No. 609,268. Patented Aug. 16, 1898.

# T. A. EDISON.

## PHONOGRAPH.

(Application filed Dec. 15, 1890.)

(No Model.)

Fig. 1.

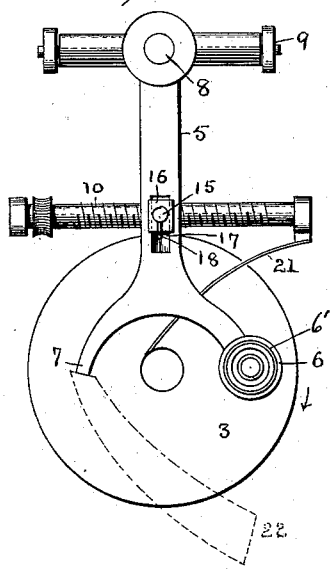



Fig. 2.

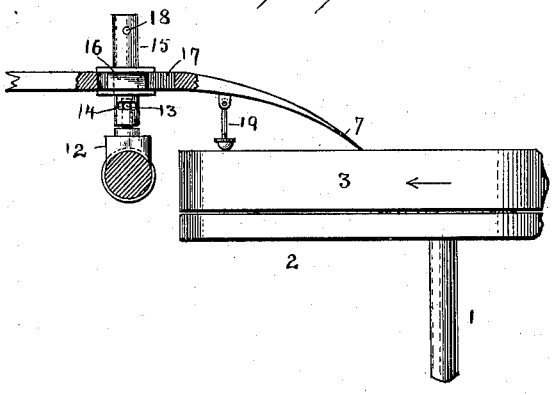



Fig. 3.

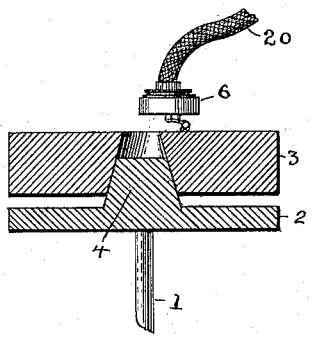



Fig. 5.

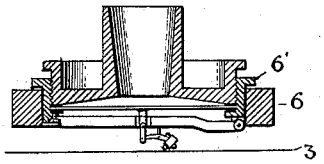
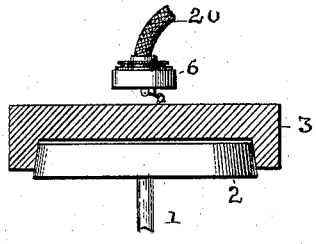



Fig. 4.

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# UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

## PHONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 609,268, dated August 16, 1898.

Application filed December 15, 1890. Serial No. 374,759. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Phonographs, (Case No. 883,) of which the following is a specification.

The present invention relates to phonographs in which disk phonogram-blanks or recording-surfaces are used and in which the record is formed in a spiral line on one face of the disk.

The invention consists in means for supporting the blank and connecting it to the shaft by means of which the blank is rotated.

The invention also consists in means for moving the recorder, reproducer, and turning-off tool across the blank, whereby the operating-point is caused to follow a spiral track; and the invention consists in the several features and combinations hereinafter set forth.

In the accompanying drawings, which illustrate the improvement, Figure 1 is a plan view of the phonograph. Fig. 2 is an enlarged view, partly in section, of a part of the same. Fig. 3 is a sectional view of the phonogram-blank and holder. Fig. 4 is a side view of a holder of slightly-different form, a phonogram-blank being shown in cross-section thereon; and Fig. 5 shows means for adjusting the recorder and reproducer.

The phonograph-shaft 1 is rotated at the proper speed by any suitable means. (Not shown.) At the upper end of the shaft is a holder or mandrel 2 for the phonogram-blank 3, preferably made entirely of recording material, as shown in Figs. 3 and 4. The holder, which is rigidly connected to the shaft, consists of a disk with a tapering extension 4, as shown in Fig. 3, or of a disk with inclined sides, as shown in Fig. 4. The blank is formed with a corresponding tapering recess or opening, so that it may be readily placed and centered on the holder and held in position wholly by its frictional contact with the mandrel or holder.

