T. EYNON.

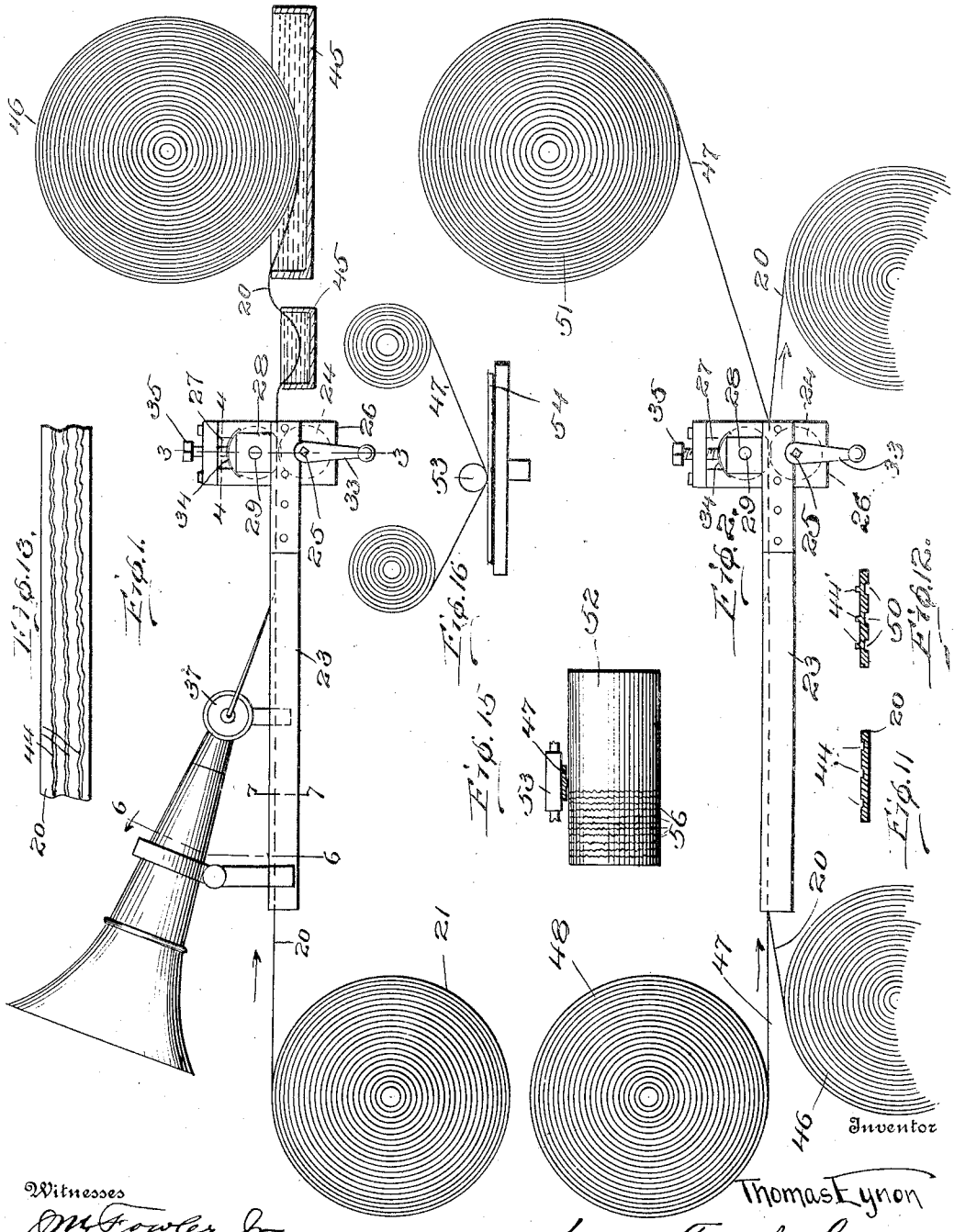
PHONOGRAPH RECORD AND PROCESS OF MAKING THE SAME.

APPLICATION FILED APR. 15, 1909.

1,011,421.

Patented Dec. 12, 1911.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS—SHEET 2.

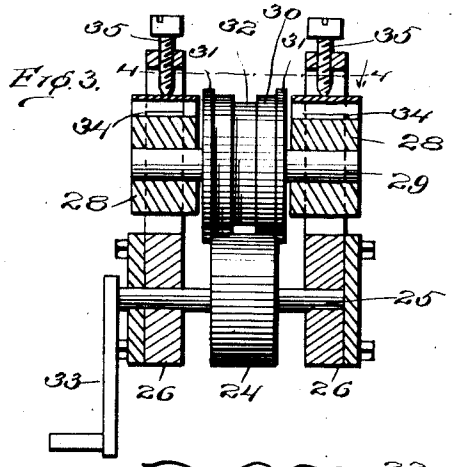


Fig. 3.

