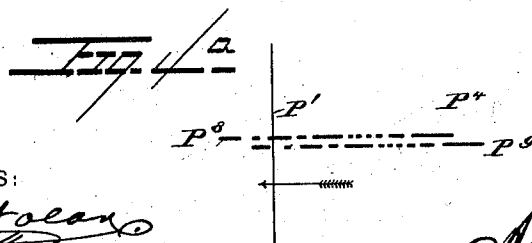
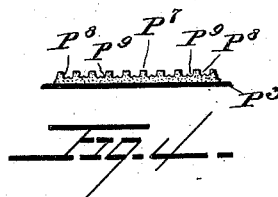
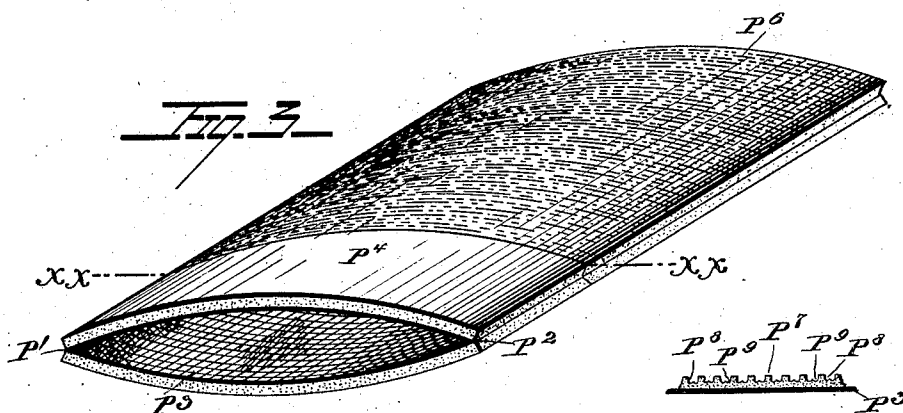
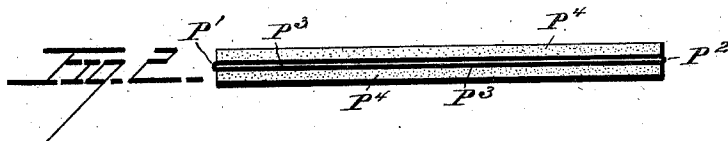
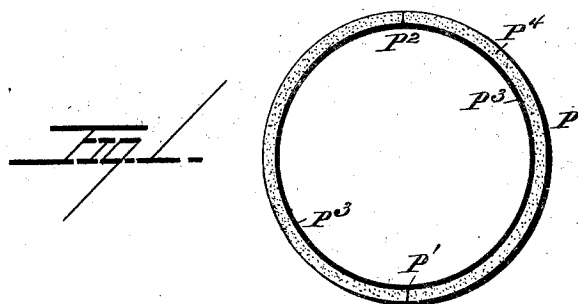


(Specimens.)

I. W. HEYSINGER.
PHONOGRAPH TABLET.

No. 460,338.

Patented Sept. 29, 1891.



WITNESSES:

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PHONOGRAPH-TABLET.

SPECIFICATION forming part of Letters Patent No. 460,338, dated September 29, 1891.

Original application filed February 7, 1888, Serial No. 263,282. Divided and this application filed April 17, 1889. Serial No. 270,897. (No model.)

To all whom it may concern:

Be it known that I, ISAAC W. HEYSINGER, of Philadelphia, in the county of Philadelphia, and State of Pennsylvania, have invented a certain new and useful Improvement in Sound Recording and Reproducing Tablets for Phonographs, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming part of this specification, in which—

Figure 1 is a view in cross-section of the collapsible tablet expanded into a cylinder, as when placed upon the cylinder of a phonograph for use. Fig. 2 is a like view of the same flattened down or collapsed for mailing purposes or permanent preservation. Fig. 3 is a perspective view of a like tablet collapsed, but not quite flattened, and having its surface partly written over in the phonograph, and also shows the transverse line upon which the surplus may be cut off for subsequent use and to lighten the tablet for mailing or other purposes. Fig. 4 is a sectional view taken upon one side of the tablet and in which the section is across the lines and grooves formed by the stylus of the phonograph, and Fig. 4^a a top view of the grooves P^a and P^b.

The lettering in all the figures is uniform.

