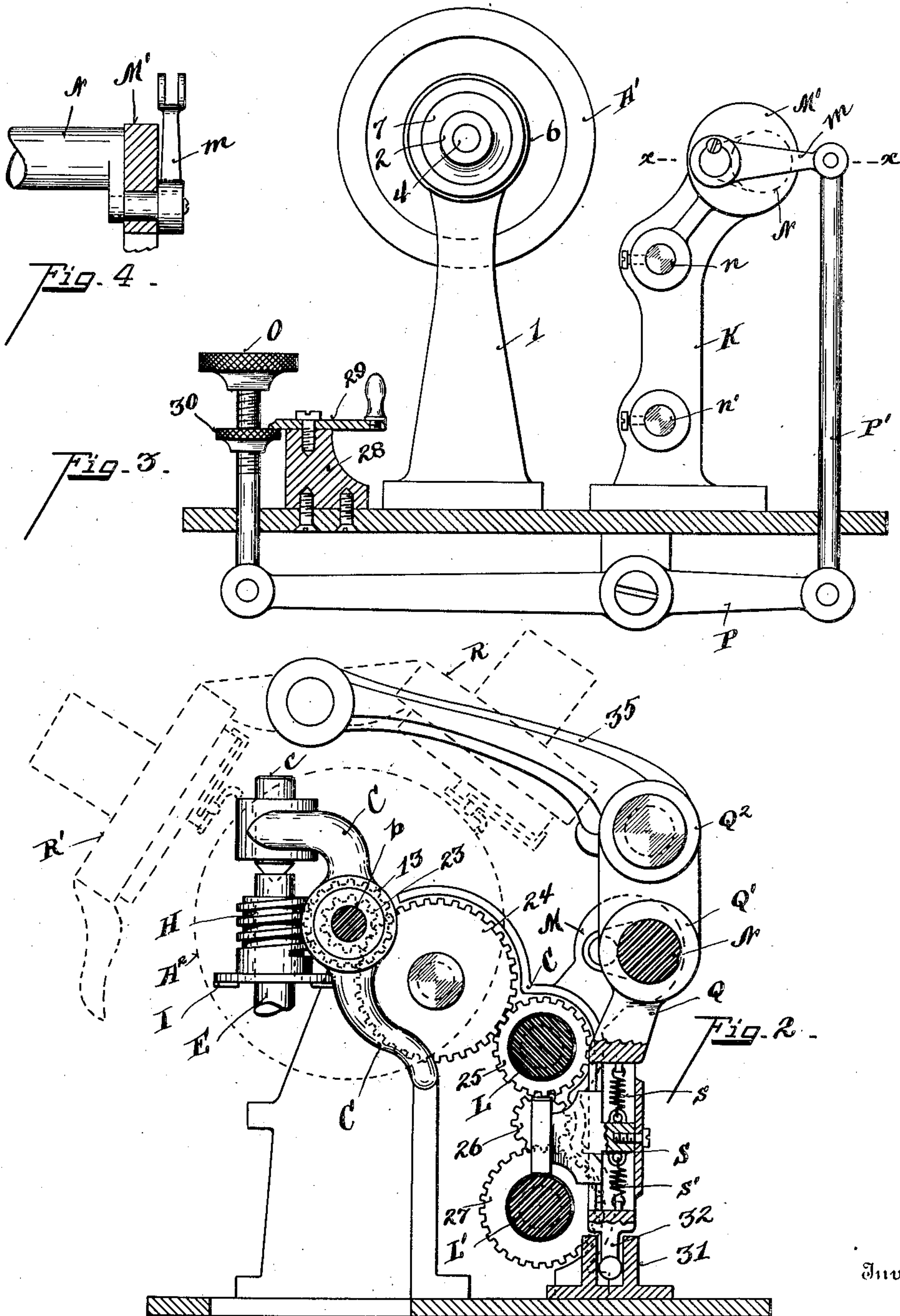
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Inventor

