

No. 671,513.

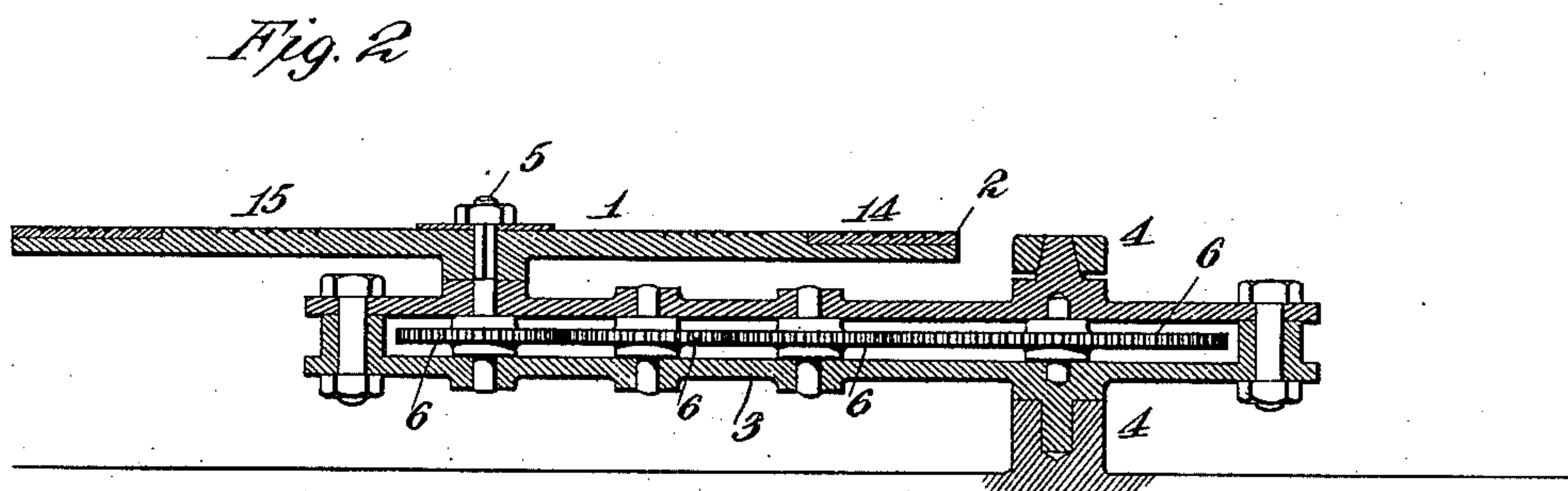
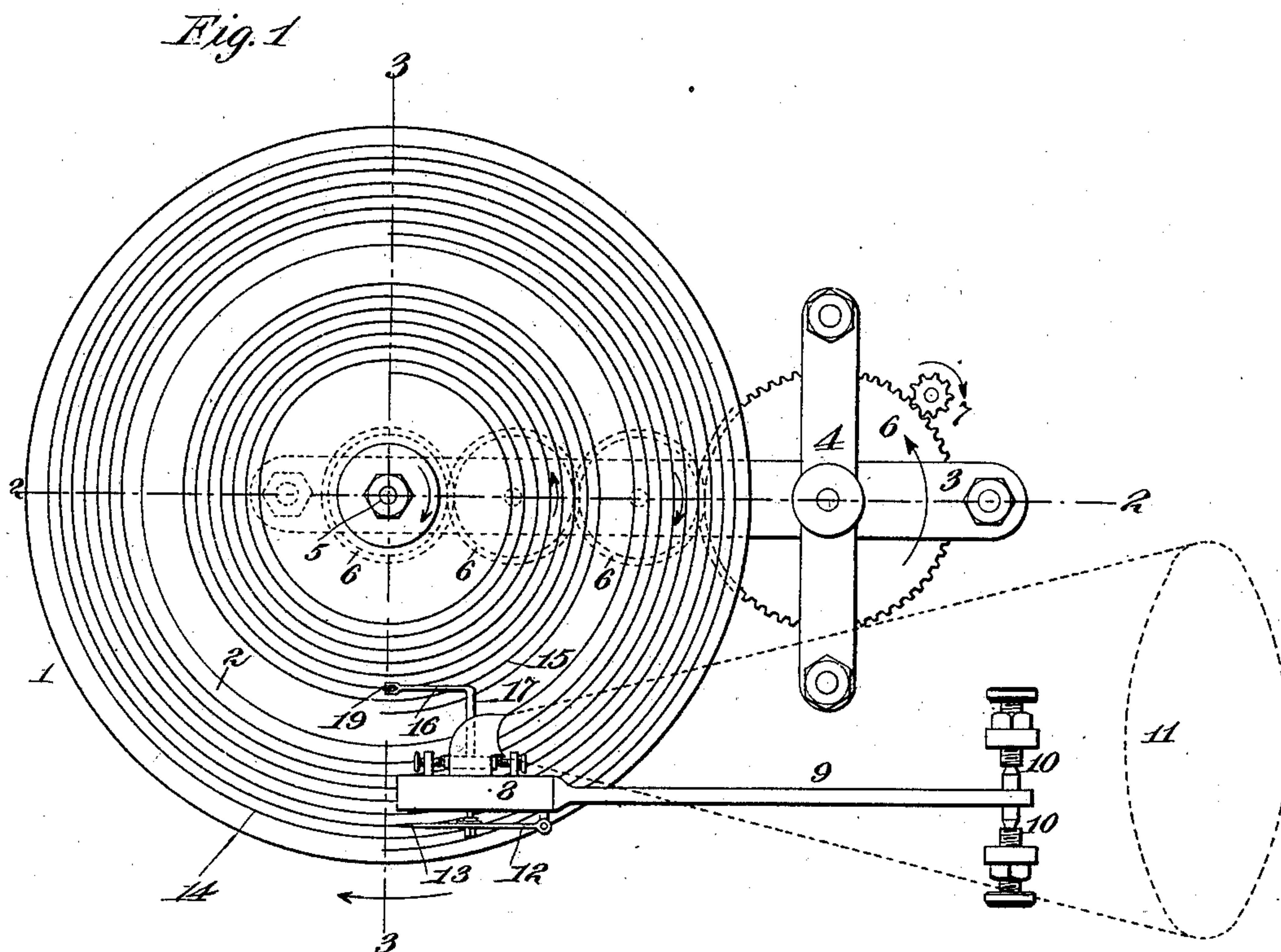
Patented Apr. 9, 1901.