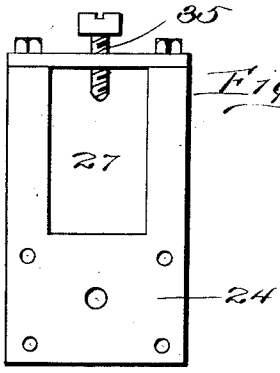


Fig. 5.

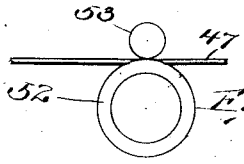


Fig. 14.

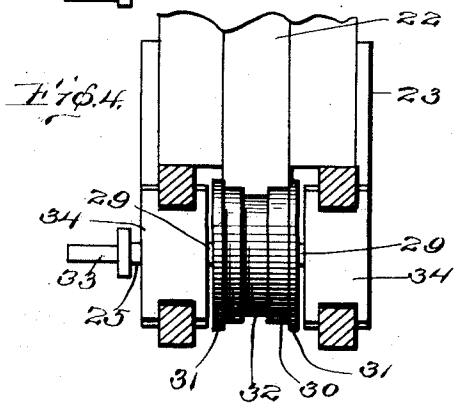


Fig. 4.

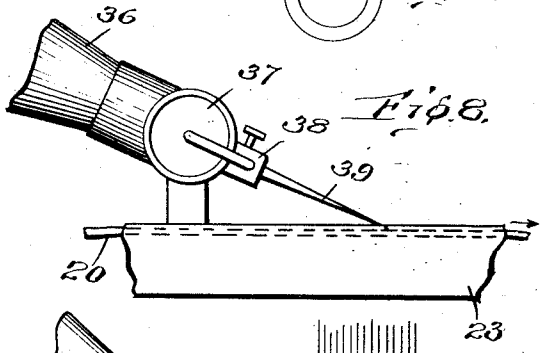


Fig. 8.

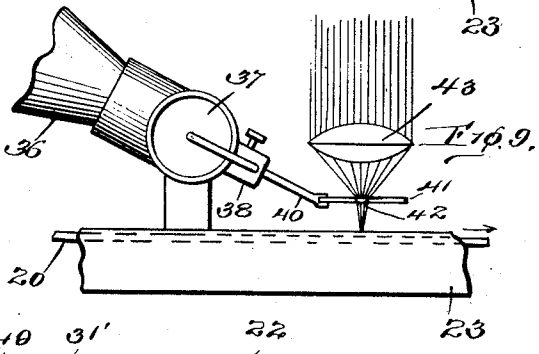


Fig. 9.

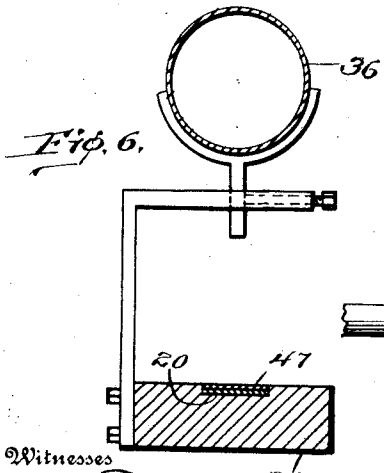


Fig. 6.

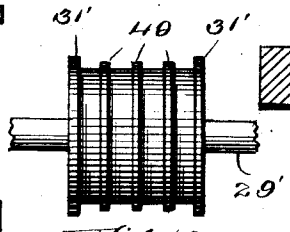


Fig. 10.

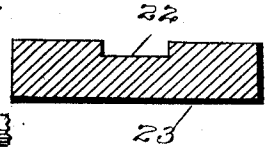


Fig. 7.

Witnesses

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PHONOGRAPH-RECORD AND PROCESS OF MAKING THE SAME.

1,011,421. Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed April 15, 1909. Serial No. 490,044.

To all whom it may concern:

Be it known that I, THOMAS EYNON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Phonograph-Records and Processes of Making the Same; and I do hereby 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.

This invention relates to phonograph records or records for any similar mechanism for the reproduction of sounds here grouped under the head of phonographs, and it is to be understood that the term "phonograph" is intended to embrace any form of talking or sound-reproducing mechanism employing wax or similar records.

An object of the present invention is to produce means whereby an unlimited number of records may be produced from a master record by transferring the record produced upon the master record to the wax record.