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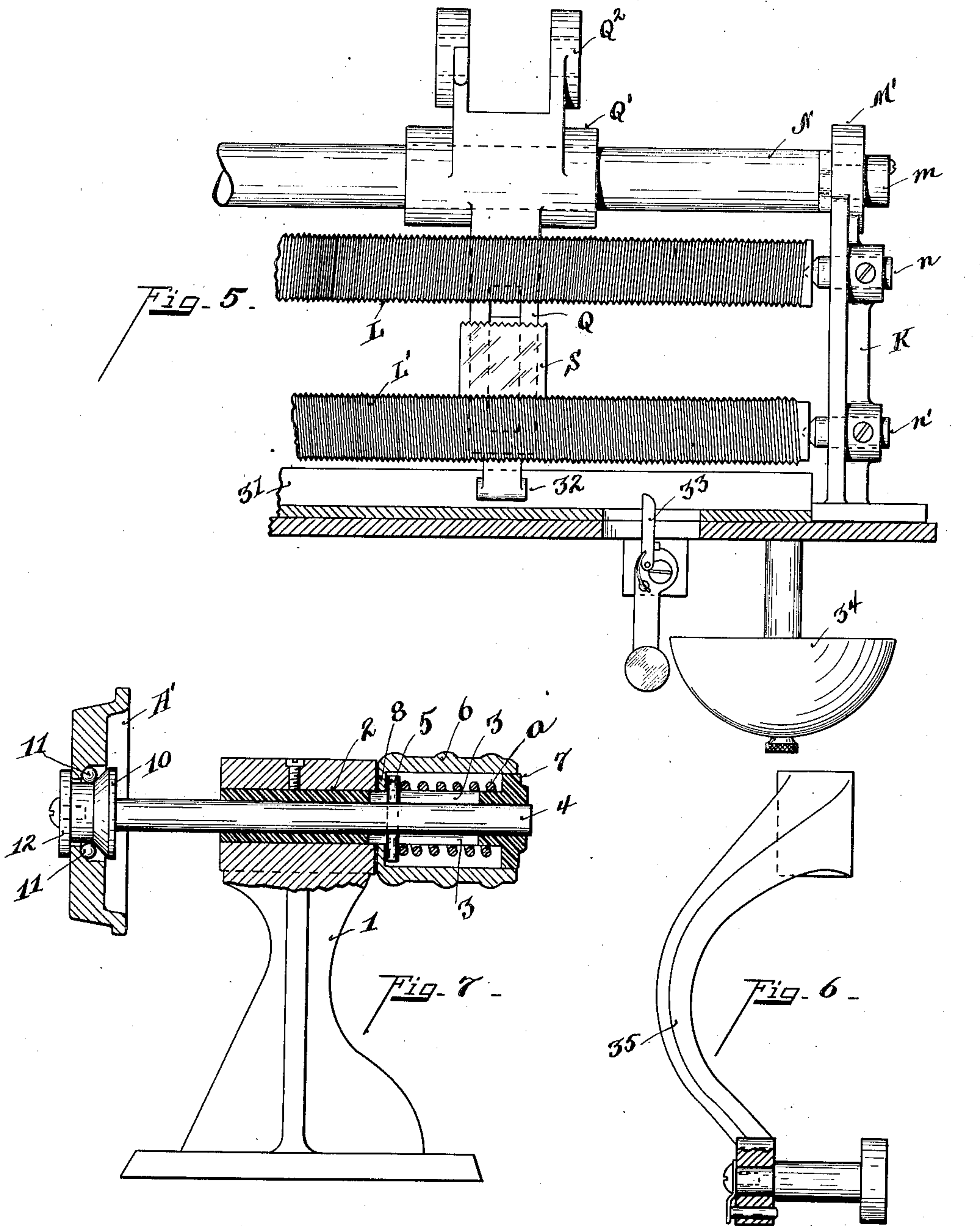
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# UNITED STATES PATENT OFFICE.

CHARLES W. NOYES, OF CINCINNATI, OHIO, ASSIGNOR TO HAWTHORNE & SHEBLE MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION.