The subject-matter of my present application originally formed a part of my application for Letters Patent, Serial No. 263,282, filed February 7, 1888, and has been divided therefrom to include the tablet in a separate patent. The said original application comprised a working phonograph with which the tablets which form the subject-matter of this divisional application were adapted to be used, and reference is made to that application to show such manner of use, though the tablets herein shown, described, and claimed are adapted to be used with any suitable phonograph, and are not limited to the specific devices shown and described in said original application; and the said sound recording and reproducing tablets, surfaced as herein described and claimed, are not limited in my invention to the specific form shown, with reference to the machine described in my originally-filed application, but are applicable to machines using tablets of other form, and my tablets may be constructed in other

shapes than those herein specifically shown without departing from the principles and scope of my invention.

My invention relates to the construction of a phonograph-tablet, or "phonogram," as it is sometimes called, upon which the stylus of a phonograph traces an indented, waved, or other inscribed record adapted to be subsequently reproduced in articulate speech by a reproducing-phonograph, in which I make my tablet in a cylindrical form having a flexible foundation of paper, cloth, or other suitable substance, upon which the plastic recording-surface is made by the application of a suitable composition, adherent thereto and having a surface adapted to be indented or inscribed by the stylus of a phonograph. Along the two opposite sides of this cylinder from end to end I cut through the composition down to the foundation, making a narrow slit along each side. When placed upon the cylinder of a phonograph for use, these slits are closed and the tablet forms a complete cylinder; but when removed from the machine the sides may be collapsed upon the foundation along the slitted lines, and the tablet becomes flat, having a double thickness and hinged joints at the sides and capable of being again erected into a cylinder at any time to be put into a similar machine for subsequent use to reproduce the sounds the record of which it may bear or to receive such record in case it has not been previously written upon. It is in its collapsed or flattened form very suitable for sending through the mails, and may be put, like a letter-sheet, into an ordinary envelope, and, if the surface be such as I prefer to use, and which will be hereinafter described, it will bear any amount of hard usage without injury. These collapsed tablets also occupy very little space and may be tied up or packed in bundles, like postal-cards, for transportation, sale, use, or preservation after having received an inscribed record. I do not always make these tubular or cylindrical tablets with a single slit or cleft down each side; but more than two slits may be cut and more than two hinged joints may be used, if so desired. The plastic composition must of course be sufficiently flexible to permit the sides to

be collapsed or flattened, or nearly flattened, though with an elastic surface of hard material the flattening may not be complete, but is made so by tying in bundles, inclosing in envelopes, or compression in other ways, after the cylinder has been collapsed. In certain cases these slits may not extend entirely down to the foundation, and in other cases they may extend partly through the foundation, while sometimes strips of flexible material may be glued or otherwise attached to the inside surfaces at the joints to form the hinges, or the whole tube may be made collapsible at any part. In manufacturing these tubular tablets I make them in long lengths and prefer to use a material woven or knitted into tubular form, which, stretched upon a flat former with parallel sides, or, preferably, upon a cylindrical mandrel, I paint or coat over with my plastic composition until a requisite thickness of surface has been secured, which may be about the one-twentieth of an inch, using the composition hot and in a fluid or semi-fluid state. When cooled and hardened, I run a graduated slitter down each side and cut through the composition to the desired depth. The long tube then removed from the mandrel, I cut it into suitable lengths for use, and, as shown in my former application of February 7, 1888, with the machine therein described and claimed, I prefer to cut these lengths longer than the cylinder of the machine, so that the tablet applied thereto may project from the free end of the cylinder thereof. When a portion has been inscribed by the stylus of the machine, the remainder may be clipped off with a pair of scissors, when flattened, and used again until the whole has been written over without waste.

My invention also relates to the composition of the plastic surface of a phonograph-tablet; and it consists in using a material or composition therefor which, when used in the machine for receiving a record, will be soft and plastic, but which said composition, after receiving the said record, is rendered hard and resistant, so that the record once made may be reproduced indefinitely under the stylus of a reproducing-phonograph without abrasion or injury to the record, and also that these tablets, bearing their records, may be piled up in bundles, sent through the mails, and subjected to rough usage without crushing down the record or impairing its use for reproducing the sounds of the same.

