

930,683.

Patented Aug. 10, 1909.
 2 SHEETS—SHEET 1.

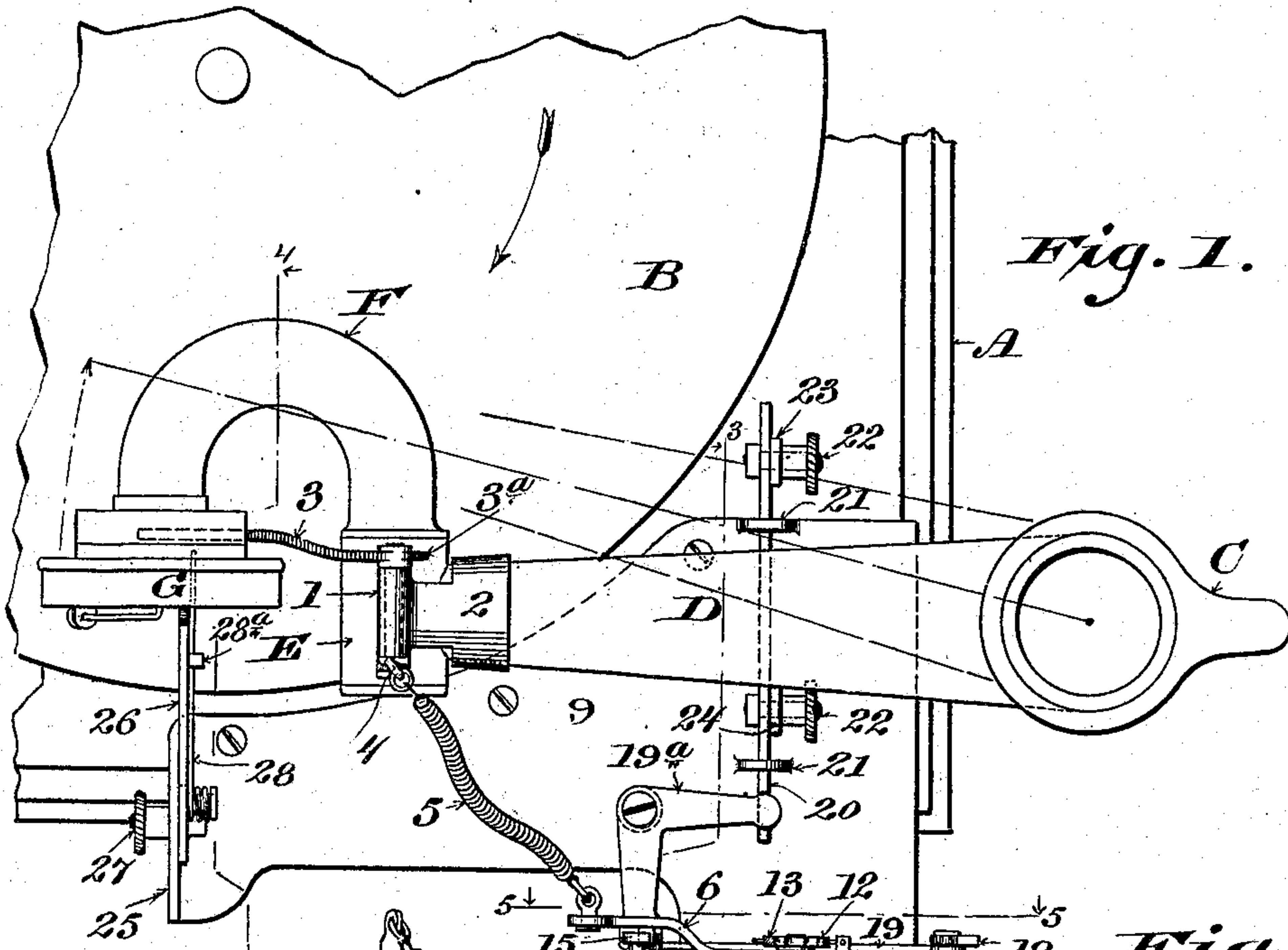


Fig. 1.