## PHONOGRAPH.

No. 836,940.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed December 15, 1903. Renewed October 17, 1906. Serial No. 339,395.

*To all whom it may concern:*

Be it known that I, CHARLES W. NOYES, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

My invention relates to an improvement in phonographs.

Primarily the object of my invention is to devise a machine particularly organized and adapted for office amanuensis and known to the trade as the "commercial" phonograph.

One of the objects of my invention is to provide means in connection with the main drive of the record, reproducer, and the recorder which is under the full control of the operator when in use, so that it can be instantly started and stopped.

Another object of my invention is to provide improved means for supporting the record-cylinder.

Another object of my invention is to provide means for readily inserting and withdrawing the record and maintaining a constant initial position without destroying or varying its accuracy relative to the reproducer or recorder.

Various other features of my invention are set forth in the description of the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a central sectional view, partly in elevation, illustrating the main drive for the various parts, together with the electrical connections. Fig. 2 represents a cross-sectional view showing a portion of the main power driving-shaft in connection with a train of gears for traversing the recorder and reproducer mechanism. Fig. 3 is an end elevation, partly in section, showing the means for operating the reproducer and recorder traversing mechanism for controlling the direction of traverse. Fig. 4 is a section on line *x x*, Fig. 3. Fig. 5 is a front elevation of a portion of the traversing mechanism for the reproducer and recorder. Fig. 6 is a top plan view, partly in section, of the recorder and reproducer supporting arm. Fig. 7 is a central vertical section of the tail-stock for supporting the record.

I will first describe my improved means for supporting the record-cylinder.

In the conventional phonograph taper mandrel-supports are employed. The record being a hollow cone brings two opposite tapered bodies into engagement. Both the record and the mandrel are liable independently to contraction and expansion, which obviously is constantly varying, and so destroying the accuracy of supporting the record relative to the mandrel. However slight may be the variation, it will be sufficient to affect the meeting taper surfaces, so that the record is constantly varying in position longitudinally of the machine. As a result of this variability the reproducer must be constantly shifted to different initial positions, and there is no assurance of starting a reproducer with a given record at the proper place. To avoid this, I employ a plain cylindrical record, into the opposite ends of which are fitted the driving taper disks *A A'*. These disks, it will be understood, compare to the live and dead center of the machine-tool, one of them being rotated and the other being free to rotate on its own axis under the influence of the record.

*A* represents the head-stock disk, and *A'* the tail-stock disk. The tail-stock disk is supported as follows: 1 represents the tail-stock having a bore, into which is secured a sleeve 2, said sleeve being provided with oblong slots 3. 4 represents a spindle loosely supported within the sleeve 2, provided with a pin 5, fixed thereto, the ends of the pin projecting through the oblong slots 3. 6 represents a sleeve loosely journaled on a flange 7 of sleeve 2 at one end and having an inwardly-projecting flange 8 at its opposite end, loosely bearing upon the sleeve 2. *a* represents a coil-spring bearing at one end against the flange 7 of the sleeve 2 and at its opposite end against the pin 5. Thus as the sleeve 6 is moved to the right it will carry with it spindle 4, the spring *a* normally forcing the spindle in a direction toward the driving-disk. The spindle 4 is provided with a cone 10, the disk *A'* being provided with a central bore and race, forming one seat for the balls 11 and the cone 10 the other. 12 represents a washer secured to the spindle 4 for holding the disk *A'* in position on the spindle 4. By this means a free revolution of the disk *A'* is obtained independent of the longitudinal manipulating means, yet at the



same time permitting the disk to be moved longitudinally with the spindle 4 when inserting or withdrawing the record. With these tapered disks engaging the interior periphery of the record-cylinder at each end the position of the said record will be invariable, the opposite disk taking up the expansion or contraction without varying the longitudinal position of the record. As a result the reproducer has a constant initial position, which avoids a great deal of vexation and delay in the manipulation of the instrument.