Referring to the drawings, in Figure 1 I have shown in transverse section a tubular foundation of flexible material P^1 , formed from a woven tube or by pasting together the edges of a strip of paper, muslin, or like substance. A suitable paste or glue for this purpose is made of fish-glue, with boiling water, the joint treated with a solution of bichromate of potassa afterward, (which renders the glue insoluble,) and then washed, if desired. This joint is both flexible and insoluble. Upon the outer surface of this tubu-

lar and flexible foundation P^1 is applied the plastic composition P^2 to the requisite thickness, the outer surface being smooth and even. It may be made so in a lathe, if desired, before removal from the cylindrical mandrel upon which the tube P^1 is fitted; but for use in the machine which forms the subject of my application of February 7, 1888, no special accuracy of surface is required, as the plow-point therein described will cut to a definite distance from the foundation of the cylinder, irrespective of variation of the surface, and the record produced at the bottom of such grooves will be regular under the same circumstances.

The composition which I prefer to use and which forms a part of this invention is made by mixing gutta-percha with resin and melting the same together with or without the addition of other fusible or miscible substances to render the composition more or less soft and plastic when cold or when warmed for use in the machine. Gutta-percha and resin melted together in equal parts, the proportion varying with differences inherent in different samples, make a composition hard and elastic at ordinary temperatures, but soft, plastic, and inelastic at a temperature of from 110° to 140° Fahrenheit, and will answer the purpose very well. It becomes fluid at or below the boiling-point of water and can be readily applied with a brush or otherwise to the foundation P^1 repeatedly, if necessary, until a proper thickness is secured. This composition or a similar one so modified by like temperature I prefer to use, when I soften the plastic surface of my tablet by artificially-applied heat at the time the record is being made and allow the said surface to harden by exposure to the ordinary temperature of the atmosphere, the same being repeated as often as desired, as shown and described in my application of February 7, 1888; but I sometimes prefer to harden my composition by the action of chemicals applied to the surface thereof in solution or otherwise, and in such case I usually add more or less starch to the said composition when being prepared, and such composition is very readily rendered hard and elastic by a solution of chloride of zinc or other concentrated chlorides. Such methods of hardening substances are numerous and are well known for many purposes in the arts. I also sometimes use alcohol as a solvent instead of moist or dry heat, and in such case I increase the proportion of resin used with my gutta-percha or use a resin-soap, so that the solvent action of alcohol applied to the surface will render the same soft and plastic until the said alcohol evaporates, when the said surface will resume its normally hard and elastic condition. I also use other well-known mechanical equivalents besides the modifications enumerated above; but for cheapness, readiness of application, and convenience I prefer to use a normally hard and resistant surface, softened tempo-

rarily while being written upon by artificially-applied heat and subsequently restored to a hard and resistant condition by the coolness of the atmosphere at ordinary temperatures. This softening may be accomplished by placing the tablet for a few minutes in a pail of moderately-hot water and then applying the same to the machine to receive the record made by the stylus thereof. A tablet thus heated will remain soft if made of approximately equal parts of gutta-percha and resin with or without the addition of a few drops of glycerine or molasses for a period of from ten to twenty minutes; but I prefer to employ the heating device shown, described, and claimed in my application for Letters Patent hereinabove mentioned, as being more under control and capable of continuous use at any time. Such a surface, when thus written upon, may be subsequently used again, the former record having been expunged by passing a hot iron or the like over it and melting and smoothing down the same to form a new surface. Gutta-percha has a special value as an ingredient because, while most substances expand by heat and contract by cooling, the reverse is the case with gutta-percha, so that when this substance is used and the tubular tablet placed upon the cylinder of the phonograph and heated it not only becomes soft and plastic, but contracts upon the cylinder, so as to present a smooth, firm, and even surface for the stylus of the phonograph. The composition, thus applied to the foundation, as shown in the figures, and allowed to harden upon a mandrel, is divided longitudinally by the clefts or slits P' P^2 , which, as shown, extend down to the foundation. These slits may be made in the composition P^4 when soft or after partially or wholly hardening. The hard elastic-surfaced cylinder cut into suitable lengths when removed from the mandrel or former presents a surface resistant against injury, which may be readily collapsed upon the hinges P' P^2 , as shown in Figs. 2 and 3. As the cylinder or mandrel upon which the foundations are laid is the precise diameter of the cylinder of the phonograph, this tablet may be readily sprung open and slipped over the free end of the cylinder of the machine, when the clefts P' and P^2 will be closed and the surface of the tablets present a smooth outer side. If removed from the cylinder of the machine when warm, it will flatten down completely, as shown in Fig. 2; but if allowed to harden before removal it will only partially collapse, as shown in Fig. 3; but in either case it may be made flat or cylindrical at will, and may be put into an ordinary envelope for mailing, like a common letter, or may be bundled up with others and stored away without the necessity of any special precaution, the composition being unaffected by water or moisture, mold, time, or accidental knocks or blows. As shown in Fig. 3, these tablets, when made longer than required, may be readily cut off

upon the line xx xx and the surplus used again. This is easily done when the tablet is collapsed by a pair of scissors or other means.