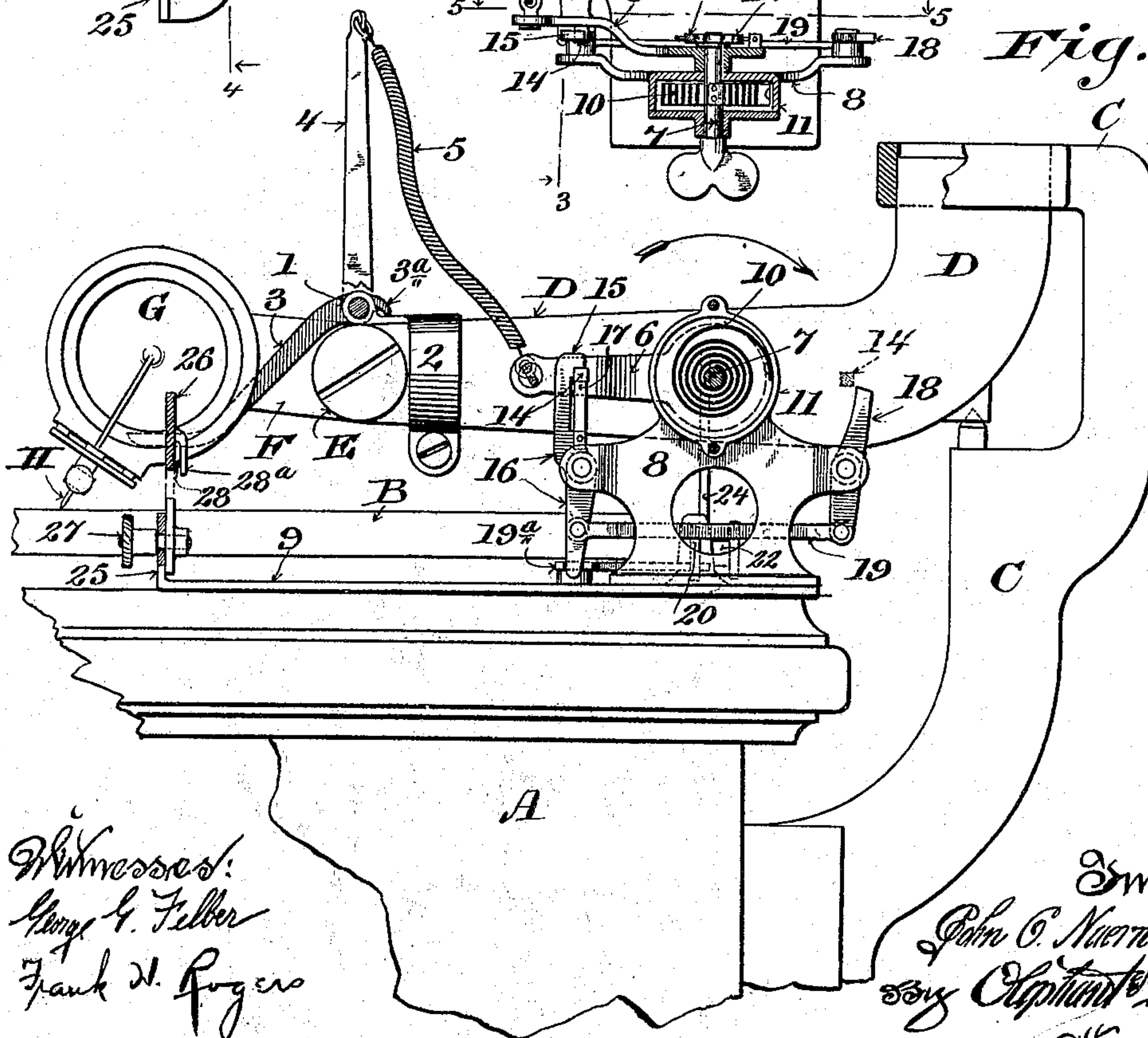


Fig. 2.

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PHONOGRAPH.

No. 930,683.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed December 30, 1908. Serial No. 470,075.