A further object of the invention is to employ a hard metal master record coated for the purpose of production only with a thin layer of wax, the wax being removed at places by the action of the needle of the phonograph and the parts uncovered by such action being etched out of the metal by ordinary etching process whereby the record is produced in the metal which is later transferred to the wax record.

A further object is to provide a hard metallic record and to employ a soft metal to produce a negative from the hard metal record, which negative is adapted to reproduce the record upon a wax body.

A further object of the invention is to provide means for employing a pencil of heat rays for removing the wax from the coated metal instead of employing a metallic needle for mechanically removing such wax.

A further object of the invention is to provide an apparatus adapted to employ the wax-covered hard metal and to move the same in position for being acted upon by the phonograph and later to transfer the record from such metal to a soft metal, from which the record is finally produced.

With these and other objects in view, the invention comprises certain novel constructions, combinations and arrangements of parts, as will be hereinafter fully described and claimed.

In the drawings:—Figure 1 is a view in side elevation of an apparatus for carrying into effect the present invention, and showing the wax covered metal ribbon being operated upon by the phonograph. Fig. 2 is a view in side elevation of the mechanism showing the completed master record ribbon being run through a machine when associated with a soft metal ribbon to produce the negative. Fig. 3 is a vertical, sectional view through the rolls of the devices as on line 3—3 of Fig. 1. Fig. 4 is a top plan view of the rolls with part of the frame-work broken away as on line 4—4 of Fig. 1. Fig. 5 is a view of part of the frame-work in side elevation. Fig. 6 is a transverse, sectional view through the bed and horn supporting member as on line 6—6 of Fig. 1. Fig. 7 is a transverse, sectional view of the bed as taken on line 7—7 of Fig. 1. Fig. 8 is an enlarged view in side elevation of the phonograph needle engaging the master record ribbon. Fig. 9 is a conventional view in side elevation showing the employment of the sun's rays and a burning glass to remove the wax from the master record ribbon. Fig. 10 is a view in side elevation of a roller employed for transferring the record from the master record to the negative. Fig. 11 is a view in transverse section of a master record tape etched with three records. Fig. 12 is a view in transverse section of one of the negatives with three records transferred thereto. Fig. 13 is a view in plan of either the master record ribbon shown at Fig. 11 or the negative shown at Fig. 12. Fig. 14 is a view in end elevation of a conventional means for transferring the record from the negative to a wax cylinder. Fig. 15 is a view in side elevation of the transferring means shown at Fig. 14. Fig. 16 is a conventional view of an apparatus for transferring the record from the negative to a disk record.

Like characters of reference indicate corresponding parts throughout the several views.

In carrying out the present invention a tape or ribbon of hard metal, preferably steel, as shown at 20, is employed, the same being coated with a very thin coating of wax of any approved form, and wound upon

a roll or drum 21, from which it is moved through a groove 22 in the bed 23. Such movement is accomplished in any approved manner as by a roller 24 carried upon a shaft 25, journaled in the frame-work 26, rigidly connected with the bed 23, in any approved manner. The frame-work 24 is bifurcated as at 27 and bearing blocks 28 mounted therein movable vertically. Within the bearing blocks 28 a shaft 29 is journaled carrying a roller 30 having flanges 31 adapted to engage upon the opposite ends of the roller 24 and with a circumferential groove 32, so formed that the roller 30 will bear only upon the edges of the ribbon 20. The shaft 25 is provided with any approved means for rotating the same here shown as the crank arm 33, so that as the crank arm 33 is rotated the roller 24 rotates therewith and rotates the roller 30, which is held in frictional engagement by means of springs 34 and tension screws 35.

Above the bed 23 a horn, shown conventionally at 36, is mounted, having the usual and ordinary diaphragm 37 carrying a socket member 38 shown in detail at Figs. 8 and 9, and carrying either a needle 39 engaging the upper surface of the ribbon 20 or an arm 40 having a refractory disk 41 secured thereto provided with a central aperture 42 above which a burning glass 43 is mounted in such manner that the rays concentrated by such burning glass are directed through the aperture 42 upon the wax surface of the ribbon 20. It will be seen that the movement of the diaphragm responsive to sound waves within the horn 36 will move the needle 39 or the arm 40 and disk 41 transversely of the ribbon 20, so that the engagement of such needle 39 or the rays from the burning glass 43 impinging upon the wax surface of the ribbon will cause the wax film to be removed from such ribbon in a waved line as shown conventionally in Fig. 13 at 44.