In Fig. 4 are shown the grooves P^6 , made by the stylus of the recording-phonograph, corresponding in the figure to those made by my special machine, as described in my other application aforesaid; but the grooves of the record may be of any form and made by any sort of recording-stylus, and the tubular collapsible tablet may be modified to conform to the special requirements in any case and used with phonographic recording and reproducing instruments of other form and construction than the machine specifically shown, described, and claimed in my other application—to wit, Serial No. 263,282, filed February 7, 1888—with which my tablet as shown in the figures is especially adapted for use.

In certain cases, with a very flexible surface, it may not be necessary to cut the slits P' P^2 to any considerable depth, and in some cases the tablet in tubular form may be made collapsible without the use of specially-inscribed clefts, the foundation being thinned at certain places, or otherwise; but I prefer the form shown and above described, as the record is not in anywise impaired by the collapsing of said tubular tablet when such slits are used, however frequently the same may be repeated.

In Fig. 4 the groove P^6 is divided at the bottom thereof into two slightly-separated parallel channels P^8 P^9 , and, as shown and described in my application for Letters Patent for a phonograph aforesaid, each of these grooves at its bottom contains an indented line of sound-record produced by the diaphragm of a phonograph acting at the same time upon two parallel styluses, one slightly in rear of the other, and producing an identical record in the slightly-separated sub-grooves P^8 and P^9 , but one of said records slightly in rear of the other as the said tablet rotates in the machine. A small part of such duplicate record is seen in Fig. 4^a, in which P^8 is the same as P^9 , but slightly in advance, as shown by the direction of the arrow, so that one record crosses the cleft P' at a time when the other record is upon the solid surface of P^4 , and any inequality due to the cleft P' is compensated for by the parallel record, acting through a duplicate reproducing-stylus at the same time and upon the same diaphragm. This duplicate record I use with the phonograph as shown, described, and claimed in my other application aforesaid; but it is not strictly necessary, the slits P' and P^2 , if properly made, making a very slight difference, and, if the surface P^4 is hardened scarcely any, the blunt reproducing-stylus crossing the closed slit very readily; but the duplicate records assist in compensating for irregularity of surface generally or for variation in the substance, as was fully explained in my former application, and they are of use for other reasons, as in case of defect of the recording

or reproducing stylus of the machine or of the cylinder or working parts thereof. For use in ordinary phonographs they may be dispensed with, if desired.

5 In making my composition for the surface of my tablets other gums or resins may be used, and linseed-oil may be used as one of the ingredients, as well as caoutchouc, in lieu of gutta-percha, a large number of like equivalents being known for all such substances in the arts; and I do not specifically confine myself to the use of any single ingredient, except as enumerated in the specific claims of those which hereinafter follow.

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

1. A phonograph-tablet for the record and reproduction of sounds, consisting of two or more flexible leaves hinged together at their sides and adapted to be expanded into a cylinder to be extended over the cylinder of a phonographic machine, said leaves having surfaces adapted to receive the indentations or other record of sound produced by said phonograph, the said tablet adapted to be subsequently flattened upon said hinged sides when removed from said phonograph and subsequently expanded for use upon the cylinder of a sound-reproducing phonograph, substantially as and for the purposes described.

2. As an article of manufacture, a phonograph sound recording and reproducing tablet, consisting of a flexible foundation of paper, fabric, or the like formed into a tube, and a surface of plastic substance attached thereto, said surface adapted to receive and retain the sound-produced record of a phonograph, the said tubular tablet flexible and its sides adapted to be flattened together or collapsed for mailing or other purposes without destruction of said record, substantially as herein set forth.

3. As an article of manufacture, a laterally-collapsible tubular phonograph-tablet adapted to receive a phonographic record when expanded, to be subsequently collapsed and afterward again expanded for use in a reproducing-phonograph, substantially as described.

4. In a phonograph-tablet, the combination of the flexible tubular foundation P^3 , the plastic recording-surface P^4 , and the longitudinal clefts $P' P^2$, extended through said surface P^4 down to said flexible foundation P^3 , substantially as and for the purposes herein shown and described.

