

No. 741,500.

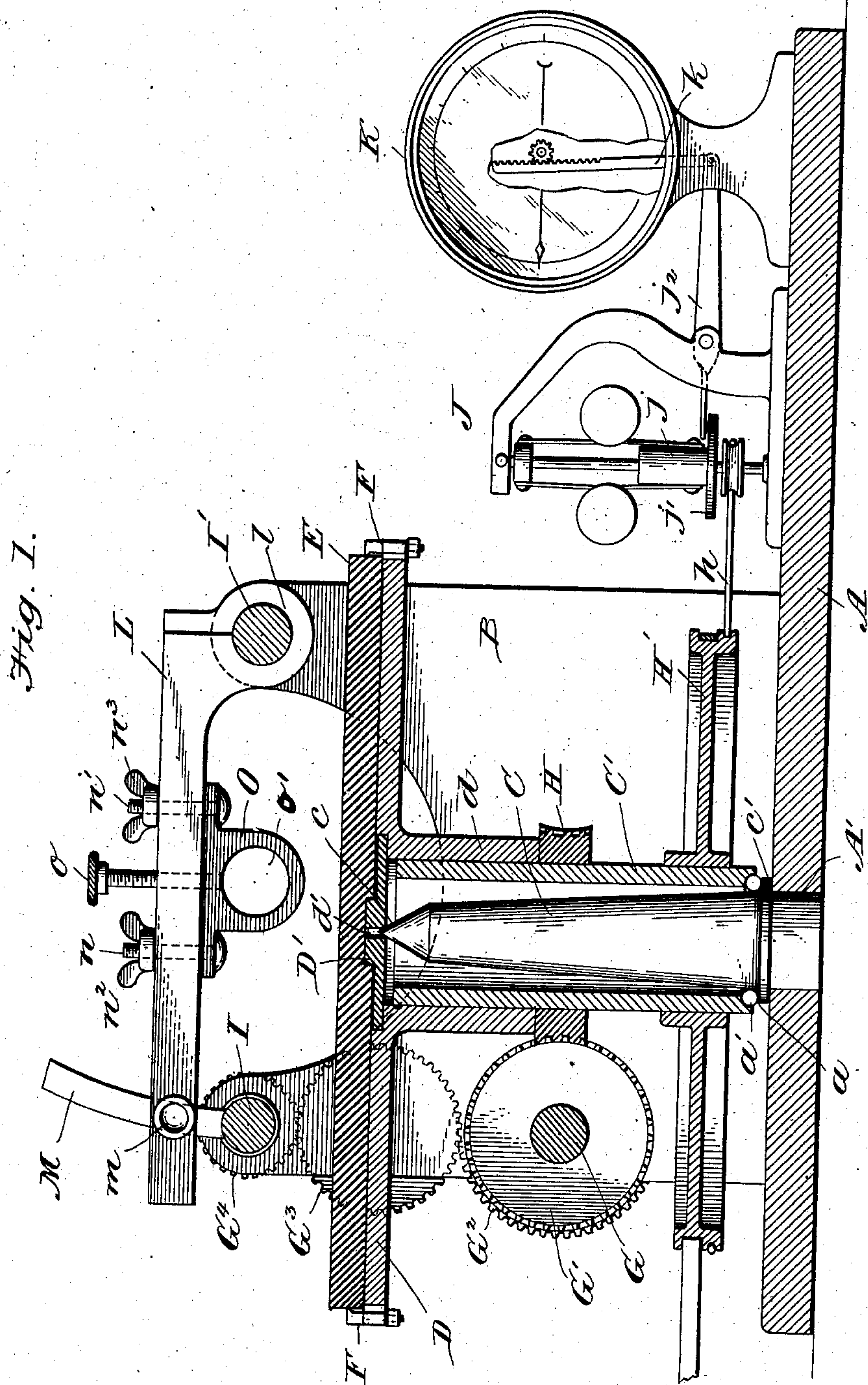
PATENTED OCT. 13, 1903.

E. R. JOHNSON.
SOUND RECORDING MACHINE.

APPLICATION FILED JAN. 20, 1900.

NO MODEL.

3 SHEETS—SHEET 1.



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Witnesses.