F. D'A. GOOLD.
PHONOGRAPH.

(Application filed Jan. 18, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

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Att'ys.

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2 Sheets—Sheet 2.

Fig. 3

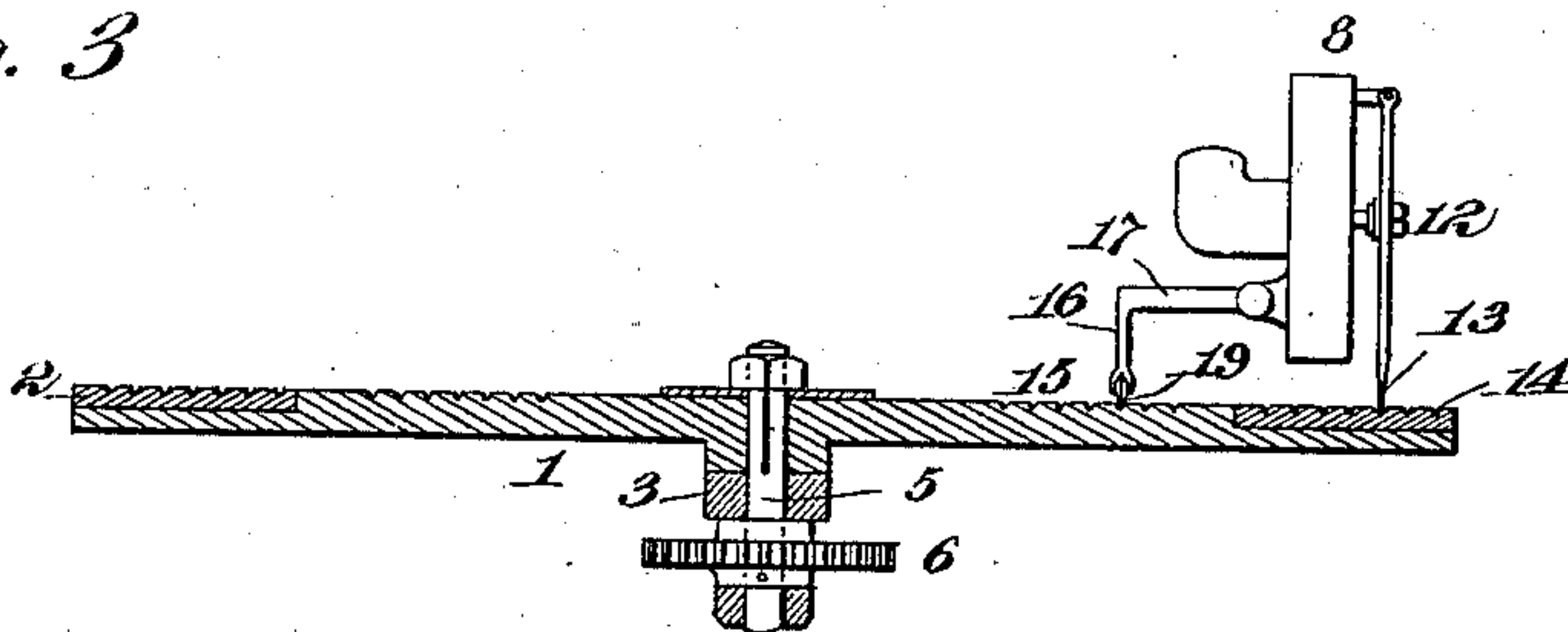
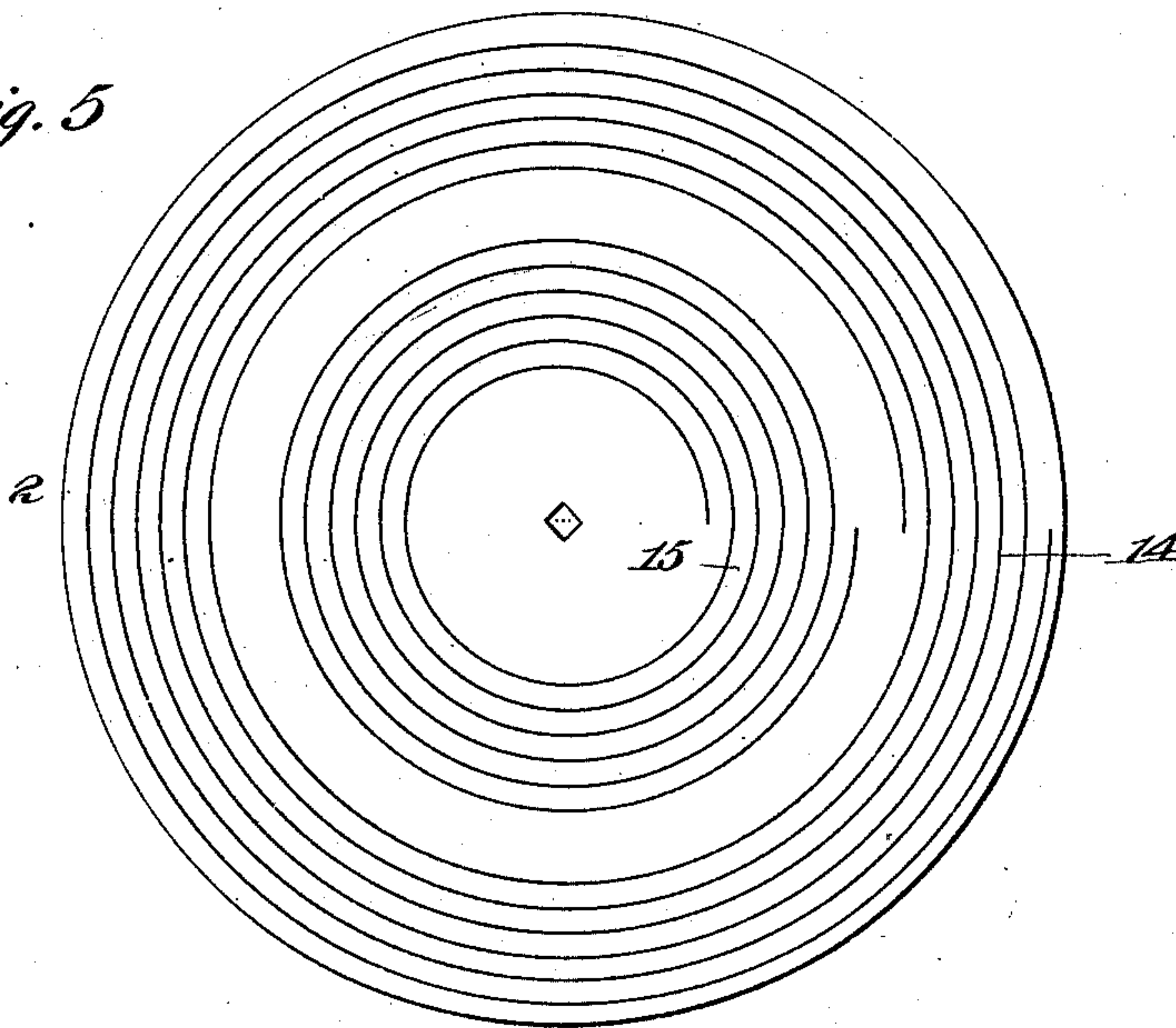


