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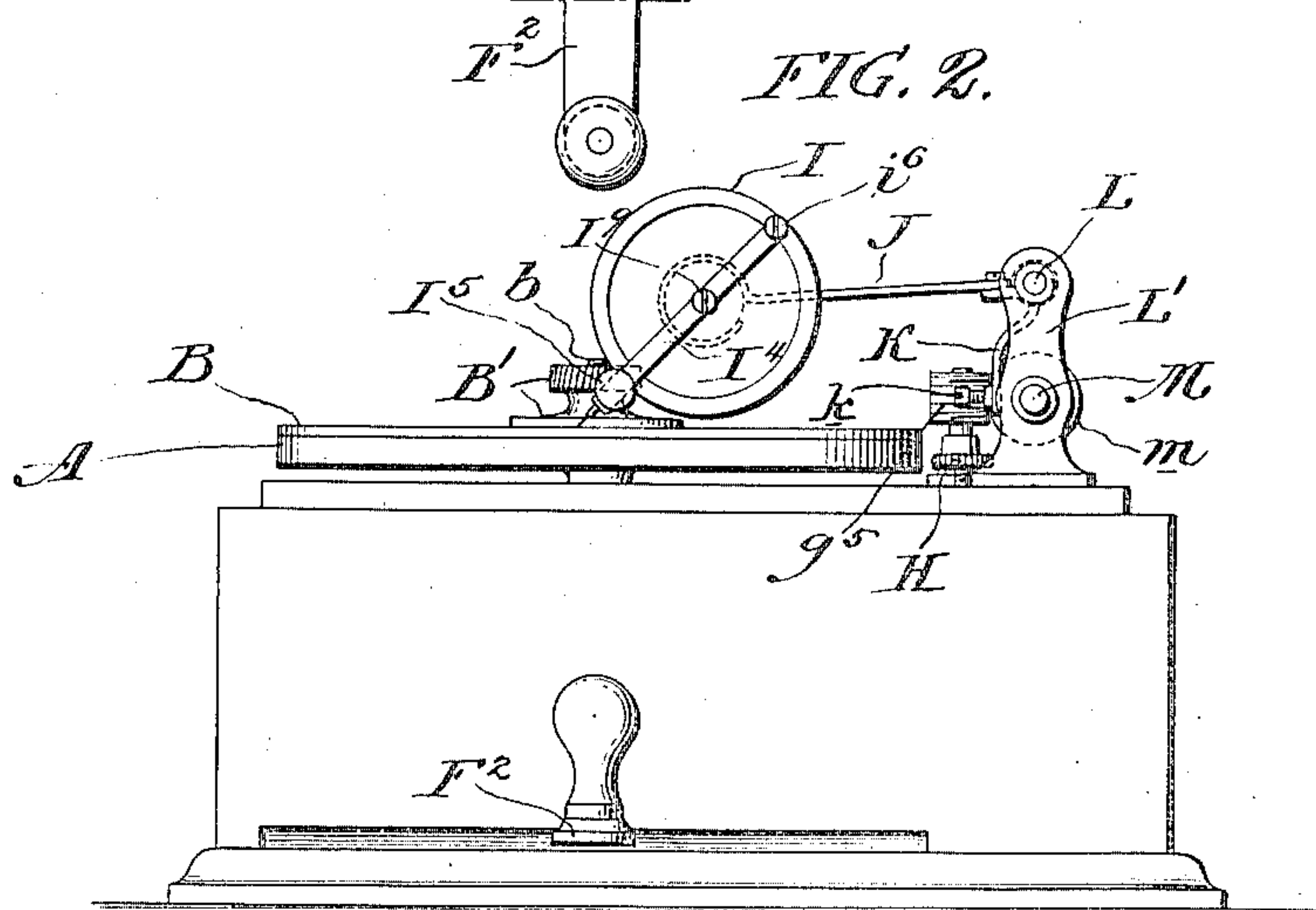
