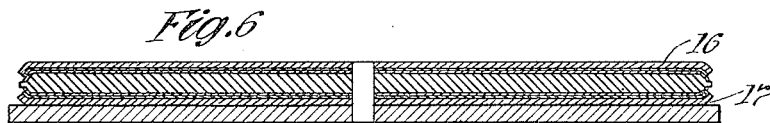
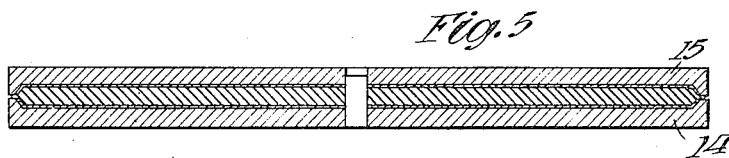
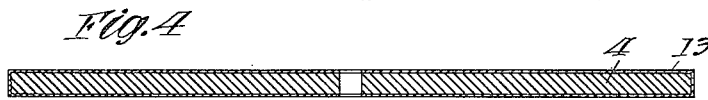
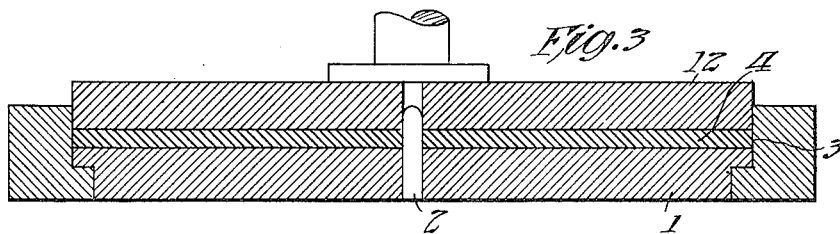
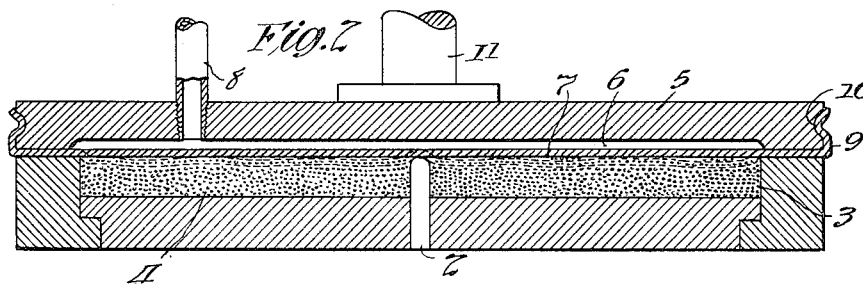
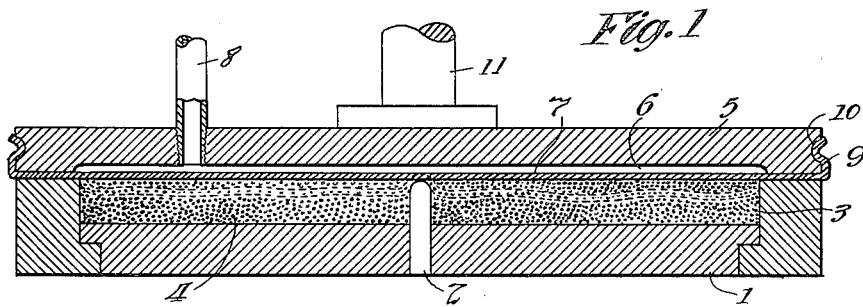


T. A. EDISON.  
 METHOD FOR PRODUCING TABLETS FOR SOUND RECORDS.  
 APPLICATION FILED DEC. 20, 1911.

1,146,413.

Patented July 13, 1915.



Witnesses:  
 Frank D. Lewis  
 Frederick Bachmann.

Inventor:  
 Thomas A. Edison  
 by Frank L. Over  
 His Atty

# UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, WEST ORANGE, NEW JERSEY, ASSIGNOR  
TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION  
OF NEW JERSEY.

## METHOD FOR PRODUCING TABLETS FOR SOUND-RECORDS.

1,146,413.

Specification of Letters Patent.

Patented July 13, 1915.

Application filed December 20, 1911. Serial No. 666,888.

*To all whom it may concern:*

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Method for Producing Tablets for Sound-Records, of which the following is a description.

