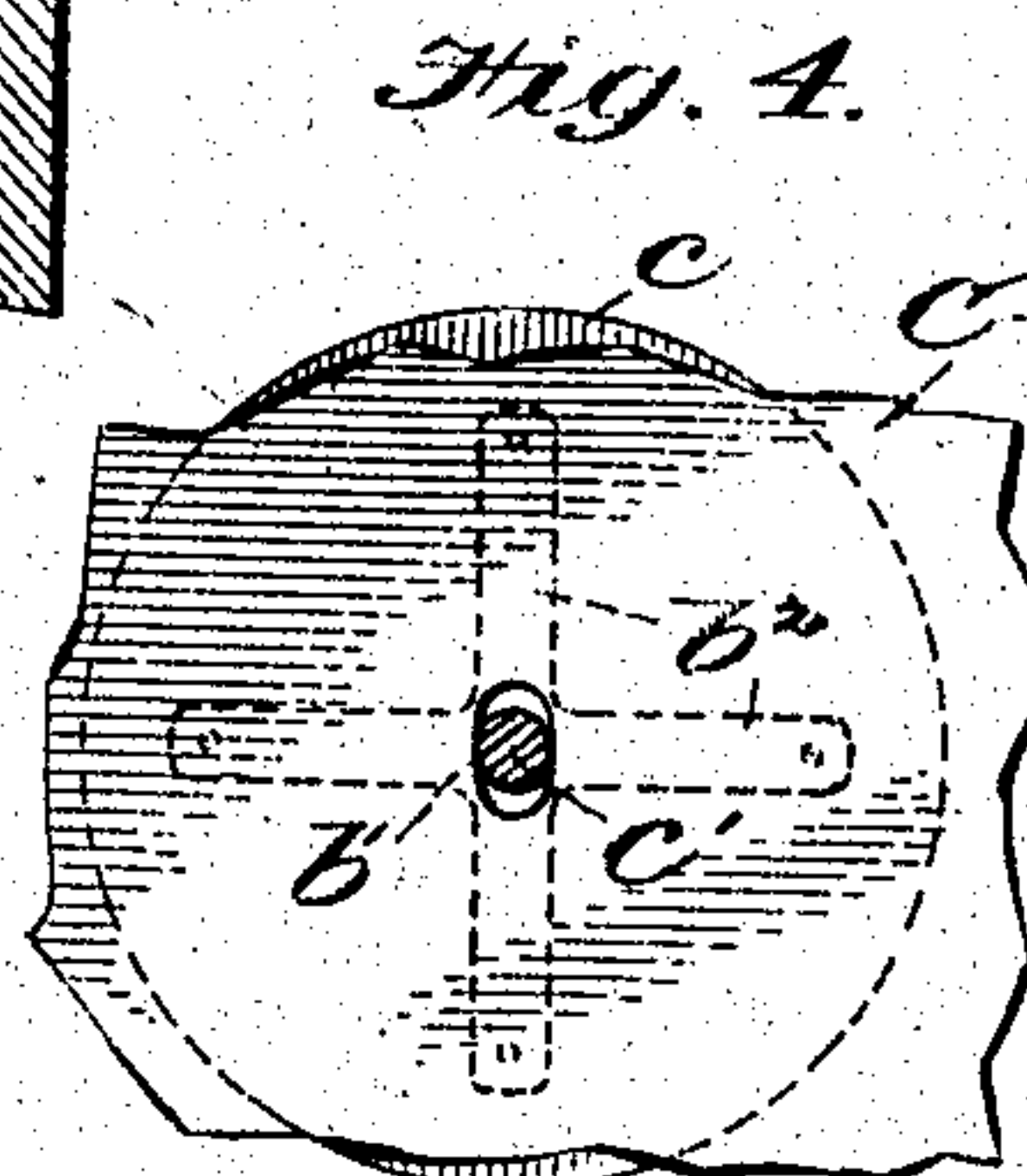