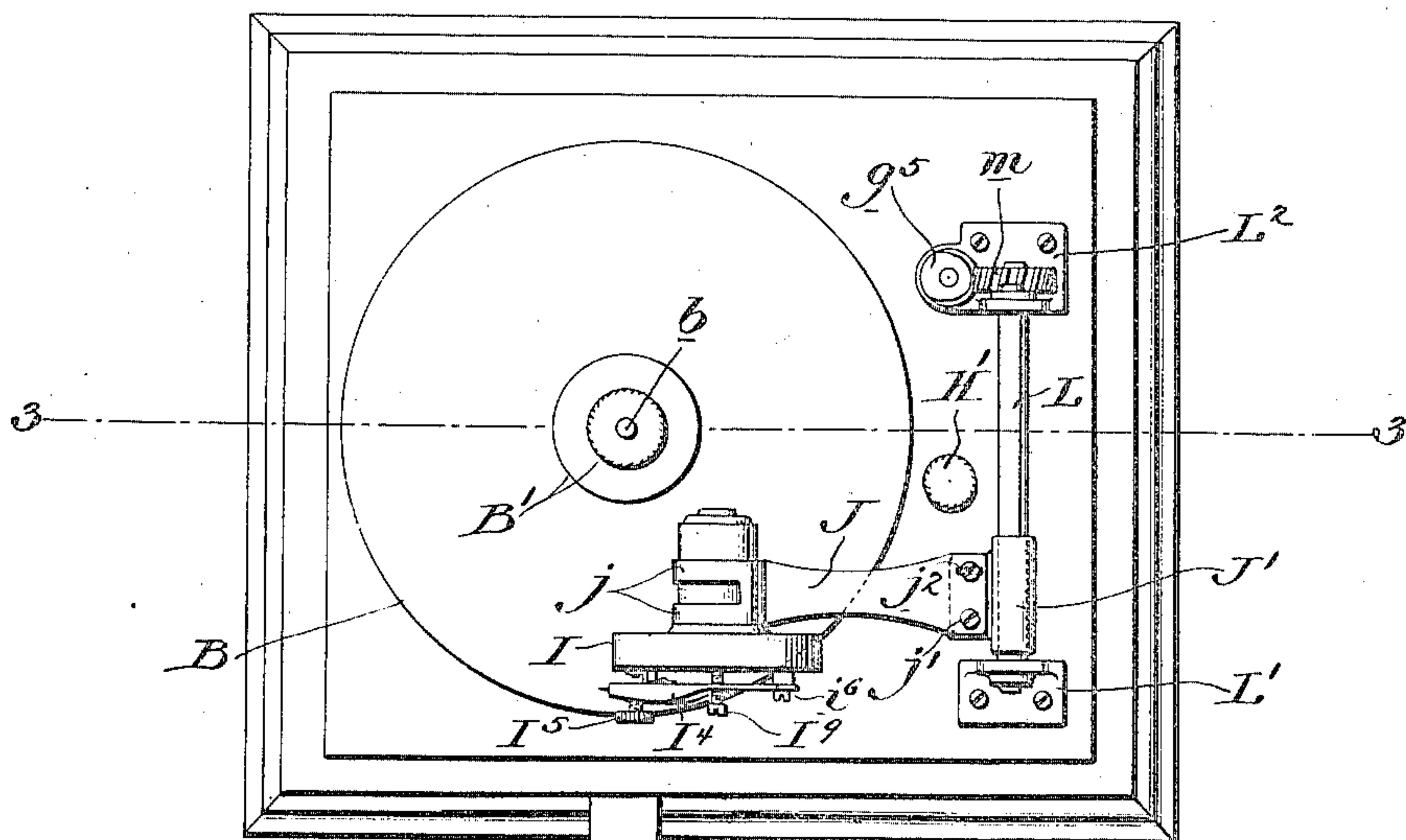
3 Sheets—Sheet 1.