My invention relates to methods and apparatus for producing tablets for sound records, more particularly for sound records of the flat or disk type having a surface of an exceedingly hard material such, for example, as the condensation products, which form the subject matter of the U. S. Patents of Jonas W. Aylsworth, Nos. 1,102,630, 1,020,593, 1,098,608 and 1,046,137, the method only being claimed in this case. In pressing a blank tablet of this type into the record matrix, unless the tablet or the base or backing therefor is of substantially uniform density throughout, it is practically impossible on account of the excessive pressure in the "hard spots" and the deficiency of pressure in the "soft spots" to obtain a perfect impression over the entire record surface. Furthermore, I have found in practice that if an ordinary mass of powdered material or stock of substantially uniform thickness is placed in a mold between the ordinary rigid mold plates, it is practically impossible to obtain the necessary evenness or uniformity in the density of the tablet, the unevenness being apparently due to the fact that the powdered material lies more compactly in some places than in others.

The principal object of my invention is to provide an improved process and apparatus whereby a tablet having the necessary uniformity of density may be readily obtained from powdered material or stock.

Other objects of my invention will appear more fully in the following specification and appended claims.

In conformity with my invention, the material or stock from which the tablet is molded is placed in a powdered condition in the mold and is there subjected to a uniform pressure applied in such a way as to compact the stock to a mass of substantially uniform density. After this, the surface of the stock is evened off in any suitable way

to prepare the compacted mass for compression to the desired form. If desired, the stock may be compacted and evened off a second time; and these operations may be repeated any number of times, but I have found in practice that it is ordinarily sufficient to compact and even off the stock a single time.

While it is evident that the compacting pressure may be applied in any suitable way so long as it acts uniformly over the whole of the exposed surface of the stock in the mold, I prefer to apply the same by a fluid, such as air, under pressure; as such a pressure acts readily upon all portions of the surface of the stock, regardless of the irregularities therein. In order to prevent scattering of the powdered material by the air or other fluid employed, I preferably apply the fluid pressure to the back of a flexible membrane or diaphragm of suitable material, such as rubber, adapted to engage the surface of the stock.

After the stock is compacted, as described above, to a mass of uniform density, the surface thereof to which the pressure has been applied is found to be undulatory or covered with high and low spots. To even off this surface I preferably again fill the mold, after which the stock may be molded under heat and pressure to the desired shape. The surface of the tablet is now provided with a veneer or veneers of impressible material adapted to receive the record impression. Although this veneer may be applied in any suitable way, I prefer to apply the same by the process set forth in an application of Jonas W. Aylsworth, Serial No. 579,130, filed August 26, 1910, and entitled "Method of molding sound records and other objects." In accordance with this process, the veneer is formed by coating the material of which the same is composed upon the surface of a blank mold, the tablet to be coated being pressed into contact with the coating in the mold with the application of sufficient heat to cause the coating to firmly adhere to the tablet. After this, the coated tablet may be removed from the mold and pressed with sufficient application of heat into a record mold to cause the sound record to be formed on the surface thereof. In order to cause the surface veneer to adhere firmly

to the rough backing, I preferably cover the latter, prior to the transfer of the veneer, with a very thin coating of the material of which the veneer is formed. This coating should be pressed into the rough tablet in order to completely fill the surface pores thereof.

In order that my invention may be more fully understood, attention is hereby directed to the accompanying drawing forming a part of this specification and illustrating various steps of my improved process and the apparatus for carrying the same into effect.

In the drawings, Figures 1 and 2 represent central vertical sectional views of the lower mold member filled with stock and covered with one form of my improved apparatus for compacting the stock, the dotted lines in these two figures indicating the respective positions of the flexible diaphragm or membrane after successive compactings. Fig. 3 represents a similar view of the complete mold after the formation of the rough tablet. Fig. 4 illustrates the rough tablet covered with a thin coating of the surface material prior to the application of surface veneers to the opposite faces thereof. Fig. 5 represents a similar view of the coated tablet placed in a mold for compressing the coating into the tablet and for forming the periphery of the latter. Fig. 6 represents a similar view of the apparatus for securing the surface veneers to the tablet, the tablet and the veneers being shown in position in the apparatus.