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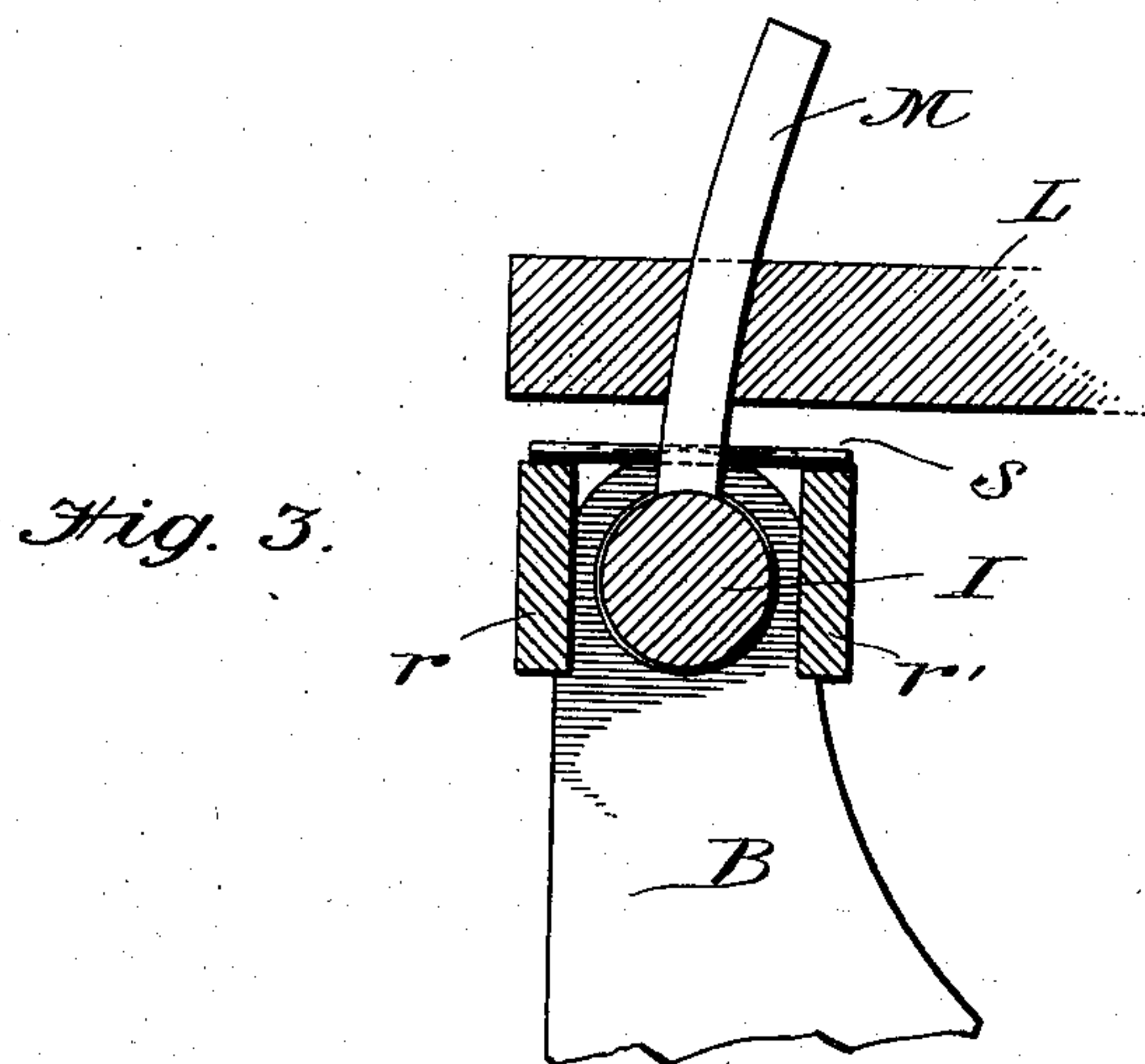


Fig. 4.