Fig. 4



Fig. 5



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UNITED STATES PATENT OFFICE.

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PHONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 671,513, dated April 9, 1901.

Application filed January 18, 1899. Serial No. 702,537. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK D'ARTREY GOOLD, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a certain new and useful Improvement in Talking-Machines, of which the following is a specification.

My invention relates to various new and useful improvements in talking-machines.

The object of the invention is to simplify the construction of such devices and to improve the operation thereof.

The invention also relates to improvements in sound-records for use in connection with the apparatus.

In carrying out my invention I provide a record-supporting platen or table, which is carried at the end of a swinging arm and on which the record-disk is placed. The record is formed in this disk as a sinuous volute spiral groove. Power is applied to the platen or table, whereby it will be rotated and at the same time will be free to swing on the pivot of the swinging sustaining-arm. Coöperating with the record is a suitable reproducing device held against movement in a plane parallel to the face of the record. This reproducing device is provided with a reproducing point or needle, which engages the record-groove and which is vibrated thereby in accordance with the sound vibrations. The engagement between the record-groove and the reproducing-point moves the record-disk with respect to the reproducing device, which movement is allowed by the mounting of the platen on the swinging arm, as explained. Instead of causing the engagement between the reproducing point or needle and the record to move the record-disk with respect to the reproducing device the said record-disk may be fed positively, as will be explained. The reproducing device is mounted so as to be movable in a plane at right angles to the face of the record-disk, so as to accommodate any eccentricities or variations in said disk. Preferably the record-disk is driven by a system of gears carried in the swinging sustaining-arm and so arranged that the driving stress thereof will tend to move the record-disk in the direction with respect to the reproducing device which it would take to cause the re-

producing-needle to engage with the entire record. When the movement of the record-disk is controlled or effected by the engagement between the reproducing-point and the record-groove, this particular way of driving the record-disk is advantageous, as it results in less wear between the record-groove and the reproducing-point. The same is also true when a positive-feed device is used, since when the record-disk is driven in this way the positive-feed device acts practically as a controlling mechanism. It will be possible to so proportion the parts that the tendency of the driving-gears to rotate the disk and to move the disk relatively to the reproducing device will exactly overcome the resistance to the rotation and movement of the disk, so that the only wear which will be imposed upon the record-groove (when the feed is effected thereby) or upon the positive-feed mechanism will be that due, respectively, to the simple engagement of the reproducing point or needle with the record-groove or to the engagement together of the elements comprising the positive-feed device. In some instances a positive-feed device or a positive-feed-controlling device may be advantageous. The preferable form of positive-feed or positive-feed-controlling device which I use comprises a volute spiral groove arranged parallel with the record, either within it or surrounding it. I engage with the feed-groove thus formed a controlling-point, which is connected with the reproducing device, which controlling-point will obviously so move the reproducing device as to cause the reproducing point or needle to engage accurately with the record-groove. The feed-groove thus formed may be produced in the platen or table which carries the record-disk; but in this case care will have to be taken to so arrange the record-disk on the platen or table as to effect the desired accurate parallelism of the record and feed grooves. In order to overcome the necessity of this accurate adjustment, I prefer to form the feed-groove when used directly on the record-disk, which feed-groove will be produced thereon at the same time that the record-groove is made in the manner to be presently explained. When this is done, any eccentricities or variations in the record-groove will be reproduced in the feed-groove and the two grooves