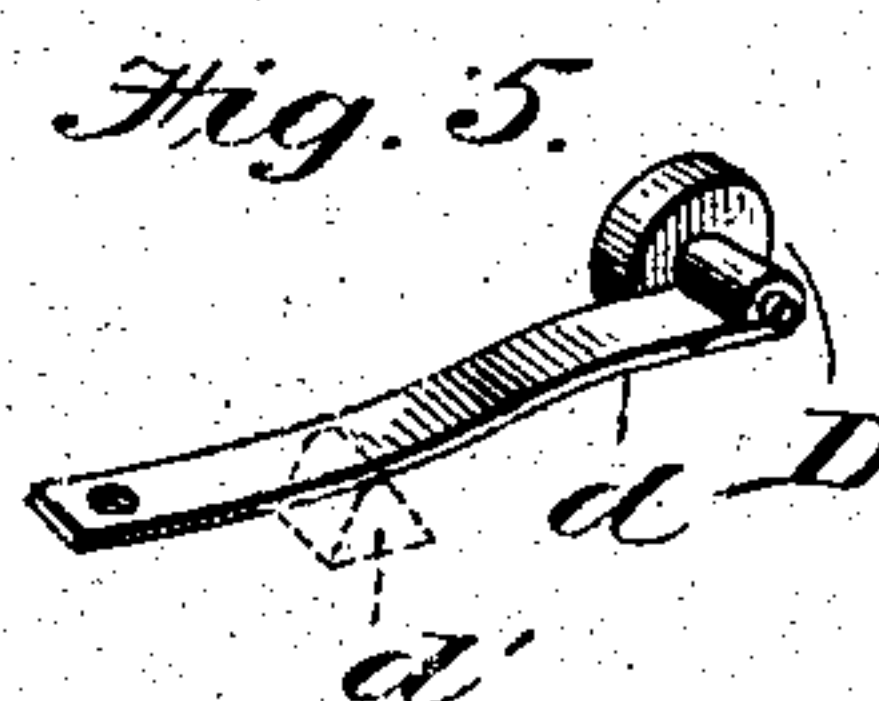
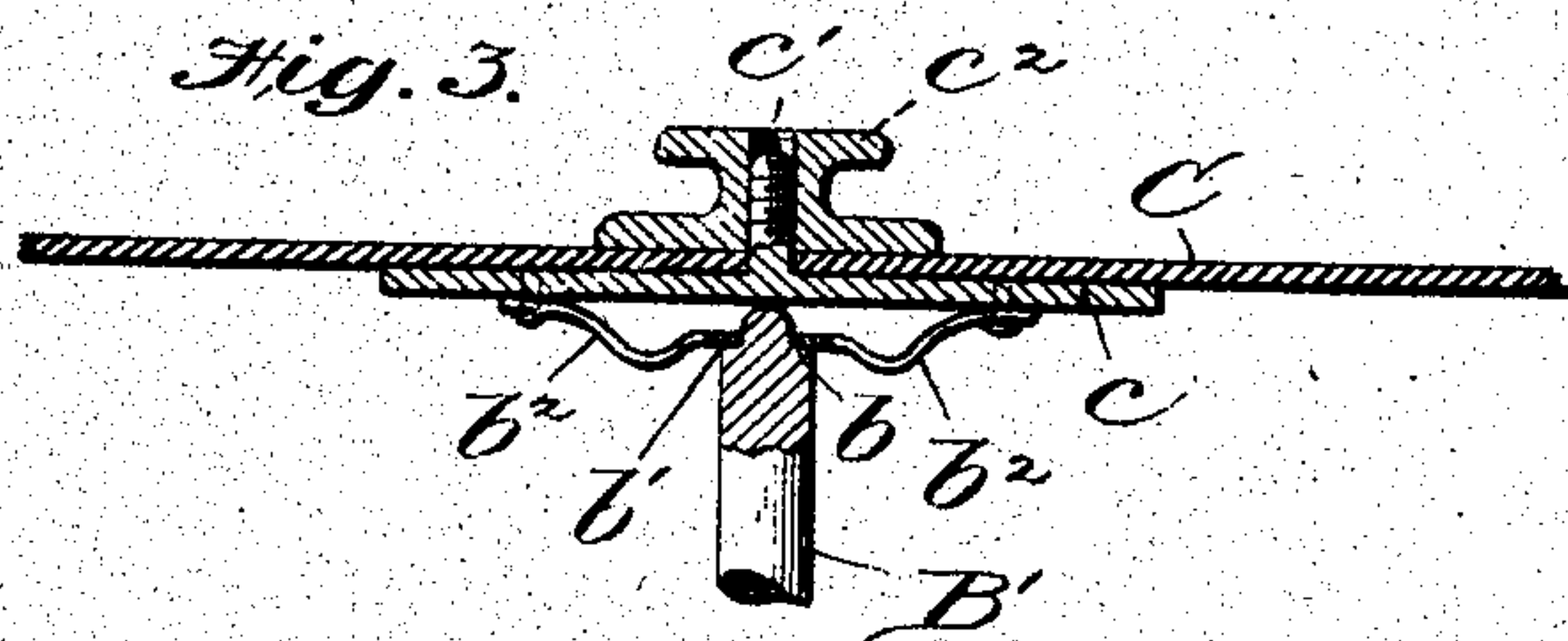