J. W. JONES.
SOUND REPRODUCING MACHINE.

No. 604,829.

Patented May 31, 1898.

FIG. 1.



WITNESSES

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(No Model.)

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FIG. 3.

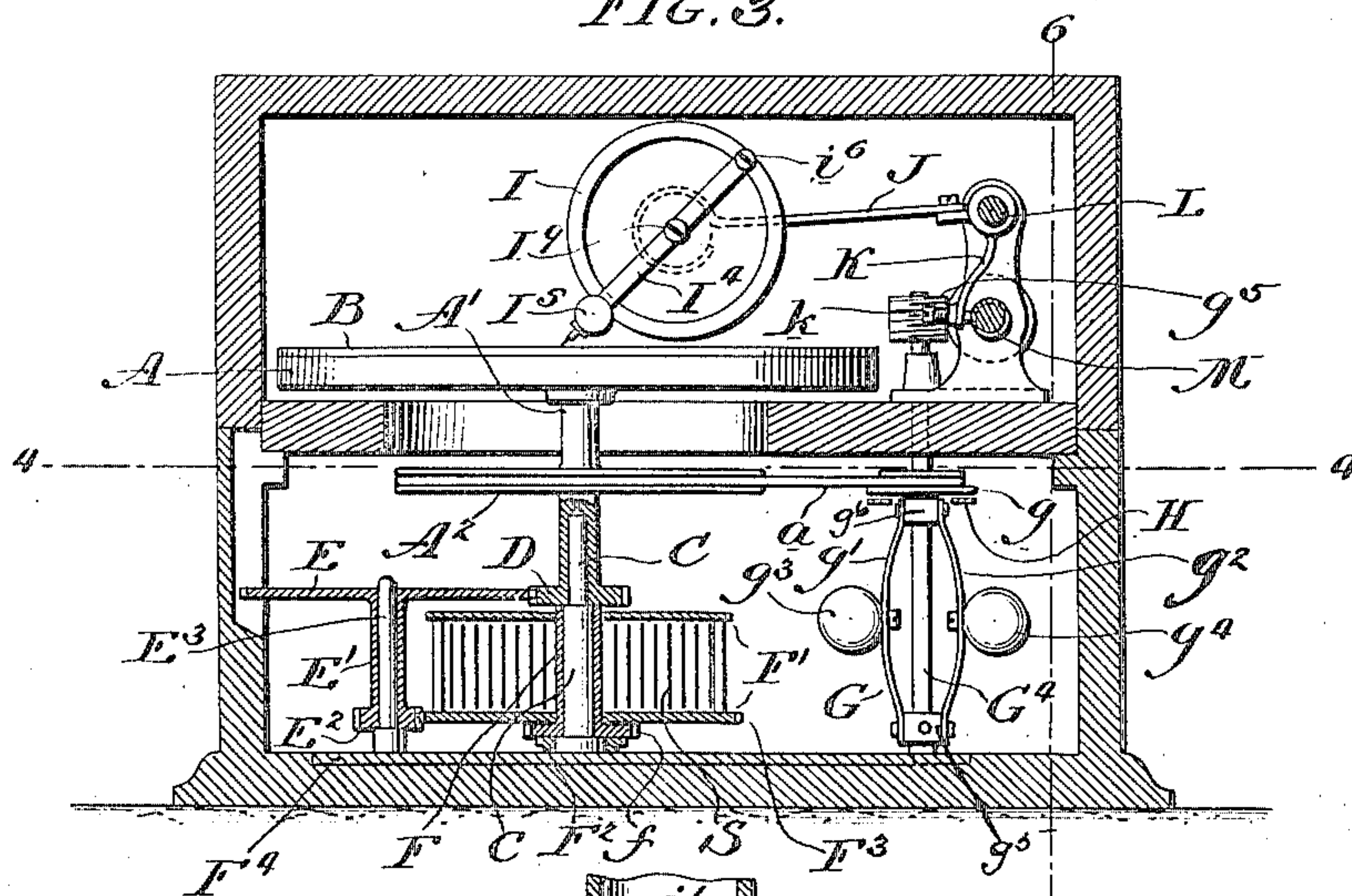


FIG. 5.