will be always parallel, so that an absolutely-accurate feeding operation or a feed-control will be effected.

In order that my invention may be better understood, attention is directed to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a plan view of so much of my talking-machine as is necessary to enable a clear understanding of the invention to be comprehended; Fig. 2, a section on the line 2 2 of Fig. 1; Fig. 3, a section on the line 3 3 of Fig. 1; Fig. 4, a separate diagrammatic view illustrating the improved record-disk and the manner of making the same, and Fig. 5 a plan view of such record-disk.

In all the above views corresponding parts are represented by the same numerals of reference.

1 represents a disk-shaped platen or table on which the record 2 is carried. In Figs. 1, 2, and 3 I illustrate this record as being in the form of a flat ring carrying the volute spiral record-groove on its upper surface. The table 1 is carried on a swinging arm 3, pivoted at one end—as, for instance, in the bearings 4 4—whereby the platen or table will be free to swing concentrically with the pivot of said arm. The platen or table is driven in any suitable way and by any appropriate mechanism. I illustrate said platen or table as being mounted on a shaft 5 in the swinging arm 3 and as being driven by a series of gears 6 6 6, carried in said arm, the last-mentioned gear being mounted concentrically with the pivot of said arm. These gears are driven in any suitable way—as, for instance, by a motor-gear 7, connected to any suitable motive device, such as a spring-motor or an electric motor.

8 represents the reproducing device, which will be presently explained and toward which the platen or table is movable in order that the reproducing-needle may engage with the volute spiral record-groove. Preferably the gears 6 and 7 are so arranged that when rotated in the directions indicated by the arrows in Fig. 1 the driving stress will tend to move the platen or table toward the reproducing device. It will be possible by properly proportioning the parts to so adjust this tendency of the platen or table to be moved toward the reproducing device as to exactly counterbalance the resistance to such movement, so as to reduce wear on the feeding device, whether the latter is the reproducing device or a special feed-arm, as will be explained. The friction imposed by the bearing 4 to the radial turning of the arm 3 should therefore be sufficient to substantially counteract the radial movement of said arm under the stress of the driving-gearing—for instance, by employing a cone-bearing for the arm, as shown in Fig. 2, the friction of which may be adjusted by varying the pressure of the upper bearing-box on the bearing-pin.

The reproducing device is of any suitable and approved construction and is not illustrated in detail. It is carried on an arm 9, so arranged as to be movable in a plane at right angles to the movement of the platen or table, so as to accommodate any eccentricities or variations of the blank 2. For this purpose the arm 9 may be mounted between the bearings 10 10, as shown. The reproducing device carries the usual horn 11, (shown in dotted lines, Fig. 1,) through which the reproduction becomes audible. It is also provided with the usual reproducing-arm 12, connected with a diaphragm (not shown) and having a reproducing point or stylus at its lower end. This reproducing point or stylus trails in the sinuous volute spiral record-groove 14, formed in the record-disk 2, vibrating the reproducing-arm 12 and the diaphragm and reproducing the original sound. It will be possible and in some instances desirable, owing to its simplicity, to effect the feed of the record-disk relatively to the reproducing device by the engagement between the needle or stylus 13 and the volute spiral groove. By so proportioning the driving-gears as to cause the driving stress to move the record-disks toward the reproducing device the reproducing needle or stylus 13 acts practically as a controlling device, allowing the record-disk to be moved relatively to the reproducing device to maintain the reproducing point or stylus in engagement with the volute spiral record. If the driving stress is not sufficient to move the platen or table toward the reproducing device the reproducing point or stylus effects a positive movement of such disk; but there will be manifestly less wear between the record groove and the stylus than if there were no tendency on the part of the driving mechanism to so move the platen or table. I consider this an important feature of my invention.