I will now describe the mechanism and organization for driving the head-stock taper disk. This head-stock taper disk is fixed to the spindle *b*, suitably journaled in the standard C.

D represents the motor.

E represents an armature-shaft extending upwardly, the upper end of which is journaled upon the spindle *c*, supported in the standard C. The front end of the spindle *b* also has a pivotal engagement with the stud *d*, also supported in said standard C.

F represents a magnet-core, through the center of which the armature-shaft E passes. The said magnet is fixed to rotate with said armature-shaft by the set-screw *e*. This set-screw passes through the magnet-core and its end engages into a vertical slot in the periphery of the armature-shaft, which permits the magnet to be raised and lowered relative to the armature-shaft. The upper end of this magnet-core is provided with a clutch member G. In the preferred form the armature-shaft is vertically disposed, and the clutch member G is splined thereon, so as to slide thereon vertically and to turn therewith. As a result of this arrangement clutch member G drops of its own weight when the magnet is deenergized, thus throwing the clutch members out of driving relation.

H represents a worm-sleeve journaled on the upper end of the armature-shaft and revoluble independently thereon. The lower end of said worm-sleeve has a clutch member I, forming the cooperating clutch element to the magnet clutch member G. The spindle *b* is provided with a worm-wheel 13, engaging into the said worm-sleeve. (See Fig. 2.)

*f* represents a contact secured to the standard C and insulated therefrom, having connection with a ring F', secured to the lower portion of the magnet and insulated therefrom. Said ring F' is connected by wire F<sup>2</sup> to one end of the magnet-coil F<sup>3</sup>. The opposite end of the magnet-coil is connected by wire *h* to the magnet-core F. Thus one pole of the electric energy has connection with the contact *f*, the opposite pole being through the armature-shaft and standard of the motor D. This magnet is energized and deenergized by a push-button 14, preferably located at some point below the machine,

where it may be operated by the foot of the operator. The magnet receives its energy from a series connection with the feed, as shown in Fig. 1, as follows: 15 represents the positive wire from the main source of supply extended to the binding-post 16, secured to the base of the machine and insulated therefrom, having a cross connection by wire 17 to the binding-post 18, thence by wire 19 to one pole of the push-button or switch 14. 20 represents the negative wire from the main source of supply connecting with the contact *f*. 21 represents a wire in connection with binding-post 22, secured to the base of the machine, which is of metal, but not insulated therefrom, said wire 21 extending to the other pole of the push-button 14, thus forming the partial circuits for the magnet, completed when the push-button or switch 14 is closed.

As shown in Fig. 1, the magnet is normally deenergized and the clutch members disengaged. When the operator depresses the push-button, the magnet will rise and bring the clutches in driving relation, thereby rotating the driving taper disk through the worm sleeve and wheel. When the foot is removed from the button, the drive and spindle stops. Obviously this is a very simple and convenient drive.

I will now describe the mechanism for traversing the reproducer and recorder.

K represents a journal-bracket erected on the platform of the machine in any suitable manner for supporting the traverse-screws L L' by spindle *n n* at one end, the opposite ends of the feed-screws being journaled in the standard C. These feed-screws are preferably oppositely threaded and driven in the same direction, whereby they are adapted to feed the reproducer or recorder in opposite directions. Obviously the same result might be obtained by having them correspondingly threaded and driven in opposite direction or having one traverse screw provided with a reversing-gear adapted to change the direction of the traverse-screw. On the spindle *b* is a gear-wheel 23. Suitably journaled on the standard C or head-stock is a transmitting-gear 24, in mesh with gear-wheel 23 and also with the gear-wheel 25 on the traverse-screw L. Journaled on the standard C is an intermediate gear 26, intermeshed with the gear-wheel 25 and with gear-wheel 27 on the forward screw L'. Rearwardly projected from the standard C is a bracket projection.

M M' represent a projection from bracket K in the rear of the tail-stock 1.