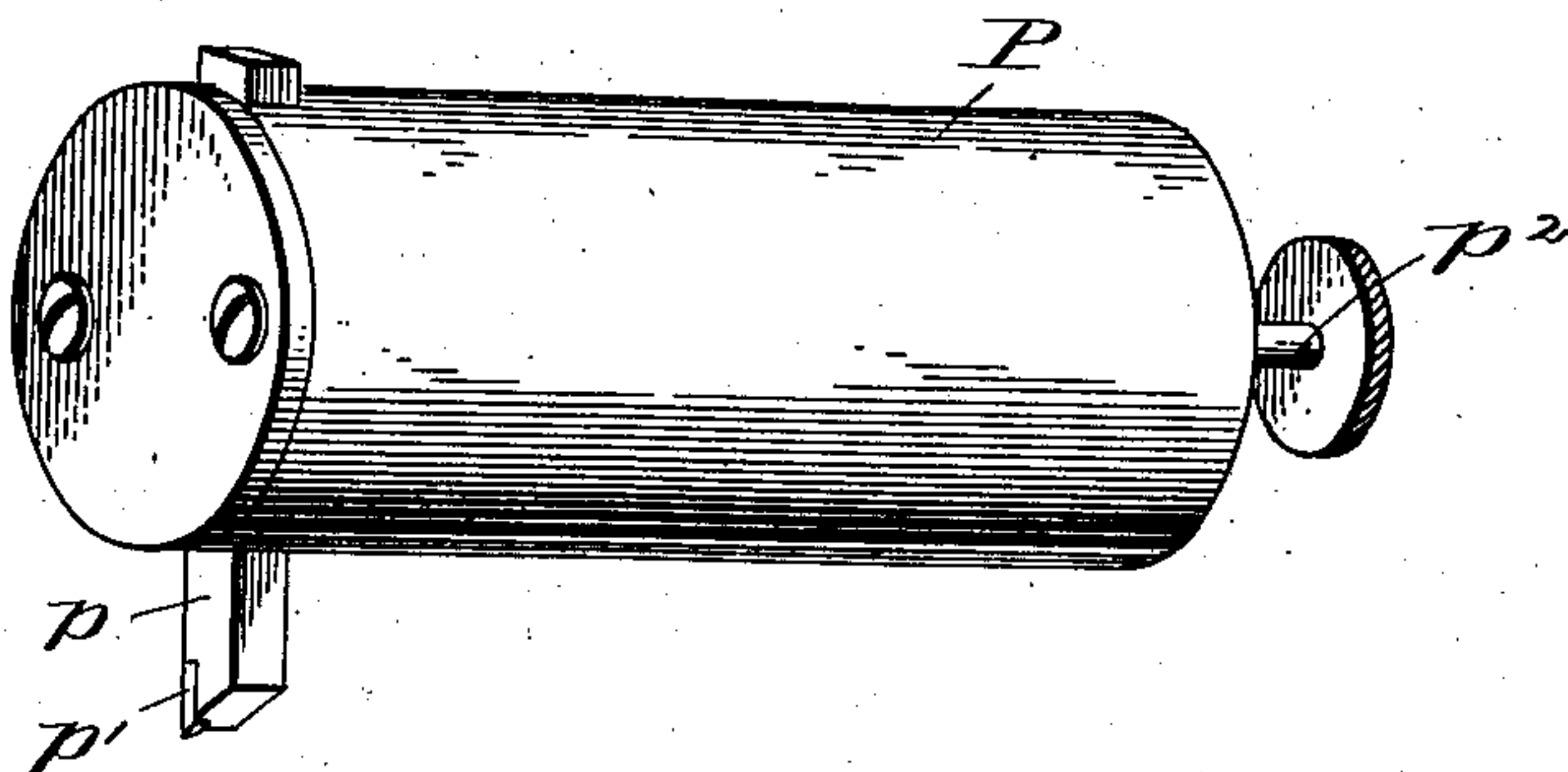


Fig. 5.

