

No. 606,725.

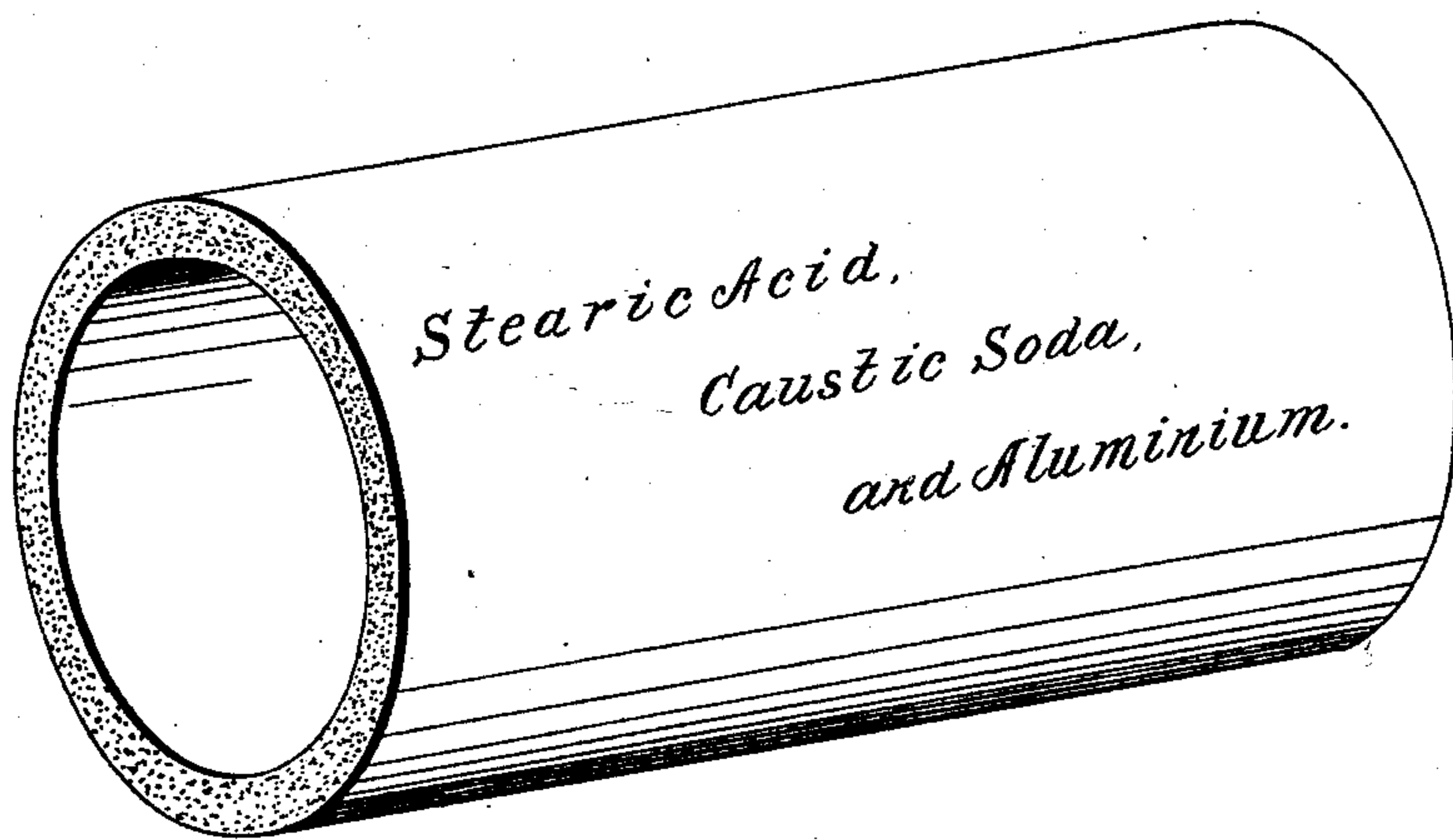
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T. H. MACDONALD.

MANUFACTURE OF GRAPHOPHONE TABLETS.

(Application filed Nov. 27, 1896.)

(No Model.)



Witnesses.

W. R. Edison.

Robert Lewis.

Inventor.