To all whom it may concern:

Be it known that I, JOHN C. NUERNBERG, a citizen of the United States, and resident of Athens, in the county of Marathon and State of Wisconsin, have invented certain new and useful Improvements in Phonographs; and I do hereby declare that the following is a full, clear, and exact description thereof.

The object of my invention is to provide a simple and effective repeating attachment for disk phonographs, its construction and arrangement being such that when the swinging-arm of a phonograph has completed its travel in the reproduction of a record, the said arm is lifted by the repeating device, returned to the starting point upon the record, and then gently lowered in such a manner that the pin is set upon the record without causing any damage to the same.

The invention therefore consists in various structural features and combination of parts as hereinafter set forth with reference to the accompanying drawings and subsequently claimed.

In the drawings: Figure 1 represents a plan view of a fragment of a disk phonograph having attached thereto a repeating device embodying the features of my invention, parts being broken away and parts in section to better illustrate the details; Fig. 2, an elevation of the same with parts broken away and other parts in section to more clearly show the structural details; Fig. 3, a detail sectional view of the apparatus, the section being indicated by line 3—3 of Fig. 1; Fig. 4, a detail cross-section of the apparatus, as indicated by line 4—4 of Fig. 1; Fig. 5, a detail sectional view as indicated by line 5—5, showing an elevation of the repeater, motor and connected mechanism, and Fig. 6, a detail sectional view, as indicated by line 6—6 of the preceding figure.

Referring by characters to the drawings, A indicates a phonograph box, B a record disk mounted thereon and C a hanger which is secured to the box, into which hanger is pivotally mounted the usual horizontal swinging hollow arm D. This arm terminates with a cross sleeve E, into which is oscillatively fitted a U-shaped tube F, the outer free end of the tube being provided with a diaphragm head G carrying the vibratory pin H. All of the above described

mechanism is of any standard construction and forms no part of my invention, it being understood that the U-shaped tube is capable of independent vertical motion relative to the horizontal swing of the arm D, whereby compensation is provided when the pin H is performing its function.

A bearing sleeve 1 provided with an extending clip 2 is secured to the arm D at the junction of its sleeve-portion E. Fulcrumed in the bearing sleeve 1 is a controlling lever having a depending arm 3 that extends under the diaphragm head G and an upwardly projecting arm 4, which latter arm is connected by a flexible coil-spring 5 to a motor-controlled crank 6 that is intermittently rotated. A stop-lug 3^a extends from the lever-arm 3 and is adapted to contact with the sleeve portion E of the swing-arm D, the lug being provided to control the limit of movement of the lever in one direction. The crank is loosely mounted upon a power-shaft 7, which shaft is revoluble in bearings of a frame 8 secured to a base-plate 9, the base-plate being in turn fast to the top of the phonograph box. One end of a clock-spring 10 constituting a motor, is secured to the power-shaft 7, the opposite end of the clock-spring being fast to a housing 11, forming part of the frame 8, and through which housing one end of the power-shaft extends and is provided with a winding-key, as shown. The opposite end of the power-shaft has secured thereto a ratchet-wheel 12, which is engaged by a spring-controlled pawl 13 carried by the crank 6, whereby said crank is rotated in one direction, while the pawl and ratchet-wheel connected to the power-shaft constitute a clutch to permit winding of the clock-spring without disturbing the aforesaid crank. The crank 6 is arranged to be rotated by the clock-spring in the direction as indicated by the arrows in Figs. 2 and 5, and as shown in these figures, when said crank is in its normal position it is held by a lug 14, which lug engages the underside of a notched head 15 of a rock-arm 16, the latter being fulcrumed upon the frame 8. For the purpose of preventing movement of the crank 6 during the winding operation of the clock-spring 10, the crank-lug 14 is locked against the underside of the notched head 15, by means of a wedge-shaped block 17, which block forms part of a leaf-spring that is secured to said rocker-arm. The

tapered face of the block 17 is presented toward the end of the lug 14 and is disposed at a right-angle to the fulcrum of the rocker-arm. By this arrangement it will be seen
5 that as the crank lug is brought to its seat under the rocker-arm head, the end of the lug will engage the leaf-spring and force the same backward to thereby permit said lug 14 to seat, at which time said leaf-spring
10 snaps forward and effects the locking.