N represents a guiding-rod eccentrically mounted in the brackets M M' and provided with a crank-arm *m* at the outward side of bracket M'. O represents a push-button at the front of the machine extending upward from the platform connected by a link-and-lever mechanism P P' to the said crank-arm



*m* of the guiding-rod N. Between the bracket and upon said eccentric rod the recorder and reproducer traversing mechanism is slidably mounted.

5 Q represents a downward-extending traversing arm provided with a sleeve Q', sliding on the rod N. Said arm is provided with an elongated slot, into which is gibbed a rack S, having vertical movements therein.

10 *s s'* represent springs secured to the arm at one end and to the rack at their opposite ends for delicately supporting the rack between the traverse-screws L L' and adapted to normally engage the direct-feed screw.

15 When the push-button is depressed, the eccentric rod N is vertically raised, lifting the traversing mechanism bodily, thereby raising the recorder and reproducer supported thereon from the record. At the same  
20 time the rack, which is provided with upper and lower screw-faces of the same pitch as the traverse-screws and at which depression the upper face of the rack is brought into engagement with the feed-screw L, thereby trav-  
25 ersing the reproducer and recorder in the reverse direction free from the record. Thus at any instant the operator may cause the recorder to be shifted toward initial position for repeating the message. The reversing  
30 traverse-screw is also preferably higher speeded than the direct traverse-screw, enabling the operator to make a quick return shift.

35 It is sometimes desirable to hold the traversing mechanism free from either of the screws or to positively hold the rack of the traversing mechanism in positive engagement with one of the screws, and this is accomplished by the following instrumentalities: 28 represents a bracket secured to the  
40 bed-plate of the machine. 29 represents a lever pivoted on said bracket. 30 represents a knurl screw-threaded onto the stem of the push-button O. Thus by adjusting this  
45 knurl 30 upon the stem the link-and-lever mechanism can be adjusted permanently for such time as desired by swinging the lever 29 in engagement with the knurl 30, as shown in Fig. 3.

50 31 represents a guide of the same length as traverse-screws L L', into which the projection 32 of the traversing arm Q extends, thereby providing a lower guiding means for the traversing mechanism, said projection 32  
55 also serving for the purpose of operating the tripping mechanism 35 for sounding the bell 34 at the end of the traversing point. The traversing arm Q is provided with upwardly-extending yoke-arms Q<sup>2</sup>, to which the re-  
60 corder and reproducing supporting arm 35 is pivoted, said arm extending over the record A<sup>2</sup>, as shown in Fig. 2, the record being shown in dotted lines.

In Fig. 2 I have shown in dotted lines a re-

producer R and a recorder R', of duplex form, 65 mounted upon the arm 35, which is made the subject of a separate application and not a part of this invention.

If the phonograph is to have an extended 70 field of utility in commercial life, it is obvious that the instrument must at all times be under perfect control of the operator and also that the controlling instrumentalities must be in such easily-accessible position as to give the operator such control without un- 75 necessary inconvenience. As the operator is transcribing the message, probably on a type-writer, it is desirable to manipulate the phonograph with the least possible move- 80 ment of the hands from the keys of the type-writer. By means of the improvements here described the operator can start, stop, and reverse the machine at will and with little or no added inconvenience. Of course 85 in reversing, the hand may be taken from the keys, as the record is not in position during the rearward traverse of the reproducer.

36 represents a switch for controlling the motor-current.

37 represents the usual form of means for 90 controlling the speed of the motor D, having connection with the governor 39, mounted on the main driving-shaft E.

Various means not shown might be employed to produce the equivalent of the or- 95 ganization I have illustrated as the preferred form without departing from the principles of my improvement. Therefore I do not limit myself to the preferred form, except as specifically claimed. 100

Having described my invention, I claim—

1. In a phonograph, a driving-shaft, means for rotating the same, record-rotating and reproducer-traversing means, trans- 105 mitting devices between said means and the driving-shaft, a magnet-clutch adapted to connect the driving-shaft with said transmitting devices when said magnet is energized, means for automatically returning the 110 clutch to normal idle position when it is de-energized, an electric circuit for energizing the clutch and a switch placed in said circuit in proximity to the foot of the operator whereby the instrument may be maintained 115 in commission while the operator retains his foot on the switch, substantially as described.