Thomas H. Macdonald  
by *John D. Macdonald*  
his attorney.

# UNITED STATES PATENT OFFICE.

THOMAS H. MACDONALD, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO  
THE AMERICAN GRAPHOPHONE COMPANY, OF WASHINGTON, DISTRICT  
OF COLUMBIA.

## MANUFACTURE OF GRAPHOPHONE-TABLETS.

SPECIFICATION forming part of Letters Patent No. 606,725, dated July 5, 1898.

Application filed November 27, 1896. Serial No. 613,615. (No specimens.)

*To all whom it may concern:*

Be it known that I, THOMAS H. MACDONALD, of Bridgeport, Connecticut, have invented new and useful Improvements in the Manufacture of Graphophone-Tablets, which improvements are fully set forth in the following specification.

This invention relates to the manufacture of tablets or blanks adapted to receive engraved records of sounds, and more particularly to the composition of matter of which the tablet is composed.

The recording material in order to answer well the requirements of the engraving method of recording sounds should be perfectly amorphous, slightly cohesive, and capable of being removed cleanly and smoothly in chips or shavings under the action of the recording-stylus when actuated by the feeble force of sound-waves. The material, moreover, should be sufficiently hard to withstand ordinary handling, to retain perfectly its form, and to resist the effect of ordinary changes of temperature. It should also be a stable compound or material in order that records made in it may be preserved for indefinite lengths of time.

As pointed out in Letters Patent No. 341,214, granted May 4, 1886, to C. A. Bell and S. Tainter, the properties above indicated reside in a greater or less degree in wax and wax-like substances—such as beeswax, paraffin, stearin, &c.—though by special preparation of these and similar substances their fitness for the purpose in view has been increased.

It has been heretofore proposed to use as a sound-recording material an insoluble soap made by saponification of any fatty acid by means of an earthy alkali, such as lime. It has also been proposed to employ a metal, such as lead, combined with stearic or oleic acid, and particularly a mixture of oleate and stearate of lead; but tablets made of insoluble lime-soap or of stearates or oleates of lead have never yielded commercially-successful results. Several practical difficulties have been encountered in endeavoring to make tablets composed wholly or in part of soap. The chief difficulty has been that the surfaces of

such tablets become coated after a greater or less length of time with a bluish film having the appearance of mold and which has been termed "efflorescence." This is due to the presence in the material of hygroscopic compounds, which on being attacked by moisture work out to and spread upon the surface of the tablet.

I have found that lead in any form, as well as most of the salts of other metals which might be otherwise suitable for the purpose in view, give rise to hygroscopic compounds. This is particularly true of stearates and acetates of lead. Another difficulty that arises is the formation of crystalline or crystallizable compounds in the operation of making soap. The object of introducing a metal (or metallic salt) is to prevent all tendency to crystallization, it being of the first importance to secure a composition which shall be and under all conditions remain perfectly amorphous and presenting equal resistance to cutting in every direction. All ordinary commercial soaps have this tendency to crystallization in some degree, it not being possible to introduce sufficient sodium or soda salt to prevent all crystallization.

The accompanying drawing illustrates a common form of tablet for use in receiving engraved records of sounds.

In carrying out my invention, whereby all the conditions herein pointed out as essential are secured, I take stearic acid as nearly pure as can be obtained and convert it into soda soap in the manner hereinafter explained. The composition, however, differs from ordinary soap in that it contains no oleates, I having found that the presence of even a small quantity of oleate or oleic acid is detrimental. It is also important that the tallow or other source from which the stearic acid is obtained be completely deglycerinized. Except under these conditions the result will be unsatisfactory.

In converting the stearic acid into soap I produce only a partial saponification—that is to say, instead of using the chemical equivalent in caustic alkali of the fat acid I use about forty per cent. of that quantity of alkali—



thus producing what may be called a soap of about two-fifths saponification. This is the proportion which gives the best results, but is of course variable within limits. The controlling consideration is that the greater the quantity of alkali the higher will be the melting-point of the resulting soap, and a complete saponification will produce a soap which requires to melt at a temperature which will char it. As the material is to be molded into cylindrical or other forms, it must be capable of melting at a moderate temperature, say between 250° and 330° Fahrenheit. On the other hand, if the saponification be not carried far enough the material will be too soft and will run at a lower temperature than is desired. In this soap I have incorporated aluminium, which I have found to be the metal best suited in all respects for the purpose. This may be used in the form of aluminic hydrate or in the metallic state, powdered, or in small ingots. The method of introducing the metal is, moreover, important, owing to the tendency of sodium and aluminium when combined to form crystallizable compounds. Preferably the metal is first added to the soda-lye, forming with a portion thereof aluminate of soda, (sodium-ortho-aluminate,) which readily unites with the stearic acid subsequently added. The quantity of aluminium employed is relatively very small.