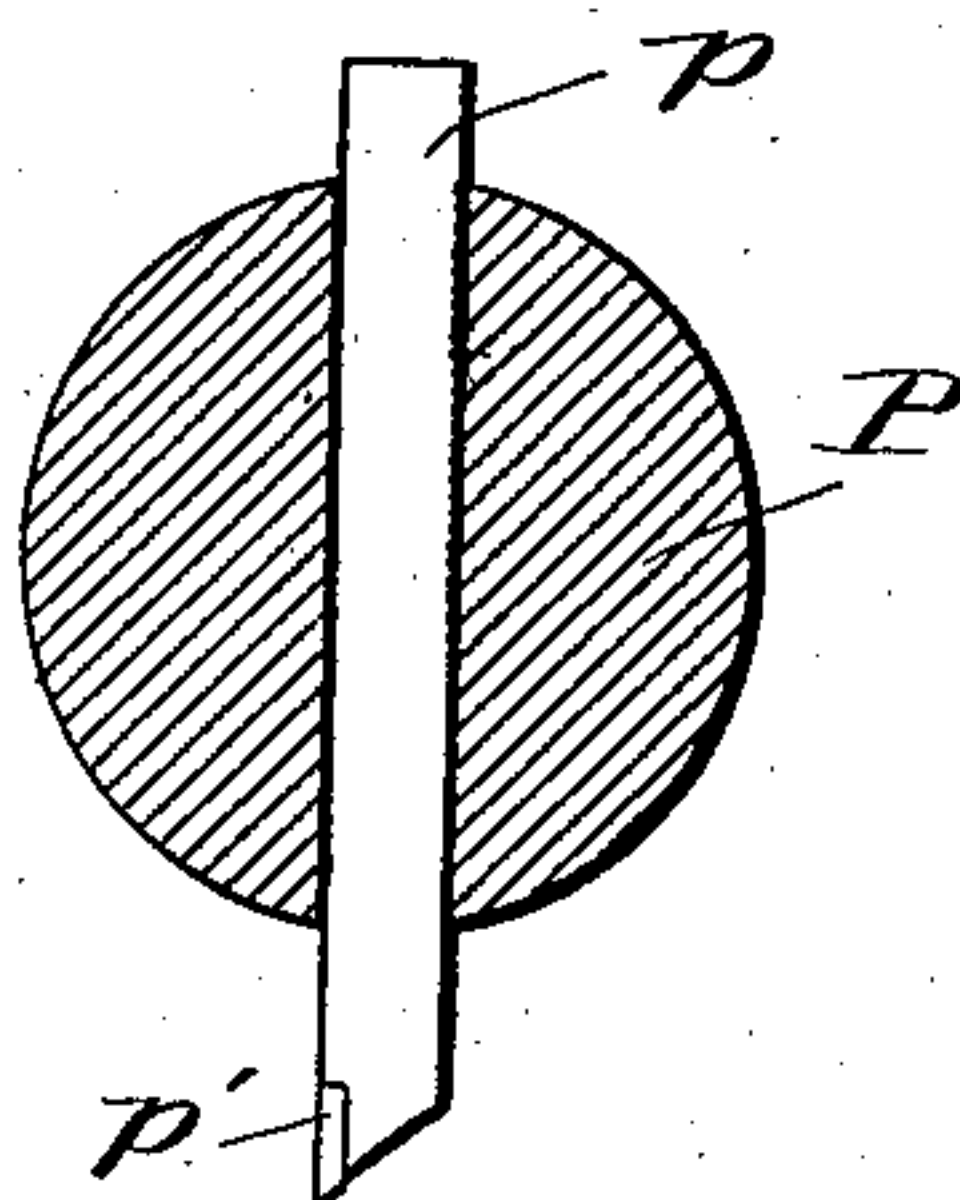
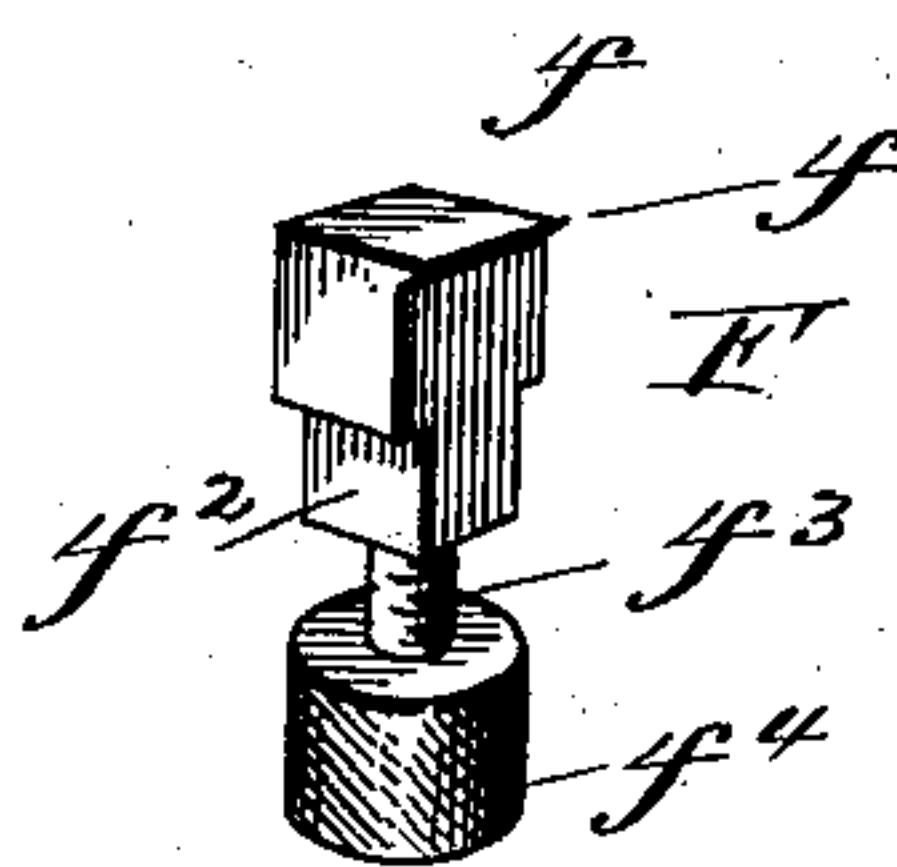