5 is an arm carrying the recorder and reproducer supporting ring 6 and the turning-off tool 7. The recorder and reproducer are carried by a single diaphragm, as shown in Fig. 5, and as in my application, Serial No. 330,789, filed November 18, 1889. When the diaphragm is turned to change the points, the arm carrying said points may be tilted slightly to raise one point away from the blank. The arm 5 is pivoted at 8 to a vertical axis and at 9 to a horizontal axis, so that the arm may be moved across the blank or may be moved toward or away from the blank.

10 is a feed-screw driven by a suitable motor (not shown) which may be connected to the screw by means of a worm-gear 11 or otherwise.

12 is a nut carried by arm 5 and coöperating with the screw. This nut has a shank in the end of which is a pin 13, which rests in and moves in the slot 14 in the cam-shaped rod 15. Rod 15 is held in a block 16, which can slide back and forth in the slot 17 in arm 5.

18 is a pin or handle by means of which 15 may be turned in its socket.

19 is a "determining device" pivoted to arm 5 and having an adjustable head, as shown and as heretofore described by me.

20 is a speaking or hearing tube, and 21 is a spring or brush which rubs lightly over the surface as the blank rotates and removes the shavings and dust therefrom. A chute 22 may be carried by the turning-off tool to convey the shavings away from the blank.

The above-described apparatus is used as follows: The recorder and reproducer are adjusted away from the face of the blank and the turning-off tool is carried to the edge of the blank by moving arm 5 on its vertical pivot. The feed-screw is then rotated and moves the turning-off tool across the face of the blank and shaves off the rough surface thereof. When the tool reaches the center of the blank, arm 5 is raised and the recorder adjusted into operative position, so that it extends below the cutting edge of 7. The recorder is then carried to the center of the blank, and 12 is placed in contact with the screw, and the recorder forms a spiral record in the well-known manner. By turning the screw in the opposite direction the recorder may make its record from the edge of the blank toward its center. As arm 5 is moved by the screw the block 16 moves along in the slot 17 in view of the varying distance between the pivot and the screw and the nut 12 is

allowed to turn slightly, so that the working face of the nut shall always rest properly on the thread of the screw. When it is desired to again shave off the surface of the blank, the rod 15 is loosened freely up and down in its support, so that it can move, and the arm 5 is moved toward the blank until the determining device 19, which has been previously put in the proper position relative to the knife 7, bears on the surface of the blank. The nut then rests on the screw, and the cam-shaped rod 15 is turned slightly, causing it to bind in its socket and to be held in place. The determining device does not interfere with the working of the knife, since as the blank revolves the device is swung to one side.

What I claim is—

1. A phonogram-blank for phonographs made in the form of a thick disk adapted to be shaved off a number of times to receive new records, and provided with a central hole or depression formed perpendicular to and tapering toward the working surface, said hole or depression being adapted to fit a tapering support, whereby the blank will be centered and held in position wholly by friction, substantially as set forth.

2. A phonogram-blank for phonographs made entirely of recording material in the form of a thick disk adapted to be shaved off a number of times to receive new records and provided with a central hole or depression formed perpendicular to and tapering toward the working surface, said hole or depression being adapted to fit a tapering support, whereby the blank will be centered and held in position wholly by friction, substantially as set forth.

3. In a phonograph, the combination of a disk phonogram-blank or phonogram having a tapering opening, a tapering rotating mandrel for supporting and rotating said blank, a recording or reproducing device, support for said recording or reproducing device, pivoted so as to be capable of movement toward and away from the blank, and means for moving said arm across the face of the blank, substantially as set forth.

4. In a phonograph, the combination of a flat phonogram-blank or phonogram, a recording or reproducing device, an arm carrying said device and movable toward and away from the phonogram-blank or phonogram, and a determining device for determining the adjustment of the arm relative to the phonogram-blank or phonogram, substantially as set forth.