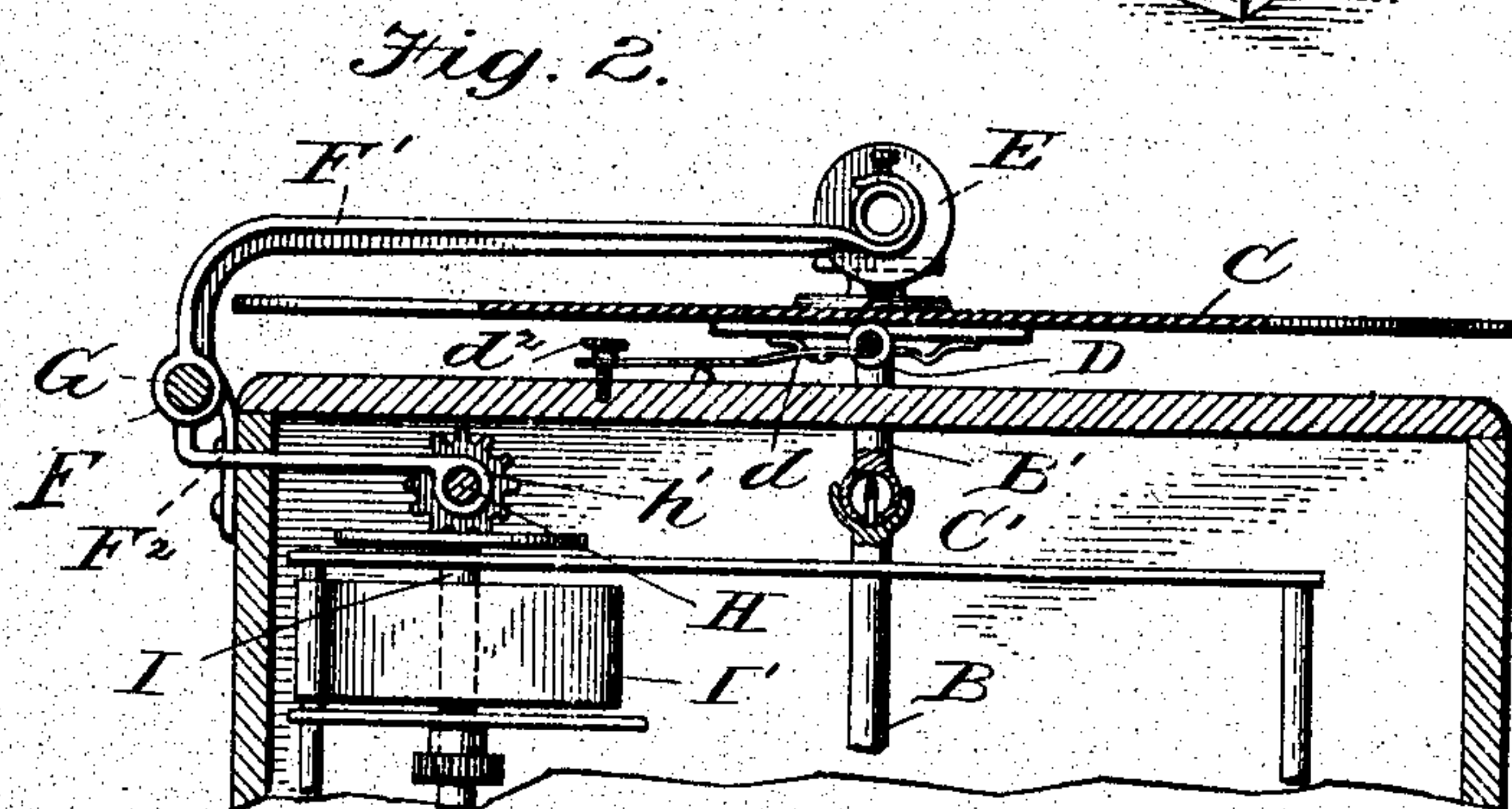