Fig. 6.



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UNITED STATES PATENT OFFICE.

ELDRIDGE R. JOHNSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW
JERSEY.

SOUND-RECORDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 741,500, dated October 13, 1903.

Application filed January 20, 1900. Serial No. 2,173. (No model.)

To all whom it may concern:

Be it known that I, ELDRIDGE R. JOHNSON, a citizen of the United States, and a resident of the city of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Sound-Recording Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an improved sound-recording apparatus for recording sound-waves upon a record such as is used upon machines commercially known as the "gramophone," but which may also be applicable to other machines of a similar character.

The principal object of my invention is to provide an improved construction of machine for recording the sound-waves upon the recording material in undulatory lines of substantially even depth, having the record formed in the sides of the grooves.

A further object of my invention is to provide means for adjusting and truing the sound-recording mechanism and for planing and truing the record material before the recording operation.

Various other uses and advantages will be apparent upon reference to the following description and drawings.

Referring to the drawings, in which similar letters of reference are used to indicate similar parts, Figure 1 is a sectional elevation of my improved recording apparatus. Fig. 2 is a top plan view of the same. Fig. 3 is a detail sectional elevation of the adjustable half-nut used for feeding the sound-box support, showing a slight modification, which is employed when the planing-tool is used before the record operation. Fig. 4 is an enlarged detail perspective of the planing-tool and its holder. Fig. 5 is a cross-sectional view through the tool-holder. Fig. 6 is a detail perspective view of one of the clamps for holding the record-tablet on its supporting-table.

In carrying out my invention I provide a supporting-frame, comprising a main base-plate A and the side plates B B'. Fitted in an opening formed in the center of the base-

plate A is a spindle C, which tapers slightly toward its upper end and is provided with a pointed head c. Around the lower portion of the said spindle C is a flange c', which rests upon the base A around the opening A' and has formed on its upper surface a ball-race adapted to receive a series of balls a', which are held in position by means of a sleeve C'. Rigidly secured to the upper end of the sleeve C' is the turn-table D, having the flange d surrounding the upper portion of the said sleeve C', which may be keyed or otherwise secured to the said sleeve, so as to revolve therewith. The central portion of the turn-table D is provided with a circular offset, in which the centering-disk D' is fitted, the said centering-disk being provided in its center with a small opening d', into which fits the pointed head of the spindle C, thus forming a pivotal bearing for the upper end of this spindle. The disk D' is also provided with an annular boss in its center, adapted to fit in an opening formed in the bottom of the record-disk for centering the same.

E designates the record-disk or recording material, which is composed of a wax-like material which may be readily cut by the operation of the sound-waves upon the cutting-stylus and is of such character that the chips or material cut out will not adhere to any appreciable extent to the record-surface and may thus be readily removed or brushed off. The composition forming the record material should also be of such a character that the walls of the record-groove may readily withstand the rubbing action of the reproducing-style without injuring or defacing the record for the purpose of testing the said record before the process of duplicating and multiplying the same is continued, as it is essential in the manufacture of records to be able to ascertain at once upon the formation of an original record before the talent employed leaves the laboratory whether the record is sufficiently perfect for commercial purposes.