It is obvious that the position of the needle or disk 41 relative to the transverse extend of the ribbon 20 may be varied so that more than one record may be produced upon the ribbon, if desired, and as shown at Fig. 13, it being understood, however, that the number of records so produced is not limited and may vary from one to any number that the width of the ribbon will accommodate.

After the ribbon 20 passes between the rollers 24 and 30 with the record formed in the soft wax of the film, it is passed through a vat or bath 45, shown at Fig. 1, such vat containing etching acid, whereby the surface of the metal not covered by the wax is etched out, after which the ribbon is run through a vat or bath 45′, containing a washing material which will neutralize the acidity of the etching bath, which may also remove the wax or the wax may be removed later by heating the ribbon, as found most convenient. As the ribbon runs through the bath 45′ it is preferably wound upon a roll 47 for storage purposes.

After the wax has been removed from the ribbon it is found that the record produced on the wax film has been faithfully reproduced in the surface of the metal itself, as shown at 44 in Fig. 11, so that the record is in the form of grooves of irregular serpentine shape formed in the surface of the metal.

It is desirable to produce the record for ordinary use in the surface either by wax cylinder or wax disk, but as the groove in the ribbon 20 would produce upon the wax an upstanding rib, it is found necessary to produce a negative. For this purpose a roll 46 is placed as shown at Fig. 2, and the etched ribbon 20 again run through the groove 22 of the bed 23. Now, however, the horn 36 is preferably removed, and the soft metal ribbon 47 is unwound from a roll 48 and passed through the groove 22, simultaneously with the ribbon 20. Now the roller 30 is removed from the frame-work, and a roller as shown at Fig. 10, substituted having a plurality of circumferential ribs 49, the end portions 31′ corresponding with the ends 31 of the roller 30. The roller shown at Fig. 10 is made to bear with a considerable degree of pressure upon the soft metal ribbon 47 at those places where the record on the ribbon 20 is disposed. With the device as shown herein with three records upon the ribbon 20, a roller with three of the ribs 49 will be employed whereby in use three grooves 50 are formed in the contacting surface of the soft metal ribbon 47 forcing contiguous portions of the soft metal into the grooves 44′ as shown at Fig. 12, after which such soft metal ribbon is wound upon a convenient roll as 51, for storage purposes. It will be understood that the soft metal ribbon provided with the upstanding ribs 44′ will be a faithful negative of the record produced in the metal ribbon 20. Now, if the negative 47 is passed over the surface of a wax cylinder 52, as shown conventionally at Figs. 14 and 15, and at the same time tension exerted thereon in any approved manner as by a tension roller 53, the record as produced in the wax film of the ribbon 20 will be reproduced in the surface of such wax cylinder. If a wax disk is to be employed as shown at 54, in Fig. 16, with a tension roller 55, the record will likewise be transferred from such ribbon 47 to the wax disk. It will be understood, of course, that mechanical means must be employed for properly moving the negative 47 or the disk or roller 54 or 52 relative to each other, so that the record will be produced on such cylinder, for instance, as shown at 56 in Fig. 15. Any of the usual and ordinary mechanism for

moving the parts now employed upon phonographs may be used to advantage in carrying out this part of the invention.

What I claim is:—

1. The process of producing a phonograph record consisting in passing a coated metal plate adjacent to a vibrating diaphragm provided with means for removing a portion of the coating, passing such metal through an etching bath, transferring the record formed by the etching to a soft metal, and transferring the negative from such soft metal to a wax record.

2. The process of producing a phonograph record consisting in passing a coated metal tape adjacent to a phonograph diaphragm having means for removing the surface coating, passing the ribbon through an etching bath, removing the coating, passing the ribbon under pressure in association with a soft metal ribbon to produce a negative, passing the negative under pressure upon the surface of a plastic record.

3. The process of making a phonograph record consisting in passing a coated hard metal ribbon adjacent a phonograph diaphragm, removing part of the surface coating by means which is carried by the diaphragm, passing the coated ribbon through an etching bath, passing the etched ribbon under pressure in association with a soft metal ribbon, and passing the soft metal ribbon in association with the surface of a plastic record.

4. The process of producing a phonograph record consisting in passing a coated metal ribbon adjacent to a vibrating diaphragm having means for removing the coating, passing the ribbon through an etching bath adapted to etch out the metal where exposed, removing the coating from the ribbon, passing the etched ribbon in contact with a soft metal ribbon under pressure to produce a negative, and employing the negative to impress a positive upon a plastic surface.

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

THOMAS EYNON.

Witnesses:
C. J. SCHRADE,
C. E. MARTIN,
WILLIAM FRUMEL.