Pivoted to the frame 8, opposite the rock-arm 16, is another rock-arm 18, the two being connected by a link 19, whereby they are actuated in unison and constitute in connection with the crank stops for the motor. The
15 upper end of the rock-arm 18 is also arranged to be engaged by the lug 14 of the crank, whereby the latter is checked when released by the rock-arm 16, thus the motive force in connection with said crank is checked at each half revolution. The lower
20 end of the rock-arm 16 is engaged by one arm of a bell-crank 19^a, which bell-crank is pivoted upon the base-plate 9, the opposite arm of said bell-crank being nested within a notched recess of a slide-bar 20, as clearly
25 illustrated in Figs. 1 and 3 of the drawings. The slide-bar 20 is guided in ears 21 extending from the base-plate and is slotted to receive thumb-screws 22, which screws serve as
30 retainers for a pair of adjustable tappets 23, 24, that are arranged to project upward upon opposite sides of the swinging arm D of the plunger, and together with the slide-bar and bell-crank constitute release-mechanism for the rock-arms or motor stops. As
35 best shown in Figs. 1 and 4 of the drawings, the base-plate 9 is provided with a slotted flange 25 approximately alined with the diaphragm head G. This flange carries an adjustable finger 26 which is secured to the flange by means of a thumb-screw 27 that
40 passes through the slot in said flange and also through an aperture in the base-portion of the finger. The end of the finger projects slightly over the upper face of the record-disk and beyond said finger end is extended the tail of a spring-rod 28 having its end
45 turned downward. The spring-rod is fastened to the base-portion of the finger and is normally under a slight tension, due to its engagement with the throat of a guide-lug 28^a, which extends from the finger and serves to hold the spring against horizontal play.
50 The finger 26 constitutes a stop against which the diaphragm head contacts when returned to its starting-point, its adjustable feature being provided in order that said diaphragm head may be accurately checked
55 so to bring the pin H thereof in register with the circumferential starting-point upon the record-disk. The delicate spring-rod 28 in this case extends under the aforesaid diaphragm head, and as the same drops,
60 by gravity, this spring-rod receives and ab-

sorbs all shock in order that the pin H may be gently seated upon the record-disk and thus prevent the same from being injured.

It should be understood that the weight of the vertically swinging diaphragm-head
70 and connected parts, relative to the tension of the spring-rod, is such that said tension will not interfere with a perfect contact between the pin H and record-disk, and when the diaphragm-head leaves the spring-rod
75 there will be no appreciable change in the tone of the instrument, this effect being due to the inclined end of said spring-rod, which permits a gradual release of said diaphragm-head from the former. 80

In adjusting the repeater device, the tappets 23, 24, are set so that the tappet 24 will be actuated by the swing-arm D, upon the return of the same to its starting position. The tappet 23 is likewise set with relation
85 to the swing of the arm, so that when said arm has reached the point upon the disk where the record is concluded the aforesaid arm will actuate this last named tappet.

As shown in the drawings, all views illustrate the parts in their starting position, in which position the coil-spring 5 is more or less slack, due to the crank 6 and lever-arm 4 being at their shortest position apart. Now should the instrument be put in motion
95 a reproduction of the record will be instantly started, the swinging-arm D being gradually moved in an arch toward the center of the disk until such time as it strikes tappet 23. A slight movement of the tappet,
100 together with the slide-bar 20, then causes a movement of the bell-crank 19^a, which in turn actuates the rocker-arms 16 and 18. This movement frees the lug of crank 6 from its seat under the head of the rocker-arm
105 16 and releases the motive power, which power causes said rocker-arm to make one-half of a revolution, when it is stopped by the end of rocker-arm 18 having been moved into the path of travel of the lug 14 simultaneously with the movement of rocker-arm
110 16, due to the link-connection between the latter and rock-arm 18. Upon the initial movement of the released crank its coil-spring connected to lever-arm 4, causes the
115 same together with its arm 3 to rock in the sleeved bearing, the coil-spring 5 prior to this time having been drawn taut. In consequence of this movement, it will be understood that the diaphragm-head together
120 with pin H is immediately lifted by lever-arm 3 a slight distance, which distance is limited by the stop-lug 3^a of said arm coming in contact with the sleeve E of the swing-arm. The pin H is now clear of the disk
125 record and as the crank 6 completes its half revolution under the power of the motor, the swing-arm D is quickly moved over to its starting position. Thus the crank-arm 6
130 in describing its first half revolution lifts