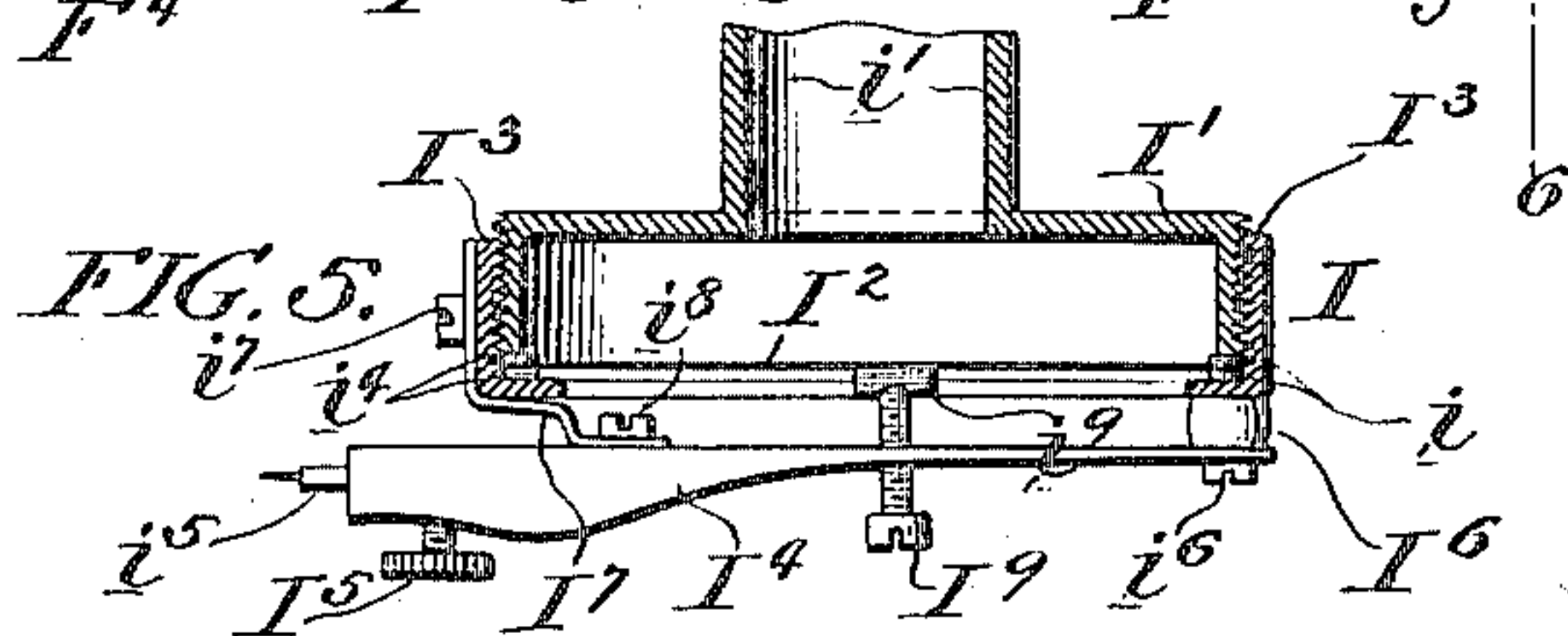
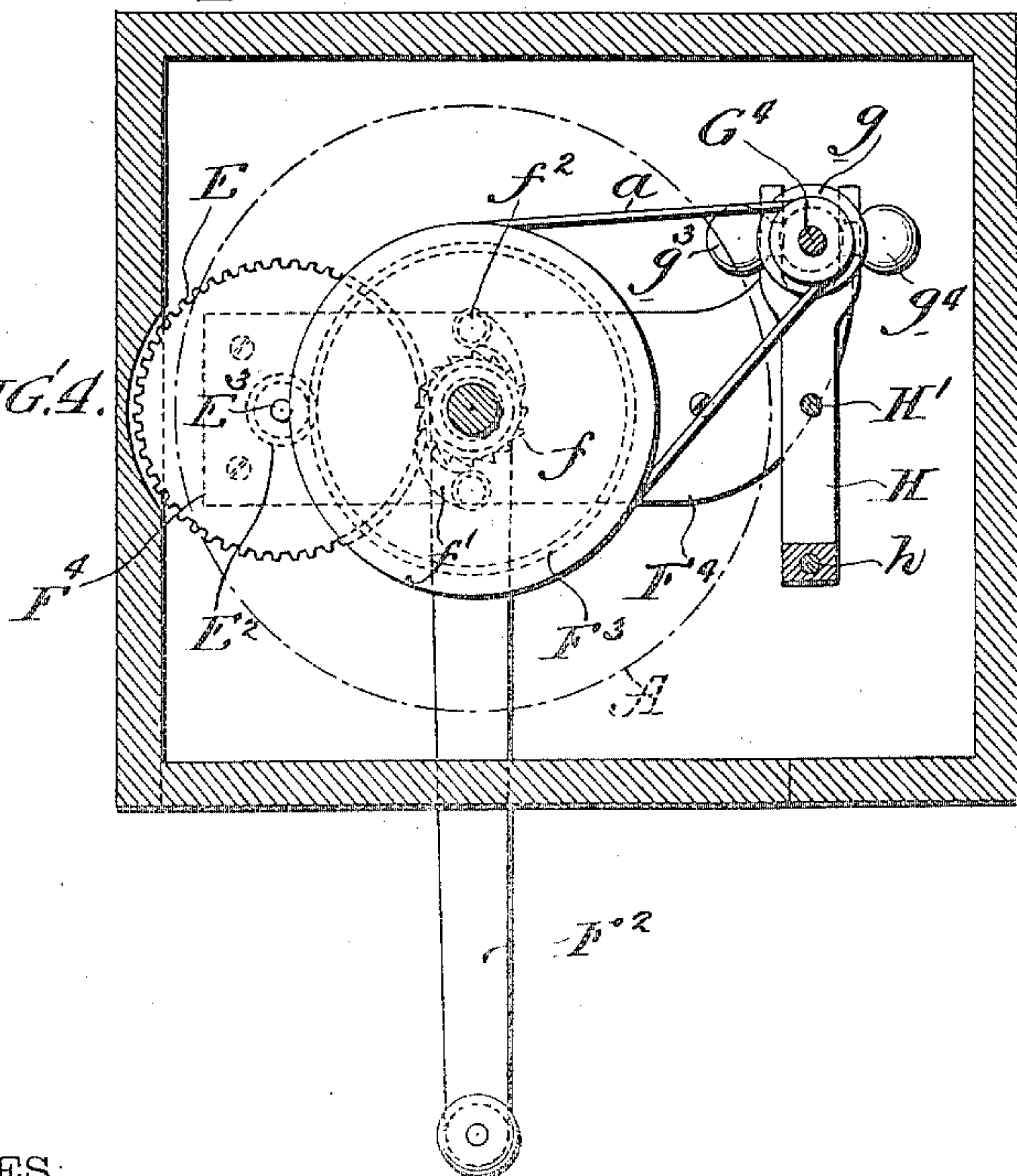