2. In a phonograph, a main driving-shaft, means for conveying power to said shaft, record-supporting means having driven con- 120 nection with said driving-shaft, recorder and reproducer traversing mechanism, means for traversing the same, in driven connection with said driving-shaft, a loose clutch member on said shaft, a cooperating clutch member fixed to turn with and slide on said shaft, 125 a magnet supported by said fixed clutch member, partial circuits in connection with said magnet and means whereby said partial



circuits may be closed for bringing into engagement said loose and fixed clutch members, substantially as specified.

3. In a phonograph, a main driving-shaft being driven by a suitable power, a record-support, a shaft for rotating the same, a combined worm and clutch member loosely mounted on said shaft, transmitting devices between said worm and said record-shaft, a cooperating clutch member fixed to turn with and slide on said shaft, adapted to be engaged with said loose clutch member and worm for conveying power thereto, and means for engaging the same, substantially as described.

4. In a phonograph, a main driving-shaft, being driven by a suitable power, a record-support, a shaft for rotating said support, a combined worm and clutch member loosely mounted on said shaft, transmitting devices between said worm and said record-rotating shaft, a cooperating clutch member fixed to turn with and slide on said shaft, revolving therewith, and adapted to be engaged with said loose clutch member and worm, for conveying power thereto, a magnet-coil supported by said fixed clutch member and forming a magnet, partial circuit connections with said magnet, and means whereby said partial circuits may be closed for bringing into engagement said loose and fixed clutch members, substantially as specified.

5. In a phonograph, a main driving-shaft, a record-support, a shaft for rotating said support having driven connection with a suitable power, transmitting devices between said driving and said record-rotating shafts, a combined driving and clutch member loosely mounted on said shaft, a cooperating clutch member fixed to turn with and slide on said shaft, adapted to be brought into engagement with said loose clutch member for conveying power thereto, a magnet, supported by said fixed clutch member around said shaft, partial electric circuits in connection with said magnet and shaft, a foot push-button in connection with one of said partial circuits, whereby when the same is closed, the said fixed clutch member may be brought into engagement with the loose clutch member, substantially as specified.

6. In a phonograph, a main driving-shaft, means for conveying power to said shaft, a combined driving and clutch member loosely mounted on said shaft, record-supporting means, power-transmitting devices between said driving member and said record-supporting means, recorder and reproducer traversing mechanism, means for actuating the same, a cooperating clutch member fixed to turn with and slide on said shaft, movably mounted thereon and revolving therewith, a magnet supported by said fixed clutch member, partial electric circuits in connection with

said magnet and shaft, means for closing said partial circuits, for bringing into engagement the fixed clutch member with the loose clutch member for driving the same, substantially as specified.

7. In a phonograph, a main driving-shaft, suitably mounted within a record, supporting head-stock means for conveying power to said shaft, record-supporting means comprising two disks, one disk being journaled in said head-stock in driven connection with said driving-shaft for revolving the record, a tail-stock for supporting the other disk, a sleeve secured in said tail-stock provided with oblong notches, a spindle loosely supported within said sleeve, provided with a pin projecting through said slots in said sleeve, a second sleeve loosely mounted over said first sleeve provided with a flange for engaging said pin for moving the spindle longitudinally, a spring for maintaining the spindle in its normal position, and a disk revolubly mounted upon and having longitudinal movement with said spindle for inserting and withdrawing a record; substantially as described.

8. In a phonograph, a main driving-shaft, means for conveying power to said shaft, record-supporting means having driven connection with said driving-shaft, forward and reverse traverse-screws, having driven connection with said driving-shaft, a guide-rod eccentrically mounted upon suitable brackets in proper relation to said traverse-screws, a traverse-arm for supporting a recorder or reproducer, slidably mounted upon said guide-rod, comprising a rack delicately supported on said traverse-arm and between said traverse-screws, means for operating said guide-rod for raising and lowering said traverse-arm for alternately bringing into engagement said rack with either of said traverse-screws, substantially as specified.