As shown in the drawings, the numeral 1 indicates the base of a mold having a centering pin 2, and a recess 3 of uniform depth in which the stock or material 4 to be molded is placed. A member 5 provided with a recess 6 is adapted to rest on the base of the mold with the recess 6 above the recess 3, the former recess being covered by a flexible membrane or diaphragm 7, forming thereby a closed chamber in the member 5. The numeral 8 designates a suitable air or fluid inlet for the said chamber. The membrane 7 is preferably provided with an upwardly directed portion 9 engaging firmly in a peripheral recess 10 in the member 5 whereby the membrane or diaphragm 7 is firmly secured to the member 5. If the said membrane is made of a yieldable material such as rubber, the contraction of the same when stretched over the member 5 will be sufficient to draw the flange 9 into close contact with the recess 10. The membrane 7 extends preferably across the portion of the member 5 adapted to engage the base of the mold so that when the said member is held in position on the said base by a suitable pressure applying member 11, the membrane because of its yielding character will form a tight joint between the base of the mold and the member 5.

In carrying out my improved process, the base of the mold is preferably filled with powdered stock, after which the compacting device above described is placed above the same and held firmly thereon by the member 11, fluid under pressure being thereupon introduced from any suitable source through the inlet 8 into the chamber above the membrane 7 which is thereby pressed upon the record material or stock to compact the same in the mold. By reason of the uniformity of the pressure upon the upper surface of the membrane and the ability of the latter to conform to the exact shape of the upper surface of the stock, the latter is compacted to a mass having a substantially uniform density throughout, the position of the membrane after this operation being shown in dotted lines in Fig. 1. The member 5 and the parts connected thereto are now removed from the top of the mold and the latter is again filled and leveled off with powdered stock to even off the surface of the latter. This operation of compacting the stock and evening off the upper surface thereof may be repeated any desired number of times, but, as above stated, I have found in practice that satisfactory results are obtained when the stock is compacted and evened off a single time. In Fig. 2, the dotted lines indicate roughly the position of the diaphragm or membrane after a second compacting operation. After the material has been suitably compacted, the upper member 12 of the mold is forced downwardly upon the stock, sufficient heat being applied to cause the latter to become slightly plastic; so that after cooling, a rough tablet of substantially uniform density and thickness is obtained.

The composition for the rough tablet may be mixtures of wood pulp or other filling agents and a fusible condensation product such as the wellknown shellac substitutes and other substances, which are referred to by the term "phenol resin" in applications of Jonas W. Aylsworth, Serial Nos. 496,060 and 541,764, the term "phenol resin" being intended to include cresol and other equivalents of phenol. A suitable composition may be formed from the ordinary shellac mixtures with wood pulp. Any other suitable composition may be employed. The rough blank or tablet having been obtained, the same is provided with a thin coating of the material which is to constitute the incompressible surface of the tablet, this coating being shown at 13 in Fig. 4. This material may be and preferably is the enamel lacquer or varnish described in application of Jonas W. Aylsworth, Serial No. 543,239, which lacquer or varnish comprises broadly a fusible resin of phenolic origin, which has mixed therewith a substance which is adapted to react with the resin upon the applica-

tion of sufficient heat to form a hard insoluble condensation product, the lacquer or varnish also containing a plasticity ingredient whereby it is adapted after hardening to receive a sound record impression upon application of sufficient heat. This varnish 5 13 is preferably sprayed onto the rough tablet in the manner and by the means described in my applications filed on Oct. 26, 1912, Serial Nos. 727,828 and 727,829. In 10 order to force the said coating into the pores on the surface of the rough blank and also to form the periphery of the said blank, I press the latter between the two plates 14 and 15 of a mold, sufficient heat being applied to permit the ready forming of the periphery of the tablet, as indicated in Fig. 5, but not to harden the varnish. Blank 15 molds 16 and 17 are now coated, preferably in the same manner as the rough blank, with 20 a solution of the surface material. These molds having been coated, the same are dried; and the rough tablet is then pressed between the same in contact with the surfacing layers or veneers formed upon the same, as clearly indicated in Fig. 6. In the 25 said figure, the numeral 18 represents the lower member of a press. It is understood that during the operation sufficient heat is applied to cause the welding of the surface veneers to the blank and the transfer of the said veneers to the rough blank or tablet upon the cooling and withdrawal of the same from the mold. If the enamel lacquer or varnish referred to above is employed for 30 the surfacing material, the same may be converted on the application of heat into a final infusible insoluble refractory product. The heat to cause this transformation may be applied before the veneers are transferred to the rough tablet or blank, or the same may be applied during the said operation. I, however, consider the former method 35 preferable because the residues of the solvent employed in making the varnish are thereby permitted to escape more readily. The heating is preferably done in successive stages beginning at about 120° F. and ending at 220° F. or higher according to the 40 nature of the particular enamel used. When the record blank is made in the manner described above, I have found that an accurate sound record may be impressed therein regardless of the hardness of the surface material. 45