FIG. 4.



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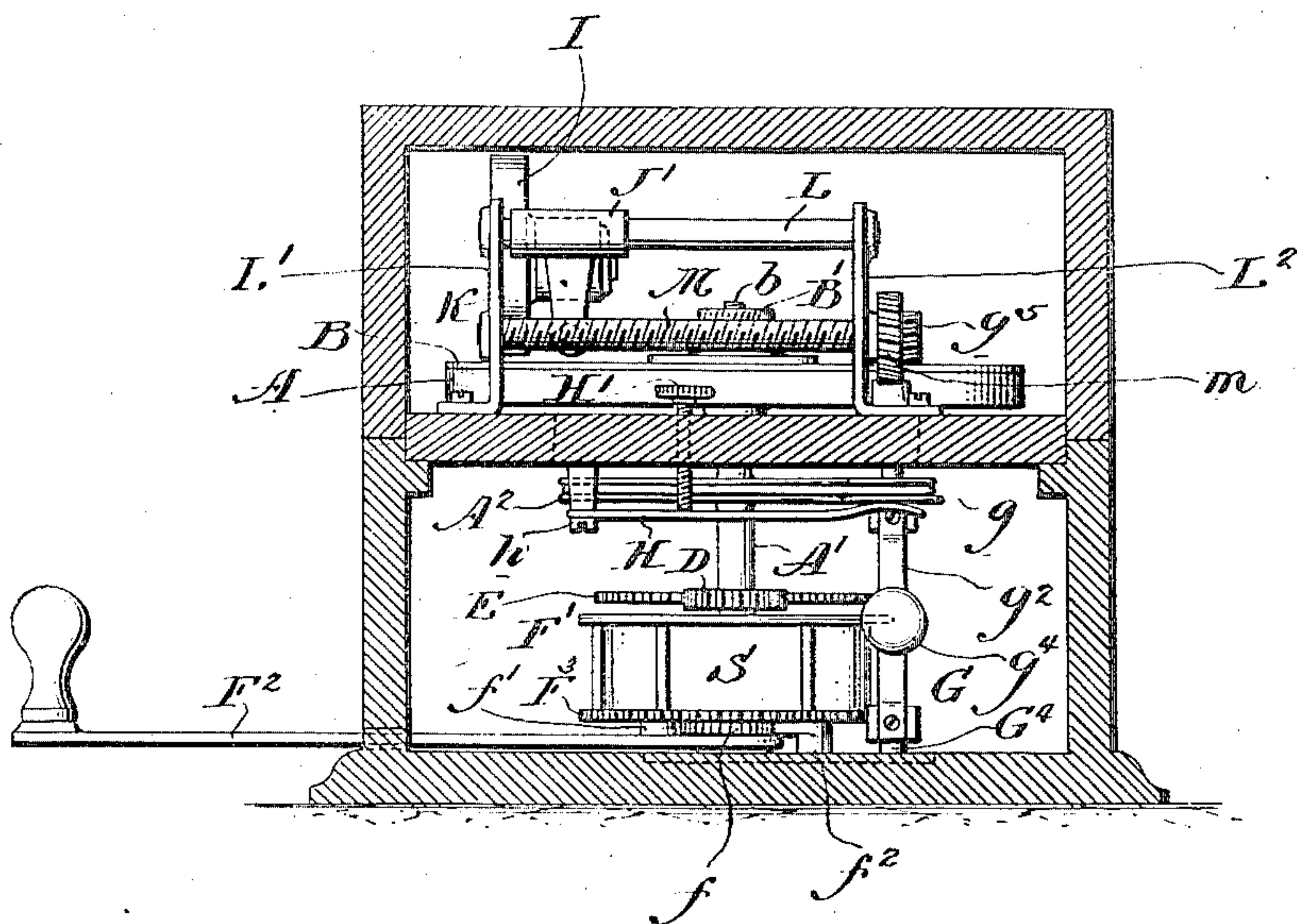
3 Sheets—Sheet 3.