A number of slots e is provided in the periphery of the turn-table D, into which fit the clamps F for securely holding the record in position on the turn-table. These clamps F

comprise a head f , having a knife-edge f' on their inner edges, adapted to take into the material forming the record. The lower portion of the head f is reduced, as at f^2 , and fits in the slotted opening e formed in the turntable, and projecting from the bottom of the head f is a screw-threaded shank f^3 , adapted to receive the nut f^4 for securing the said clamps in their adjusted positions.

Mounted in the side $B B'$, on one side of the central spindle C , is a shaft G , carrying the worm-wheel G' , located centrally between the two side frames. Rigidly secured to the sleeve C' is a worm-wheel H , adapted to mesh with the worm-wheel G' , carried by the shaft G . On the outer projecting end of the shaft G is a gear G^2 , which meshes with an intermediate gear G^3 , journaled on the frame B , which in turn meshes with a gear G^4 , carried on the end of the screw-shaft I . On the lower end of the sleeve C' is rigidly secured the driving-pulley H' , which is connected by means of a suitable belt to the driving mechanism of the machine. This pulley H' also carries a belt h , which is connected to the spindle of a governor J , which may be of any of the ordinary constructions used for this class of machines. On the governor-spindle is a sleeve j , to which is connected one end of the springs which carry the governor-balls, and on the lower end of the sleeve j is formed a disk j' , on the upper surface of which bears a brake-lever j^2 , which is pivoted to the governor-frame. This brake-lever j^2 projects upwardly and has pivotally secured to its outer end a rod k , which is connected with the mechanism of an indicating-dial K , which dial shows during the operation of the machine the number of revolutions of the turntable.

Journaled in the side frames $B B'$ are the horizontal shafts $I I'$. The shaft I' is screw-threaded for a portion of its length, as illustrated in Fig. 2 of the drawings, and is driven by means of the gearing heretofore described. The shaft I' is stationary and carries the supporting-arm L , which is mounted thereon by means of the sleeve l , adapted to fit loosely around the said shaft I' . The other end of the supporting-arm L is provided with a slot through which passes the segmental arm M , having on its lower end screw-threads adapted to engage with the screw-threads provided on the shaft I , heretofore described. The set-screw m is provided for holding the segment M in its adjusted position. In the central portion of the supporting-arm L , I provide a longitudinal slot N , through which pass the bolts $n n'$, the said bolts being secured to the spectacle O , which is adapted to hold the sound-box during the recording process and the planing-tool during the planing and truing process. Each of the screws $n n'$ are provided on their upper ends with the hand-nuts $n^2 n^3$. An adjusting-screw o passes through the center of the slot N and enters into the opening

o' of the spectacle for the purpose of holding the sound-box in position therein.

In Fig. 3 of the drawings I have illustrated a slight modification, which consists in providing the strips $r r'$ on each side of the screw-shaft I , running parallel therewith, said strips being rigidly secured to the side frames $B B'$. Through the segment M , near the bottom thereof, I provide a pin s , extending there- through, adapted to rest on the top edges of the strips $r r'$ when the segment M is in contact with the screw-shaft I . This construction prevents any sagging of the movable arm L in the event of the screw-threads on the shaft I being irregular.

When it is desired to plane the surface of the record-tablet E before the recording operation, I employ a tool such as illustrated in Figs. 4 and 5 of the drawings, which can be inserted in the opening o' of the spectacle O and secured therein by means of the set-screw o . This tool comprises a holder P , cylindrical in form, having an opening provided transversely through one end thereof for the reception of the cutting-tool p . A set-screw p^2 passes longitudinally through the center of the cylinder P and impinges against the tool p for holding the same in position. The end of the tool p is provided with a diamond-point p' , such as is used in machines of this character.

In operation the record-blank E is placed in position on the turn-table D , being centered by means of the annular shoulder of the centering-disk D' entering a depression formed in the lower side of the said record, and the clamps F are then adjusted so as to tightly clamp the periphery of the record-disk and hold it firmly in position. The recording sound-box, which is not illustrated in this case, but which may be of any of the well-known constructions, is placed in position in the spectacle O and adjusted by means of the set-screw o . When this operation has been completed, the recording-stylus will be in contact with the upper surface of the record-blank, and the motor is now started, which revolves the sleeve C' and the turn-table D and also transmits motion through the medium of the worm-gear $G H$ and the intermeshing gears $G^2 G^3 G^4$ to the screw-shaft I . The segment M having the screw-threaded end, as heretofore described, being in contact with the threaded portion of the shaft I will feed the supporting-arm L , carrying the sound-box toward the center of the record-disk, and the record-grooves will be recorded therein. The sound-box can be easily and readily adjusted with relation to the record-blank by means of the set-screws $n n'$, and as soon as the record has been completed the supporting-arm L can be raised from contact with the screw-shaft I and the sound-box removed. A reproducing sound-box can then be inserted in the spectacle O for the purpose of testing the said record, so as to ascertain

whether it is sufficiently perfect for commercial purposes.