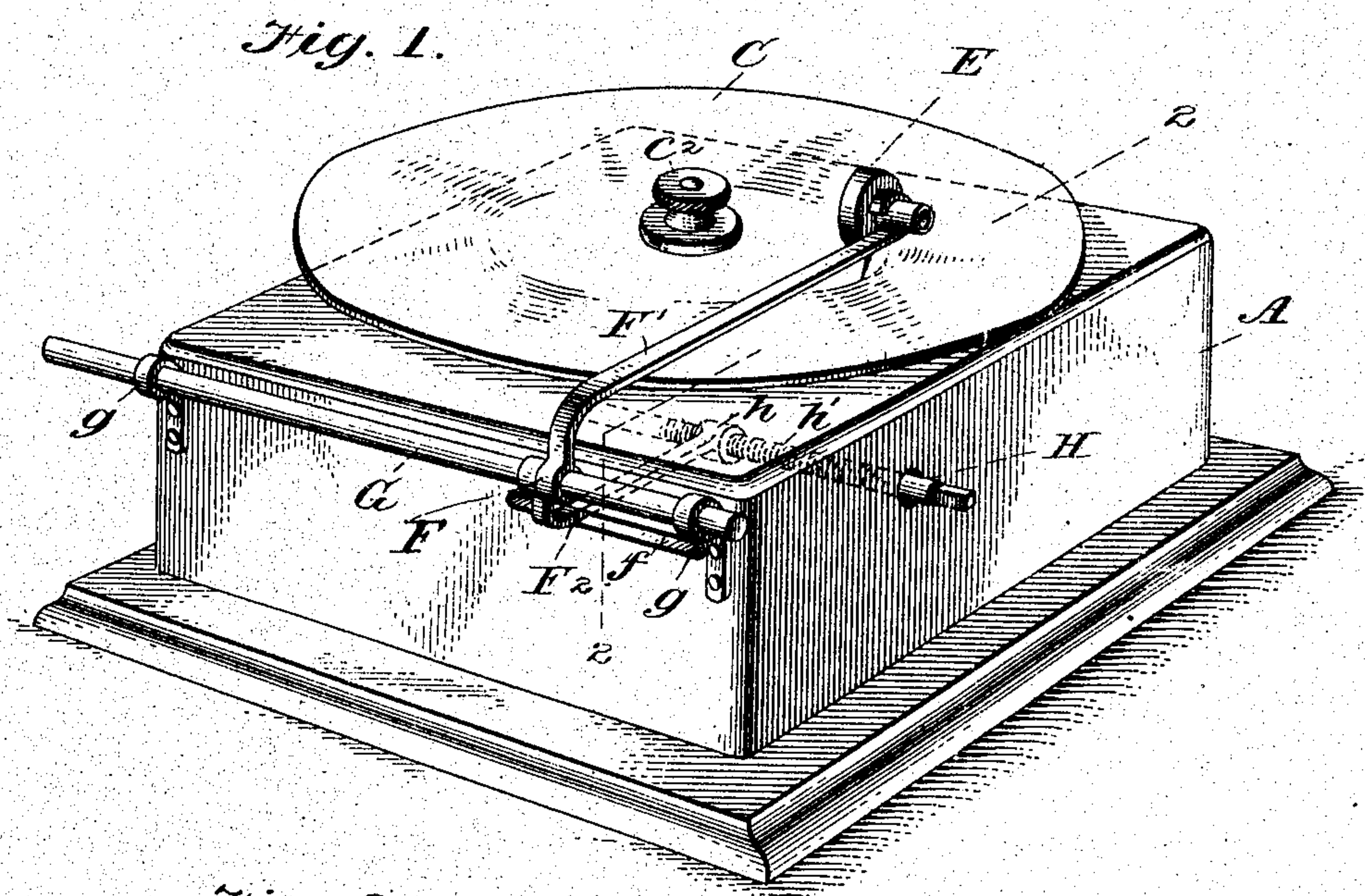