5. The laterally-flexible collapsible tubular phonograph-tablet having the surface thereof longitudinally divided into two or more segments and provided with flexible hinged joints at the sides of said segments, substantially as described.

6. In a recording and reproducing tablet, a flexible foundation and a plastic surface formed into a tubular case, said surface hav-

ing clefts extended along the sides of said tube through said plastic surface, said surface adapted to have a continuous record in said plastic material extending in parallel lines around said tube and crossing the clefts thereof, said tube adapted to be collapsed or flattened, and when again expanded, as around the reproducing-cylinder of a phonograph, having said lines of record on adjacent sides of said clefts match with each other as originally produced and produce a continuous record therefrom, substantially as described.

7. The tubular phonograph-tablet having a flexible foundation and a plastic surface, the same adapted to be collapsed or flattened for mailing or other purposes, said tubular tablet made longer than the cylinder of the machine upon which it is to be used, the surplus length adapted to be cut off with a pair of scissors or the like when the same is flattened, both sides cut simultaneously, if desired, said surplus serving for subsequent use as a separate tablet till all is used, substantially as and for the purposes described.

8. A tubular collapsible tablet for phonographs, having a flexible foundation of fabric or the like and a normally hard and resistant surface of considerable thickness, said surface adapted to be softened and made plastic by heat or otherwise for use in said recording-phonograph and subsequently hardened, substantially as described.

9. A collapsible tubular phonograph-tablet adapted to be flattened for preservation in bundles for mailing or other purposes and having a surface of considerable thickness composed of a substance adapted to be made plastic for use with a recording-phonograph and to be subsequently hardened and made resistant, substantially as described.

10. A phonograph-tablet consisting of two flat yielding surfaces, the edges thereof united by flexible hinges and the whole adapted to be expanded to form a cylindrical tablet extending over the cylinder of a phonograph for use therewith, said surfaces having a composition applied thereto to receive and reproduce the record of said phonograph, and said composition acted upon by the stylus of a recording-phonograph in a soft and plastic state and subsequently hardened for use under the stylus of a reproducing-phonograph, substantially as described.

11. In combination with the resistant and elastic surface P^4 , adapted to be softened by heat and subsequently hardened, the flexible tubular foundation P^3 , attached to and supporting said surface, and the longitudinal clefts $P' P^2$, extended through said surface down to said foundation, the whole adapted to be flattened when not in use and to be expanded to form an open tube or cylinder to closely fit over the cylinder of a phonograph and to be softened to present a plastic surface for receiving the record from the stylus of said phonograph, said surface subsequently made hard and resistant for the retention or

reproduction of said record, substantially as described.

12. In a phonograph recording and reproducing tablet, the surface composed of a body of gutta-percha with or without the admixture of modifying substances, said surface adapted to be softened by artificial heat for receiving the phonographic record and subsequently made hard and elastic by the ordinary atmospheric temperature, substantially as and for the purposes described.

13. A phonograph-tablet composed of gutta-percha and resin applied in a heated and fluid or semi-fluid state to a flexible foundation and forming a body thereupon, said body and said foundation composing a recording and reproducing tablet for phonographic purposes, substantially as described.

14. A phonograph-tablet composed partially of gutta-percha, adapted to be softened by heat and hardened by cold or chemicals for preservation subsequently to receiving the phonographic record, substantially as described.

15. A recording and reproducing tablet for phonographic purposes, consisting of a surface composed of substances adapted to be made more or less plastic by temperature or the application of chemicals and made hard

and resistant subsequently to receiving the record of said phonograph by other temperature or chemicals, the whole constructed to be used for receiving the record in a soft and plastic condition and to be used for reproducing the said record in a hard and resistant condition, the said surface supported by a laterally flexible and collapsible foundation adapted to be flattened or folded together, substantially as described.

16. As an article of manufacture, a collapsible flexible tubular phonograph tablet having a surface of considerable thickness to receive and retain the record made by the stylus of a phonograph or the like, said surface composed of a material softened by a moderate heat artificially applied thereto and subsequently hardened by the cooling effect of an ordinary atmospheric temperature, said tubular tablet adapted to be expanded for use upon the cylinder of a phonograph and at other times preserved in a collapsed or flattened state, substantially as described.

ISAAC W. HEYSINGER.

Witnesses:

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