9. In a phonograph, a main driving-shaft, means for conveying power to said shaft, record-supporting means having driven connection with said driving-shaft forward and reverse traverse-screws, having driven connection with said driving-shaft, a guide-rod eccentrically mounted upon suitable brackets in proper relation to said traverse-screws, a traverse-arm for supporting a recorder or reproducer slidably mounted upon said guide-rod comprising a rack delicately supported on said traverse-arm and between said traverse-screws, means for operating said guide-rod for raising and lowering said traverse-arm, alternately bringing into engagement said rack, with either of said traverse-screws and simultaneously raising and lowering a recorder and reproducer, supporting-arm mounted on said traverse-arm whereby said recorder and reproducer are brought into and out of engagement with the record, substantially as specified.



10. In a phonograph, a main driving-shaft, means for conveying power to said shaft, record-supporting means, having driven connection with said driving-shaft forward and reverse traverse-screws, having driven connection with said driving-shaft, a guide-rod eccentrically mounted upon suitable brackets in proper relation to said traverse-screws, a traverse-arm for supporting a recorder or reproducer slidably mounted upon said guide-rod comprising a rack delicately supported on said traverse-arm and between said traverse-screws, means for operating said guide-rod for raising and lowering said traverse-arm, alternately bringing into engagement said rack, with either of said traverse-screws and simultaneously raising and lowering a recorder and reproducer supporting arm mounted on said traverse-arm whereby said recorder and reproducer are brought into and out of engagement with the record, means for positively maintaining said guide-rod in any adjusted position, substantially as specified.

11. In a phonograph, a main driving-shaft, being driven by suitable power, a combined driving and clutch member loosely mounted on said shaft, a cooperating clutch member fixed to turn with and slide on said shaft, adapted to be brought into engagement with said loose clutch member for conveying power thereto, means for electrically operating said fixed clutch member into and out of engagement with said loose clutch member, record-supporting means, power-transmitting devices connecting said loose clutch member to said record-supporting means, traversing mechanism having driven connection with said driving-shaft, a guide-rod, supported on suitable brackets in proper relation to said traverse mechanism, a traverse-arm for supporting a recorder or reproducer slidably mounted upon said guide-rod and provided with means engaging said traverse mechanism, for traversing the same, means for raising said traversing arm whereby said recorder and reproducer are brought into and out of

engagement with the record, and means for reversing the travel of said traversing mechanism, substantially as specified. 50

12. In a phonograph, a source of power, a driving-shaft, record-supporting mechanism having driven connection therewith, reproducer or recorder traversing mechanism having driven connection therewith, clutch members controlling the power transmission, a magnet for operating said clutches, circuit connections for the magnet and a switch, whereby the instrument is operated when the circuit is closed, substantially as described. 60

13. In a phonograph, a vertically-disposed driving-shaft, horizontally-disposed record-supporting means, a loose clutch member on said shaft having driving connection with the said record-supporting means, a cooperating clutch member fixed to turn with said shaft, and slide vertically on said shaft, an electromagnet for one clutch member adapted to magnetically attract the cooperating clutch member whereby the vertically-movable clutch member is lifted when the magnet is energized, and drops by a gravity when the magnet is deenergized, substantially as described. 70

14. In a phonograph, a driving-shaft, means for rotating the same, a record-rotating shaft, transmitting devices between said shafts comprising a magnet clutch mechanism, an electric circuit and source of electricity for energizing said magnet and shifting one of said clutch members, means for automatically unshifting said clutch members when the magnet is deenergized, and a switch in the said circuit under the control of the operator whereby the said record-rotating shaft may be stopped and started independent of the said driving-shaft, substantially as described. 85

In testimony whereof I have hereunto set my hand.

CHARLES W. NOYES.

Witnesses:

OLIVER B. KAISER,  
LUISE BECK.