No. 781,429.

PATENTED JAN. 31, 1905.

E. R. JOHNSON.
SOUND RECORDING AND REPRODUCING MACHINE.

APPLICATION FILED DEC. 22, 1898.



Witnesses.
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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 AND REPRODUCING MACHINE.

SPECIFICATION forming part of Letters Patent No. 781,429, dated January 31, 1905.

Application filed December 22, 1898. Serial No. 700,032.

To all whom it may concern:

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

My invention relates to certain improvements in sound recording and reproducing machines, and is particularly adapted to machines of the gramophone type wherein a flat circular record-disk is employed, but might be
15 adapted to machines of other character.

The principal object of my invention is to provide means for supporting the record-disk in such a manner as to be capable of being tilted in any direction, also in providing means adapted to act on the under side of the disk for keeping the record-disk in constant contact with a rigidly-mounted reproducer, which disk is at the same time capable of a
20 yielding movement, so as to accommodate itself to any irregularities or unevenness which might occur therein by reason of a slight warp or otherwise or such as might be due to imperfections in the mechanism which are
25 apt to occur in all machines, especially those constructed at small cost.

A further object of my invention is to provide means for rigidly supporting the reproducing mechanism above the record-disk
35 against movement toward or from the face of the record tablet or disk; by the terms "rigidly supported," as hereinafter employed, is meant rigidly supported against movement toward or from the record-tablet; the reproducer may of course be movable backward
40 or forward; also in providing means for automatically carrying the said reproducer in a backward or forward direction, as may be required, to accommodate the record-groove to the stylus as the said record-disk is revolved.

In the class of sound recording and reproducing machines to which my invention relates, such as the gramophone, the sound

record or undulations are in the sides of the grooves, and the stylus is positively vibrated
50 thereby. The object in keeping the disk in constant contact with the rigidly-mounted stylus is to keep it within the groove, and thus provide against any lost motion, which is always liable to occur even when great care is
55 exercised in the construction of the machine, so shallow are the grooves. In records of this character, with their sound-undulations in the sides of the groove, it is not necessary that the base of the groove shall be in perfect contact with the stylus-point, as in records of
60 the character of the graphophone and phonograph, where the sound-undulations are recorded in the base of the groove. All that is necessary in the gramophone-record is that
65 the stylus-point shall not jump from the groove, but always remain therein. The aim of my invention is to provide means for keeping the groove about a rigidly-mounted stylus-point, and preferably but not necessarily
70 against it, so as to reduce the liability of displacement to a minimum, thereby presenting means providing against all lost motion incident to most machines of this character.

My invention allows of the production of
75 machines at a minimum cost, and the same amount of care in the production and adjustment of the parts is not necessary, allowing the parts to be readily stamped by machinery and requiring less finishing, grinding, &c.
80

With these and other objects in view my invention consists in the construction such as is hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, which form a
85 part of this specification, and in which similar letters of reference are used to indicate similar parts, Figure 1 is a perspective view of a machine embodying my invention. Fig. 2 is a sectional elevation taken about on the line 22 of
90 Fig. 1. Fig. 3 is a detail sectional elevation through the upper end of the main driving-shaft, illustrating the manner of securing the record-disk to the same. Fig. 4 is a plan view of the central portion of the record-disk,
95 illustrating the elongated opening therein.

Fig. 5 is a detail illustrating in perspective the spring-supported idler.

In the drawings, A designates the outside casing, such as is commonly used in machines of this character, in which is located a spring-motor, which may be of any desirable construction. As the motor mechanism proper forms no important feature of my invention, I do not deem it necessary to illustrate or describe the same in detail.