J. W. JONES.
SOUND REPRODUCING MACHINE.

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FIG. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH W. JONES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
HIMSELF AND JOSEPH A. VINCENT, OF SAME PLACE.

SOUND-REPRODUCING MACHINE.

SPECIFICATION forming part of Letters Patent No. 604,829, dated May 31, 1898.

Application filed July 23, 1897. Serial No. 645,750. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. JONES, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Sound-Reproducing Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in the reproducing apparatus adapted for use in the method of recording and reproducing sounds as carried out in that class of instruments known as "gramophones."

In this class of apparatus the record is produced on the face of a disk as a volute band consisting of a sinuous or undulating groove of even depth. In the production of the record a recording-stylus is caused to travel in a straight radial path from the circumference toward the center. The reproduction of the recorded sounds is effected by giving to a reproducing-stylus a vibratory movement by and in accordance with the sinuosities of the record-groove, and these vibratory movements being transmitted to a diaphragm vibrations of the latter give rise to sounds which are reproductions of the sounds originally produced in the recording apparatus.

In all reproducing apparatus of the above type, as far as I am aware, a long arm has been employed to support the sound-box and stylus, and where it has been desired to intensify the sound a horn in like manner has thereby been supported and carried, the movement imparted to the arm sound-box and horn being effected by the delicate groove of the record working in conjunction with the stylus. It frequently happens that the sinuosities of the record leave very delicate partition-lines between the volutes of said record, so that after several reproductions the grooves are caused to run together by the friction of the stylus, thus preventing a complete and perfect reproduction of the sound-waves recorded upon the record.

One of the main features of my invention,

therefore, has reference to the means for positively conveying the sound-box and stylus along with the parts connected thereto across the face of the record-disk at a uniform speed with the travel of the stylus.

Another feature of my invention is the construction of the sound-box and means for regulating the quality of sound thereby produced.

My invention further embodies the construction and arrangement of various parts of the apparatus, all of which will be more fully explained hereinafter.

In reference to the drawings accompanying this specification, Figure 1 represents a plan view of a device embodying my invention. Fig. 2 illustrates a front elevation of the same. Fig. 3 shows a sectional elevation on the line 3 3 of Fig. 1. Fig. 4 represents a sectional plan view on the line 4 4 of Fig. 3. Fig. 5 illustrates an enlarged sectional view of the sound-box diaphragm and stylus, and Fig. 6 illustrates a section on the line 6 6 of Fig. 3.

A represents a rotating table which I prefer to make of sufficient weight to act as a balance-wheel, so that in conjunction with the governor the table will have a tendency to more regularly rotate.