Before the recording operation it will be found necessary to plane off the upper surface of the record, so as to make the same perfectly true and even, and in order to accomplish this the tool-holder P, carrying the planing-tool *p*, can be inserted in the spectacle O and the entire surface of the record planed off, so as to insure of its being perfectly true and level.

While I have illustrated and described the particular form of mechanism now used by me, it is evident that various changes might be made in the construction and arrangement of the different parts without departing from the spirit and scope of my invention. Consequently I do not wish to be limited to this exact construction.

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

1. In a sound-recording machine, the combination of a rotating table adapted to support a record-tablet, a horizontally-disposed rod journaled in the frame of the machine above the record-table on one side of the center of said table, a screw-threaded shaft journaled in the main frame on the other side of the table center parallel to the first-mentioned rod, a transversely-disposed carrying-arm loosely mounted on the rod so as to slide freely thereon, a half-nut secured adjacent the free end of the said carrying-arm adapted to rest by gravity on the top of the screw-threaded shaft, an adjusting-spectacle adapted to carry a recording sound-box carried by the carrying-arm, and means for adjusting the half-nut to regulate the height of the recorder, substantially as described.

2. In a sound-recording machine the combination of a rotary table adapted to support a record-tablet, a horizontally-disposed rod journaled in the machine-frame above the table on one side of its center, a screw-threaded shaft journaled in the frame on the other side of the table center, means for revolving said screw-threaded shaft, a carrying-arm loosely mounted on the first-mentioned rod so as to slide freely thereon, a threaded half-nut secured to the other end of said carrying-arm adapted to rest upon and engage the screw-threaded shaft, means for adjusting the half-nut vertically to raise or lower this end of the carrying-arm, a spectacle carried by the carrying-arm adapted to support a sound-box or other recording instrument and means for adjusting the said spectacle on the carrier, substantially as described.

3. The combination with a revolving turn-table, of a supporting arm or carriage arranged above said turn-table, means for moving said carriage in a line parallel to a radius of the table, a spectacle carried by the carriage adapted to support a sound-box, means for adjusting the said spectacle laterally on the carriage, and means for the vertical adjustment of said spectacle, for the purpose described.

4. In a sound-recording machine, the combination of a tapering spindle rigidly supported in the frame of the machine, ball-bearings supported in a race formed on the lower end of said spindle, a loose sleeve fitting around the spindle and supported on the ball-bearings carried thereby, a turn-table secured to the upper end of said sleeve, a worm-wheel secured on the said sleeve below the turn-table, a spiral gear mounted on a horizontally-disposed shaft adapted to engage with the worm-gear, a sliding carriage supported above the turn-table, a screw-threaded shaft for feeding the said sliding carriage, gearing connecting the screw-threaded shaft with the spiral-gear shaft and means for driving the vertical sleeve and turn-table, substantially as described.

5. The combination with the revolving turn-table of a supporting arm or carriage arranged above said table, means for moving the said carriage in a line parallel to a radius of the table, a slotted opening formed in the center of the carriage, a spectacle located on the under side of the carriage, set-screws secured to said spectacle adapted to pass through the slotted opening, and hand-nuts provided on the upper ends of the set-screws for adjusting the position of the spectacle, substantially as described.

6. The combination with the revolving turn-table, of a supporting arm or carriage loosely mounted at one end on a horizontal shaft arranged above the turn-table, a shaft, I, arranged parallel to the main shaft, means for revolving said screw-shaft, a pair of parallel bars arranged on each side of the screw-shaft, a half-nut carried by the carriage adapted to rest upon the screw-threaded shaft, and a pin passing through said half-nut adapted to rest at each end upon the parallel bars, substantially as described.

In witness whereof I have hereunto set my hand this 18th day of January, A. D. 1900.

ELDRIDGE R. JOHNSON.

Witnesses:

JNO. T. CROSS,
BENJ. F. PERKINS.