B designates the main driving-shaft of the motor and is propelled by means of spring mechanism as above referred to. In the upper part of this shaft B, I provide a universal joint C', which may be constructed in the manner illustrated in Fig. 2 of the drawings or which may be of any of the other well-known constructions, the object being to provide the upper end of this shaft with a universal movement. The construction of joint shown in the drawings consists, essentially, of socket portion provided upon the upper end of the shaft B, into which the ball portion on the lower end of the shaft B' is adjusted. To insure the rotary movement of the shaft B', a transversely-disposed pin is provided through the socket portion adapted to a slot provided substantially vertically in the ball portion, the pin and slot being so arranged as to allow the ball portion to freely rest in the base of the concavity of the socket portion. It is clear that the table C will therefore yield in operation in the desired manner. The upper section B' projects through an opening provided in the top of the casing A a short distance above the said casing. An annular shoulder b is provided on the upper end of section B', adapted to receive a spider b', constructed of thin resilient metal, the arms b² of which are bent or corrugated in substantially the shape illustrated in Fig. 3 of the drawings. Secured to the upper side of the spider b' is a flat disk or plate c, having in its center an upwardly-projecting screw-threaded boss c', this plate c being adapted to support and hold the record-disk C, the said record-disk being securely held thereon by means of the thumb-nut c², which is adapted to engage the screw-threaded boss c' and securely clamp the record-disk between it and the plate c. The joint C', provided on the shaft B, permits both sections of the said shaft to be revolved through the medium of its spring-motor, and at the same time allows the record-disk C, carried thereby, to be revolved, and also capable of being tilted in any direction. The resilient spider b', which supports the said record C, also allows the record-disk to be slightly tilted independent of the universal movement of the section B' of the driving-shaft, so that if the said record-disk should not be exactly true or should be slightly warped or not in a horizontal plane or the operative mechanism be not perfectly true the said resilient spiders will allow it to

yield slightly to accommodate such unevenness when it is in contact with the reproducing-stylus.

On the under side of the record-disk C, at a point directly below the position of the reproducing mechanism, is a spring-supported roller or idler D, carried on the free end of a flat metallic spring d, which bears in about its center on a block d', formed or secured on the top of the casing A, while the other end of said spring d is held to the casing A by means of a set-screw d² and by means of which the tension of the said spring may be regulated.

E designates the reproducing mechanism or sound-box of well-known construction, which is held in a position directly above the record-disk C rigidly against any vertical displacement or movement and against any lateral displacement save that given it by the positive movement of the rotating screw h in the travel of the stylus and sound-box across the record-disk, so that the stylus-point may rest in the grooves of the said record, the spring-pressed idler heretofore described serving to constantly hold the said record-disk so that the groove will remain about the stylus-point and prevent displacement. The sound-box E is supported by means of an arm F', formed on a bracket F, which is rigidly supported on a shaft G, journaled by means of the brackets g to one side of the casing of the machine. This shaft G is loosely journaled in the said bracket g, so as to be capable of a sliding longitudinal movement, which is imparted to it automatically and simultaneously with the revolving of the record-disk, so as to allow the stylus-point of the reproducing mechanism to feed inwardly or outwardly in order to follow the grooves of the record-disk as the said disk revolves.

H designates the winding-shaft, which is generally horizontally arranged, as illustrated in the drawings, having one end projecting outside of the casing A and squared for the reception of a key, while its other end is suitably geared to the shaft I, which carries the propelling-spring I' of the motor. The shaft H is provided with coarse screw-threads h', extending almost its entire length, adapted to engage an interiorly-threaded sleeve h, carried on the free end of the arm F² of the bracket F, which is rigidly secured on the shaft G, as heretofore described. This arm F² passes through a slot f', provided in the side of the casing A, as clearly illustrated in Fig. 1 of the drawings. Thus as the shaft H is revolved to wind up the spring of the motor the bracket F is fed outwardly by means of its arm F² and sleeve h engaging the threads h' on the said shaft H, carrying with it the shaft G, which slides loosely in the bracket g heretofore described, also carrying the reproducing mechanism E to the point near the periphery of the record, the operator during

the winding operation pressing down and tilting that side of the record under the stylus-point, so as to prevent the said point from scratching or mutilating the said record.