Upon the table A is placed the disk B, containing the record, the same having an opening in the center adapted to a threaded stem b, which projects from the top of the table A, the record-disk being held in place by a thumb-screw B', which engages the threaded stem b. The table A is secured to a vertical shaft A', which carries a pulley A², which through the medium of the belt c and pulley g imparts a rotary motion to the governor G.

The lower end of the shaft A' is hollowed out to receive a stationary vertical shaft C, by which the shaft and table are supported, and upon the lower end of the shaft A' is a pinion D, which meshes with a spur-wheel E, secured to a sleeve E', to which in like manner is fastened at the lower end thereof a pinion E², all of which are supported upon the stationary vertical shaft E³.

Surrounding the stationary vertical shaft C is a sleeve F, which supports the spring-drum F' and to which the inner end of the spring S is secured.

The sleeve F is provided at the lower end

with ratchet-wheel f , operated by a pawl f' , which is pivoted to the winding-lever F^2 . The lower side of the spring-drum F' is provided with a spur-wheel F^3 , forming a part of the spring-drum, and said spur-wheel meshing with the pinion E^2 imparts motion thereto from the spring S , the outer end of which is secured to said drum.

To the base-plate F^4 is pivotally secured a retaining-pawl f^3 , which engages with the ratchet-wheel f to lock the latter in position during the winding of the spring.

The mechanism for causing the sound-box and stylus to travel across the face of the record is driven from the governor-shaft, in order to impart a positive and more regular motion to the stylus.

The vertical shaft G^4 , which is driven by the pulley g , has a lower bearing in the plate F^4 and an upper bearing in one of the brackets supporting the bar carrying the sound-box.

The governor itself, which is of very ordinary type, comprises two steel springs g' and g^2 , to which are secured the weights g^3 and g^4 . At the lower end of the governor said springs are secured to a block g^5 , which in turn is fixed to the shaft. The opposite ends of the springs are secured to a movable block g^6 , to which is secured the pulley g .

On the under side of the upper portion of the cover of the machine is a leaf-spring H , having forked ends capable of being adjusted with respect to the pulley g . The leaf-spring is pivoted at a point h , and at or near the center is an adjusting-screw by which the pressure of the spring upon the pulley g and consequent speed of the machine can be regulated.

The sound-box I is carried by a short arm J , having a spring portion j , which encircles the reduced end of the sound-box and holds the same firmly in position.

The arm J is connected to a sleeve J' by means of screws j' and j^2 , the former acting as a fulcrum-point, while the latter is adapted to a slot in said arm, the object of this arrangement being to allow for any irregularity which may exist between the feed imparted to the stylus by the groove of the record and that given to the arm J by the mechanism acting upon the same.

The sleeve J' is mounted upon a horizontal bar L , which is supported at opposite ends by brackets L' and L^2 , and in like manner said brackets form supports for the screw M .

Depending from the sleeve J' is an arm K , provided with a screw k , tapered at the end to engage the thread of the screw M , by which the sound-box is fed in one direction across the face of the record-disk, motion being imparted to said screw from the shaft G^4 by the worm g^6 , mounted thereon, and worm-wheel m , secured to the end of the screw-shaft.

One of the features of my present invention is the sound-box I , which has been designed to overcome harsh and grating sounds emitted by reproducing-diaphragms and to further re-

duce the loudness of the sound, which cannot be received with comfort by the listener.

In the present construction the sound-box I comprises a casing or body portion I' , provided with a reduced portion i' , through which the sound-waves are conducted.

The diaphragm I^2 is secured to the body portion by a ring I^3 , and on opposite sides of the diaphragm between the ring and casing are soft-rubber washers i^4 .

The stylus-lever I^4 has a heavy rigid portion to which the stylus i^5 is secured by a thumb-screw I^5 , and a spring portion which is secured to the ring of the sound-box by a screw i^6 , there being a buffer I^6 interposed between the stylus lever and ring of the sound-box.

A delicate steel spring I^7 serves to fulcrum the heavy end of the stylus-lever to the ring of the sound-box, the same being secured to the respective parts by screws i^7 and i^8 .