In order that the invention may be fully understood, I will give two formulas which have yielded the best results obtained.

35 Formula A: Stearic acid, free from oleic acid and glycerin, four hundred and eight pounds; aluminic hydrate, seven pounds; caustic-soda lye, eighty-five pounds. To this is added, for the purpose of "tempering,"  
40 paraffin, ozokerite, or similar material, seventy-two pounds. The caustic soda is incorporated in water until a lye of 37.5° Baumé is obtained, and this is heated to its boiling-point, about 242° Fahrenheit. The aluminic hydrate is added and is quickly taken up by the lye. The stearic acid is melted and raised to about the same temperature and the compound of lye and aluminium added slowly thereto. It will unite readily therewith. It  
50 is preferred to employ about the temperature indicated, as thereby the formation of the composition proceeds gradually and without violent ebullition. The temperature may subsequently be raised to about 300° Fahrenheit and continued at that heat until the water is all expelled. The composition is now completed except for the addition of a material such as paraffin, ozokerite, or ceresin to bring it to the desired degree of hardness.

60 Formula B: Stearic acid, three hundred pounds; powdered aluminium, 1.5 pounds; caustic-soda lye, 37.5° Baumé, nine pounds; sal-soda dissolved in twelve gallons of water, sixty pounds; ceresin, sixty pounds. The  
65 sal-soda lye and caustic-soda lye may be united before the aluminium is added, or the

latter may be added to the caustic soda and the two liquids then united. Instead of powdered aluminium I may use ordinary ingot-aluminium with results nearly if not equally as good. After the material is molded to the desired form it should be quickly cooled to ordinary temperatures.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The process of making a sound-recording material, by dissolving aluminium in soda-lye, and adding the solution to stearic acid, substantially as described.

2. The process of making a sound-recording material by melting stearic acid, free from glycerin and oleates, adding thereto soda-lye and aluminium, and heating the mass, substantially as described.

3. In the process of making a sound-recording material, the improvement consisting in adding to stearic acid soda-lye with which a metal such as aluminium has been united in such quantity as to produce partial saponification, and heating the mixture, substantially as described.

4. The process of making a sound-recording material by treating stearic acid with soda-lye in quantity sufficient to produce about a forty-per-cent. saponification, the lye containing a metal and heating the mixture, substantially as described.

5. The process of making a sound-recording material by forming a soda-lye, heating to about its boiling-point, adding a small quantity of aluminium thereto, heating pure stearic acid to about the same temperature, adding the compound of lye and aluminium and continuing the heating until the moisture is expelled, substantially as described.

6. The process of making a graphophone-tablet by forming a soda-lye, heating to about its boiling-point, adding a small quantity of aluminium thereto, heating pure stearic acid to about the same temperature, adding the compound, continuing the heating until the moisture is expelled, molding into the desired shape and then quickly cooling, substantially as described.

7. The process of making a sound-recording material, by partial saponification of stearic acid with soda-lye having aluminium united therewith, substantially as described.

8. The process of making a sound-recording material, by adding aluminic hydrate to caustic-soda lye, adding the compound to melted stearic acid, and heating the mixture, substantially as described.

9. The process of making a sound-recording material, by adding aluminium to soda-lye, adding the same to stearic acid, heating the mixture, and adding a softening material such as paraffin, substantially as described.

10. A composition of matter for a sound-recording tablet formed of pure stearic acid (free from oleic acid and glycerin) partly

saponified by caustic soda, and having aluminium incorporated therein, substantially as described.

5 11. The process of making a sound-recording material by adding aluminate of soda to stearic acid and heating the mixture, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS H. MACDONALD.

Witnesses:

S. T. CAMERON,  
REEVE LEWIS.