5. In a phonograph, the combination of a flat phonogram-blank or phonogram, a recording or reproducing device, an arm carrying said device and movable toward and away from the phonogram-blank or phonogram and across its face, and a determining device for determining the adjustment of the arm relative to the phonogram-blank or phonogram, substantially as set forth.

6. In a phonograph, the combination of a disk phonogram-blank, a holder for supporting and rotating said blank, a recording device, adapted to be moved across the face of said blank, and a tool for turning off the face of said blank, substantially as set forth.

7. In a phonograph, the combination of a disk phonogram-blank or phonogram, a rotating holder therefor, an arm carrying a recording or reproducing device, means for moving said recording or reproducing device across the face of the phonogram-blank or phonogram, a turning-off tool and a device for determining the position of said arm relative to the phonogram-blank or phonogram, substantially as set forth.

8. In a phonograph, the combination of a disk phonogram-blank, a recorder or reproducer, a support for said recorder or reproducer, pivoted so as to be capable of movement toward and away from the blank and across the face of the blank, a feed-screw, and a nut-section carried by said arm and adapted to engage said feed-screw and whereby the recording or reproducing device is caused to move across the face of the blank, substantially as set forth.

9. In a phonograph, the combination of a pivoted arm having two prongs, a recording or reproducing device carried by one prong, a turning-off tool carried by the other prong, and means for moving said arm relative to the phonogram-blank or phonogram, substantially as set forth.

10. In a phonograph adapted to receive a disk phonogram-blank or phonogram, the combination of an arm having two prongs and pivoted to move toward and away from the blank or phonogram, a recording or reproducing device carried by one prong, a turning-off tool carried by the other prong, and means for moving said arm across said phonogram-blank or phonogram, substantially as set forth.

11. In a phonograph adapted to receive a disk phonogram-blank or phonogram, the combination of an arm having two prongs and pivoted to move toward and away from the blank or phonogram, a recording or reproducing device carried by one prong, a turning-off tool carried by the other prong, a device for determining the position of said arm relative to the phonogram-blank or phonogram, and means for moving said arm across said phonogram-blank or phonogram, substantially as set forth.

12. In a phonograph, the combination with a phonogram-blank or phonogram, and a holder therefor, of a pivoted arm carrying a recording or reproducing device, a feed-screw, and an adjustable connection between said feed-screw and arm, whereby the position of the recording or reproducing device relative to the blank or phonogram may be adjusted, substantially as set forth.

13. In a phonograph, the combination with a phonogram-blank or phonogram, and a

holder therefor, of a pivoted arm carrying a recording or reproducing device, a feed-screw, an adjustable connection between said feed-screw and arm, and a device for determining the adjustment of said connection, whereby the position of the recording or reproducing device relative to the blank or phonogram may be adjusted, substantially as set forth.

14. In a phonograph, the combination with a disk phonogram-blank or phonogram, and a rotating holder therefor, of a pivoted arm carrying a recording or reproducing device, a feed-screw, and an adjustable connection between said feed-screw and arm, whereby the position of the recording or reproducing device relative to the blank or phonogram may be adjusted, substantially as set forth.

15. In a phonograph, the combination with a disk phonogram-blank or phonogram, and a rotating holder therefor, of a recording or reproducing device, a support for said device pivoted so as to be capable of movement toward and away from and across the face of the phonogram-blank or phonogram, a feed-screw for moving said arm across the face of the phonogram-blank or phonogram, and an adjustable connection between said feed-screw and arm, whereby the position of the recording or reproducing device relative to the blank or phonogram may be adjusted, substantially as set forth.

16. In a phonograph, a slotted recorder or reproducer carrying arm, a block movable in said slot, a nut-section carried by the block, and a feed-screw adapted to engage said nut-section, substantially as set forth.

This specification signed and witnessed this 6th day of December, 1890.

THOS. A. EDISON.

Witnesses:
JOHN F. RANDOLPH,
W. PELZER.