In some instances a positive-feed device may be used, and this preferably comprises a volute spiral feed-groove 15, arranged parallel with the record-groove. I show this groove as being inclosed by the record-groove; but it obviously may inclose the latter. In Figs. 1, 2, and 3 I show the feed-groove 15 as being formed on the upper surface of the table or platen 1, and I engage with said groove a feed-stylus 16, carried on an arm 17, pivoted to the reproducing device 8. Preferably the feed-stylus is provided with a small antifric-tion-roller 19, which engages directly with the feed-groove. It will be obvious that when the record table or platen is turned the engagement between the feed-stylus 16 and the feed-groove will shift the disk with respect to the reproducing device, allowing the reproducing point or stylus to trail accurately in the record-groove. The advantage of this construction (in positive-feed talking-machines) is that wear on the record-disk is overcome. It is obvious, however, that care must be taken to so

place the record-disk on the platen or table as to have the two grooves 14 and 15 exactly parallel. In order that this objection may be overcome, I prefer to form the feed-groove directly on the record-disk, as illustrated in Figs. 4 and 5, because by doing so the feed-groove and record-groove may be produced simultaneously, so that any eccentricities or variations in one will be reproduced in the other. In making a record, therefore, I prefer to connect the recording-point 18 (see Fig. 4) with a cutting-point 19, engaging the record-disk within the record-groove. In making these records the disk will be rotated in any suitable recording device, the recording-point 18 forming the record-groove and the point 19 forming the feed-groove. In this way the two grooves will be made absolutely parallel. It will be understood that with a record-disk such as illustrated in Fig. 4 the reproduction can be effected directly from the original record or that the latter, including the feed-groove, may be reproduced by any suitable process for the reproduction of such record. Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a talking-machine, the combination with a rotatable flat record movable horizontally and having a sinuous volute spiral record-groove therein, of a horizontally freely movable support for said record, means for so rotating said record that horizontally it will be maintained in substantial balance, and a reproducing device engaging the record-groove and held against horizontal movement, substantially as set forth.

2. In a talking-machine, the combination with a rotatable flat record swinging horizontally and having a sinuous volute spiral record-groove therein, of a support for said record, a freely-movable swinging arm carrying said support, means for so rotating said support as to substantially balance its tendency to swing horizontally, and a reproducing device engaging the record-groove and held

against horizontal movement, substantially as set forth.

3. In a talking-machine, the combination with a rotatable flat record having a sinuous volute spiral record-groove therein, of a rotatable platen carrying said record, a freely-movable swinging arm sustaining said platen, a system of gears carried by said swinging arm for driving the platen and maintaining the arm in substantial balance, means for operating said gears, and a reproducing device engaging the record-groove and held against horizontal movement, substantially as set forth.

4. In a talking-machine, the combination with a rotatable flat record having a sinuous volute spiral record-groove therein, of a rotatable platen carrying said record, a freely-movable swinging arm sustaining said platen, means for rotating the platen and for maintaining the arm in substantial balance, a reproducing device engaging the record-groove, and a hinge for said reproducing device allowing movement thereof in a plane at right angles to the horizontal swinging movement of said platen, substantially as set forth.

5. In a talking-machine, the combination with a rotatable flat record movable horizontally and having a sinuous volute spiral record-groove therein, of a horizontally freely movable support for said record, means for so rotating said record that horizontally it will be maintained in substantial balance, a reproducing device engaging the record-groove and held against horizontal movement, a feed-groove arranged parallel with the record-groove, and a device carried by the reproducing device for engaging the feed-groove, substantially as set forth.

This specification signed and witnessed this 10th day of January, 1899.

FREDERICK D'ARTREY GOOLD.

Witnesses:

JNO. R. TAYLOR,
FRANK L. DYER.