The volume and quality of tone emitted from the sound-box is regulated by the set-screw I^9 , which is threaded to the stylus-lever at the center and bears against a buffer i^9 , fastened to the diaphragm, preferably formed of rubber.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a sound-reproducing machine a record-disk, suitably supported and rotated, a sound-box provided with a diaphragm and stylus, the latter being adapted to the record, a lever secured to the sound-box and hinged to a sleeved portion or carrier which is guided upon a horizontal bar, said lever being hinged in such a manner as to allow a slight movement of the sound-box and stylus independent of the motion imparted by the feed mechanism, the sleeved portion or carrier having a depending portion adapted to a feed-screw, the horizontal bar for guiding said carrier, the feed-screw arranged below the horizontal bar, a worm-wheel on said screw, and a worm driven from the source of power to impart motion to the worm-wheel.

2. A feed-motion for a sound-reproducing machine comprising a horizontal bar, a carrier mounted thereon having a depending portion engaging a feed-screw, the feed-screw, means as shown for imparting motion thereto, a sound-box provided with a diaphragm and stylus, the latter being adapted to a sound-record, and an arm secured to the sound-box and hinged to the carriage in such a manner as to allow a slight movement of the sound-box and stylus independent of the movement imparted thereto by the feed-screw.

3. A sound-reproducing machine consisting of a record-disk suitably supported and rotated, a sound-box provided with a diaphragm, a stylus-lever extending across the face of the diaphragm, having a rigid portion fulcrumed by a spring to the sound-box and a flexible portion secured by a screw to the sound-box, an adjusting-screw located at or

near the center of the stylus-lever, one end of which is in contact with the diaphragm, a sound-box lever hinged and guided upon a horizontal bar, said lever having a depending portion provided with a screw-thread, a screw for engaging the threaded depending portion of said lever, a worm-wheel upon the end of said screw, and a worm driven from the source of power for operating said worm-wheel.

4. A sound-box for a sound-reproducing machine, consisting of a diaphragm mounted in a box or casing, a stylus-lever having a rigid portion hinged to the box or casing by a thin leaf-spring, and a flexible portion united through the medium of a rubber cushion to the box or casing, and an adjustable set-screw threaded to the stylus-lever at or near the center thereof, adapted to engage a buffer secured to the center of the diaphragm.

5. In a sound-reproducing machine, a sound-box comprising a shell or casing provided with a diaphragm and stylus-lever, the latter passing diametrically across the face of the diaphragm, and having a rigid portion connected to the sound-box by a spring, and a flexible portion pivoted at the opposite side and provided with a buffer, and an adjusting-screw adapted to the center of the stylus-lever and bearing against the diaphragm, substantially as specified.

6. In a sound-reproducing machine a sound-box provided with a diaphragm and securing-ring, a stylus-lever extending across the face of the diaphragm having a rigid portion fulcrumed by a spring to the securing-ring and a flexible portion formed integral therewith and secured to said ring by a screw and an adjusting-screw passing through the stylus-lever and acting upon a buffer fixed to the center of the diaphragm, substantially as specified.

7. In a sound-reproducing machine, a sound-

box provided with a diaphragm, a stylus-lever extending diametrically across the face of the diaphragm and having a rigid portion fulcrumed at one side of the sound-box and a flexible portion secured to the opposite side of the sound-box with an adjustable screw threaded to the stylus-lever at or near the center and adapted to press upon the diaphragm, substantially as specified.

8. In a sound-reproducing machine, a sound-box provided with a diaphragm and securing-ring, a stylus-lever, extending across the face of the diaphragm, having a thickened and rigid portion fulcrumed by a spring to the securing-ring and a flexible portion united by a yielding pivotal connection to the opposite side of the securing-ring with an adjustable screw passing through the stylus-lever and acting upon the diaphragm, substantially as specified.

9. In a sound-reproducing machine, a sound-box provided with a diaphragm and securing-ring, a stylus-lever extending diametrically across the face of the diaphragm, the same being thick and rigid at one end and thin and flexible at the other, a leaf-spring interposed between the rigid portion of the stylus-lever and the securing-ring, an elastic buffer interposed between the flexible end of the stylus-lever and the securing-ring with a screw for holding the same in position, and an adjusting-screw passing through the center of the stylus-lever and acting upon the diaphragm through the medium of an elastic buffer, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH W. JONES.

Witnesses:

GEO. W. REED,
DAVID S. WILLIAMS.