5 After the spring is sufficiently wound the motor when released by suitable brake mechanism commences to operate and the driving-shaft B and B', carrying the record-disk C, is thereby revolved, while the shaft H revolves
10 in an opposite direction to that of winding and feeds the bracket F and the reproducing mechanism E toward the center of the disk in the proper proportion to allow the stylus-point to follow in the record-grooves, the
15 spring-pressed idler, which bears against the under side of the record, serving to keep the said record-disk constantly in contact or in engagement at all times with the stylus-point of the reproducing mechanism.

20 I do not limit myself to the particular mechanism described and illustrated for providing a yieldingly-supported record, nor to the mechanism for feeding the producer, so as to follow the grooves which may be fed auto-
25 matically by the record-grooves as the record is revolved, as various changes in construction may be employed without departing from the spirit and scope of my invention.

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

1. In a sound recording and reproducing machine, a rigidly-mounted reproducer, a yieldingly-mounted tilting record, and means for
35 keeping the grooves of the record in contact with the stylus of the reproducing mechanism, for the purpose stated.

2. In a sound recording and reproducing machine, a yieldingly-mounted revoluble record-
40 holder, a laterally-movable reproducer located above the same rigidly mounted against movement toward and from the face of the record and means for keeping the grooves of the record in contact with the stylus of the re-
45 producing mechanism and for disengaging the same.

3. In a talking-machine the combination of the reproducing-stylus movable in a horizontal plane, the tilting sound-record rotating on
50 a vertical axis, and mechanism for forcing the sound-record toward the reproducer with yielding pressure, substantially as described.

4. In a sound recording and reproducing machine, a tilting record, means for rotating the
55 same, a sound-box provided with a diaphragm and stylus, and yielding supporting device for bringing the record-disk into engagement with the stylus.

5. In a sound recording and reproducing machine, a rigidly-mounted reproducer, a yieldingly-mounted record-disk, means for keep-
60 ing the walls of the grooves of the record-disk about the point of the stylus of the reproducing mechanism and means for positively moving the reproducer to allow it to

follow the grooves of the record, substantially as described.

6. In a sound recording and reproducing machine, the combination of a revoluble record-disk mounted so as to yield in any direction, a
70 rigidly-supported reproducer arranged above said record, and mechanism adapted to act on the under side of the record-disk for keeping the same in constant but yielding contact with reproducing mechanism, substantially as de-
75 scribed.

7. In a sound recording and reproducing machine in combination with the motor mechanism, a rigidly-mounted reproducing mechanism on a laterally-moving carrier, a yielding
80 record-tablet mounted on a universal joint to conform itself to the stylus of the rigidly-mounted reproducing mechanism, substantially as described.

8. In a sound recording and reproducing machine, in combination with the motor mechanism a rigidly-mounted reproducer, a spring-supported record-tablet mounted on a universal joint adapted to keep the grooves of the
90 said record-tablet constantly about the stylus-point of the reproducer, substantially as described.

9. In a sound recording and reproducing machine, the combination with a driven shaft, a universal joint formed therein, a record-disk
95 carried by said shaft, a rigidly-mounted reproducer located above said record-disk, and means for keeping the record-disk in constant contact with the stylus of the reproducing mechanism, substantially as described. 100

10. In a sound recording and reproducing machine, the combination of a driven shaft, a universal joint formed in the upper part thereof, a yieldingly-mounted support carried on
105 the upper end of said shaft, a record-disk secured on said support, a rigidly-mounted reproducer located above the record-disk and means for keeping the grooves of the said disk in contact with the reproducing mechanism.

11. In a sound recording and reproducing machine, the combination of a yieldingly-mounted record-disk, a rigidly-mounted reproducer located above the same, and a spring-supported idler located under the said disk
115 for keeping the disk in constant contact with the reproducing mechanism, substantially as described.