While I have illustrated the application of surface coatings to both of the faces of the tablet, it is evident that if desired only one face of the tablet need be coated. Numerous other modifications may be made in the process and also the apparatus above 50 described without departing from the spirit of my invention, the latter being limited only as defined by the terms of the appended claims. 55

What I claim as new and desire to protect by Letters Patent of the United States is as follows:

1. The process of making tablets for sound records, which comprises placing in a mold 70 a quantity of finely divided stock, pressing the same to a compact mass having a substantially uniform density throughout, evening off the surface of the compacted mass, and compressing the same with the 75 application of heat to form a tablet of desired shape, substantially as described.

2. The process of making tablets for sound records, which comprises placing in a mold 80 a quantity of finely divided stock, forming the same into a compacted mass having a substantially uniform density throughout, evening off the surface of the compacted mass to form a mass of stock of uniform 85 thickness, and compressing the same with the application of heat to form a tablet of desired shape, substantially as described.

3. The process of making tablets for sound records, which comprises placing in a mold 90 a quantity of powdered stock, compressing the same to a compact mass having a substantially uniform density throughout, evening off the surface of the compacted mass with additional powdered stock, and 95 compressing the same with the application of heat to form a tablet of desired shape, substantially as set forth.

4. The process of making tablets for sound records, which comprises placing into 100 a mold a quantity of powdered stock, compacting and forming the same into a mass having an even upper surface and a substantially uniform density throughout, compressing the same with the application of 105 heat to form a tablet of desired shape, and applying to said tablet a veneer of hard impregnable record material, substantially as set forth.

5. The process of making record tablets which comprises placing into a mold a quantity 110 of powdered material which is plastic when hot and hard when cold, compacting and forming the same into a mass having a comparatively even upper surface and a substantially uniform density throughout, 115 compressing the same with the application of heat to form a tablet of desired shape, and applying to said tablet a veneer of material which becomes slightly softened but not sufficiently plastic to flow when hot, substan- 120 tially as set forth.

6. The process of making tablets for sound records, which comprises placing in a mold a quantity of powdered stock, compressing the same by means of fluid pressure 125 to a compact mass, evening off the surface of the compacted mass, and compressing the same with the application of heat to form a tablet of desired shape, substantially as set forth. 130

7. The process of making tablets for sound records, which comprises placing in a mold a quantity of powdered stock, applying a flexible covering to the top of said stock, compressing the latter to a compact mass by the application of fluid pressure to the said covering, evening off the surface of the compacted mass, and compressing the same with the application of heat to form a tablet of desired shape, substantially as set forth.

8. The process of making tablets for sound records, which comprises placing in a mold a quantity of powdered stock, applying a flexible covering to the top of said stock, compressing the latter to a compact mass by the application of fluid pressure to the said covering, evening off the surface of the compacted mass, compressing the same with the application of heat to form a tablet of desired shape, and applying to said tablet a veneer of hard impressible record material, substantially as set forth.

9. The process of making tablets for sound records or the like, which comprises placing in a mold a quantity of powdered stock, applying a yielding covering to the top of said stock, compressing the latter to a compact mass by the application of pressure to said covering, evening off the surface of the compacted mass, and compressing the same with the application of heat to form a tablet of desired shape, substantially as set forth.

10. The process of making tablets for sound records or the like which comprises

placing in a mold a quantity of finely divided stock comprising a filler and a binder therefor, compacting the same to a mass having substantially uniform density throughout, evening off the surface of the compacted mass, and compressing the same with the application of heat to form a tablet of desired shape, substantially as set forth.

11. The process of making tablets for sound records or the like which comprises placing in a mold a quantity of finely divided stock comprising a filler and a phenolic binder therefor, compacting the same to a mass having substantially uniform density throughout, evening off the surface of the compacted mass, and compressing the same with the application of heat to form a tablet of desired shape, substantially as set forth.

12. The process of making tablets for sound records or the like which comprises placing in a mold a quantity of finely divided stock comprising a filler and a binder therefor, compacting the same to a mass having substantially uniform density throughout, evening off the surface of the compacted mass, compressing the same with the application of heat to form a tablet of desired shape, and applying a surface veneer to said tablet, substantially as set forth.

This specification signed and witnessed this 19th day of December 1911.

THOS. A. EDISON.

Witnesses:

FREDERICK BACHMANN,  
ANNA R. KLEHM.