the diaphragm-head and draws the swinging-arm D back to its starting-point. The crank-arm now rests upon the top of rocker-arm 18 and the coil-spring 5 is taut. Owing to the fact that the crank-arm, when making its first revolution, travels faster than the swinging-arm D, said crank-arm consequently distends the coil-spring 5 and hence the latter spring, in contracting, causes the swinging-arm D to be moved over to its starting-point, the interval of time in which this movement takes place being the period when the crank-arm is resting upon the rocker-arm 18. At the instant of impact between the diaphragm-head and the finger 26, upon the return movement of the swinging-arm D, the latter actuates tappet 24, which action through the slide-bar and bell-crank causes the rock-arms to assume their normal or starting position, as shown in the drawings. This rock-arm 18 is thus swung free of the lug 14 of the crank-arm, which arm had momentarily rested thereon and the latter is thereby returned by the motor to its starting-point having now made a complete revolution in one direction. The crank-arm after being returned to its normal or starting position is again caught under the head of rock-arm 16, whereby slack of the coil-spring 5 is established and the diaphragm head will assume such a position as will enable the pin H to effect a repeat operation of the record, by engaging the first circumferential groove in the disk.

Thus it will be seen that the essential features of the repeater mechanism consist primarily in a motor having a flexible connection with the swinging-arm of a phonograph and intermittent stop and start mechanism for the motor under control of said swinging arm.

While I have shown and described the motor-spring as being connected directly to the power-shaft, it is apparent that there may, in some instances, be interposed any suitable clock-gear trains between the spring and power-shaft, whereby frequent winding of said spring will be avoided.

I claim:

1. In a disk phonograph provided with a swinging-arm, a repeating mechanism comprising a motor, a crank in connection with the motor, a pair of stops for the crank, release tappets disposed upon opposite sides of the swinging-arm in connection with the stops, and a flexible connection between the crank and swinging-arm.

2. In a disk phonograph provided with a swinging-arm, a repeating-mechanism comprising an independent motor, a flexible connection between the swinging-arm and motor, and a start-and-stop mechanism for the motor controlled by said swinging-arm.

3. In a disk phonograph provided with a horizontally swinging-arm, and having a vertically swinging head section in connection with the arm, a repeating-mechanism comprising a controlling-lever for the head section carried by the arm, a stop for said arm adapted to engage said head section, a motor, a flexible connection between the motor and controlling-lever, stop-and-start mechanism for said motor, and tappet mechanism disposed in the path of travel of the swinging-arm in connection with the stop-and-start mechanism.

4. In a disk phonograph provided with a horizontally swinging-arm, and having a vertically swinging head section in connection with the arm, a repeating-mechanism comprising a controlling-lever for the head-section carried by the arm, a yielding stop for said arm adapted to engage said head-section, a motor actuating crank, a flexible connection between the crank and controlling-lever, stops disposed in the path of travel of the crank, tappets upon opposite sides of the swinging-arm, and releasing means for the stops in connection with the tappets.

5. In a disk phonograph provided with a horizontally swinging-arm, and having a vertically swinging head-section in connection with the arm, a repeating-mechanism comprising a controlling lever in pivotal connection with said arm, one arm of which lever extends under the head-section, a stop for the controlling-lever, an adjustable yielding stop for the head section of the aforesaid arm, a motor actuating crank, a flexible connection between the crank and controlling lever, stops disposed in the path of travel of the crank, tappets upon opposite sides of the swinging-arm, and adjustable releasing means for the stops in connection with the tappets.

In testimony that I claim the foregoing I have hereunto set my hand at Athens, in the county of Marathon and State of Wisconsin in the presence of two witnesses.

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Witnesses:

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