12. In a sound recording and reproducing machine, the combination of a yieldingly-mounted record-disk, a rigidly-mounted re-
120 producer located above the same, an idler adapted to bear against the under side of the record-disk, a spring-support for said idler, and means for adjusting the tension of the said spring-support, substantially as described. 125

13. In a sound recording and reproducing machine, the combination of a driven shaft, a universal joint formed in the upper part thereof, a spider having spring-arms secured to the
130 upper end of said shaft, a supporting-plate

secured thereto, a record-disk carried by said supporting-plate, a reproducer rigidly mounted above the record-disk, and means for keeping the said disk in contact with the stylus-point of the reproducing mechanism, substantially as described.

14. The combination with the yieldingly-mounted record-disk, of a reproducer rigidly mounted above the same, means for keeping the record in contact with the reproducing mechanism and a rigid but laterally-movable support for the reproducing mechanism adapted to be operated on the unwinding and winding of the motor, substantially as described.

15. The combination with the winding-shaft of a spring-motor, of screw-threads provided thereon, a screw-threaded sleeve adapted to surround said shaft, a bracket-arm formed on said sleeve having its other end rigidly connected to a loosely-mounted horizontally-disposed shaft, an arm, F', rigidly secured on said shaft extending over the record-disk and a reproducer carried by the free end of said arm adapted to follow the grooves of the record-disk as the machine operates, substantially as described.

16. In a sound recording and reproducing machine, the combination of a yieldingly-mounted record-disk, a rigidly-mounted reproducer located above the said record-disk, means for holding the record-disk in constant contact with the stylus-point of the reproducer, a horizontally-disposed sliding shaft journaled in the side frame of the machine, a bracket-arm rigidly mounted on said shaft carrying the reproducer on its free end, and connections between the horizontally-disposed shaft and the winding-shaft of the motor whereby the reproducer is fed forward or backward simultaneously with the winding-shaft so as to allow the said reproducer to follow the grooves of the record, substantially as described.

17. In a sound recording and reproducing machine, the combination with the yieldingly-mounted record-disk, of a reproducer located above the same against the stylus of which the said disk is adapted to bear, a shaft, G, loosely mounted in brackets carried by the frame of the machine, an arm, F, rigidly secured to said shaft, G, having the reproducing mechanism rigidly supported on its free end, an arm, F², rigidly secured on the arm, G, having an interiorly-screw-threaded boss on its inner end, and a screw-threaded winding-shaft, H, suitably geared to the motor mechanism, said screw-threaded shaft being

adapted to the threaded boss of the arm, F', substantially as described and for the purpose stated.

18. In a sound-reproducing machine, a tilting record, a reproducer mounted rigidly in a direction normal to the record, and a support for the record mounted to yield in the same direction during reproduction.

19. In a talking-machine, the combination of a reproducing-stylus movable in one fixed plane only and a flexibly-mounted tilting sound-record of rigid material cooperating therewith.

20. In a talking-machine, the combination of a reproducing mechanism, and a tilting sound-record cooperating therewith.

21. In a talking-machine, the combination of a reproducing mechanism, and a flexibly-mounted tilting sound-record cooperating therewith.

22. In a talking-machine, the combination of a reproducing mechanism movable in one fixed plane only, and a tilting sound-record cooperating therewith.

23. In a talking-machine, the combination of a reproducing mechanism, a flexibly-mounted sound-record cooperating therewith, and means, independent of the sound-record, for moving said reproducing mechanism to allow the latter to follow the grooves of said sound-record.

24. In a talking-machine, the combination of a reproducing mechanism, a tilting sound-record cooperating therewith, and means, independent of the sound-record, for moving said reproducing mechanism to allow the latter to follow said grooves of said sound-record.

25. In a talking machine the combination of a reproducing mechanism movable in one fixed plane only, a flexibly-mounted sound-record cooperating therewith, and means, independent of the sound-record, for moving said reproducing mechanism to allow the latter to follow the grooves of said sound-record.

26. In a talking-machine, the combination of a reproducing mechanism, a tilting sound-record cooperating therewith, and a cushion supporting said sound-record, adjacent to and on the side thereof opposite the reproducing mechanism.

In witness whereof I have hereunto set my hand this 21st day of December, A. D 1898.

ELDRIDGE R. JOHNSON.

Witnesses:

BENJ. F. PERKINS,
HORACE PETTIT.