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PROCESS OF FORMING DUSTLESS CRAYONS.

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To all whom it may concern:

Be it known that I, JOHN A. HAUFF, a citizen of the United States, residing at Valparaiso, in the county of Porter and State of Indiana, have invented certain new and useful Improvements in Processes of Forming Dustless Crayons, of which the following is a specification.

My invention relates to the process of forming dustless crayons, and it more especially consists of the features pointed out in the annexed claims.

The purpose of my invention is to produce white or various colored dustless crayons in a simple and inexpensive manner; that avoids the usual complexity and expense of kiln drying etc.; that produces a crayon that is available for either natural or artificial slatings, blackboards, etc.; that may be erased without appreciable dust; and that does not glaze over artificially slated surfaces whether the same be formed on wood, paper or metal. A further object is the formation of a dustless crayon that can also be used as an alternative to well known water or pastel colors.

With these and other ends in view, I describe such instances of adaptation as will disclose the broad underlying features without limiting myself to the exact relation of parts or the specific order of procedure herein set forth.

In carrying out my invention, I have not found it necessary to install or use complicated or expensive equipment to produce dustless crayons.

So-called dustless talc crayons have been used on slated surfaces or "blackboards" supplied direct to users as a part of home study devices, such as Chautauqua industrial art desks which are sold in large quantities, approximately 100,000 per year. The use of blackboards in schools, etc., has been largely discontinued because of dusty crayons. This latter disadvantage is accentuated many times where ordinary colored crayons are used. In the home it is impracticable to have children use such colored crayons because of the dust and general mussiness. It is not only the unhygienic feature but economy also must be considered, because furniture, carpets, rugs, clothes, etc., are damaged.

Dustless white crayons have given a fair degree of service in the past but the ever present demand for dustless colored crayons has been unsuppied. From only one indicated avenue of distribution it will be seen that the demand will quite naturally be greater than it has been in the past for white crayons only. In view of this it is important that the steps of production be simplified as much as possible without lowering the quality and also reducing the liability to breakage to a minimum during shipment.

The so-called talc crayons used heretofore have not been entirely satisfactory because of inherent variations in mixtures, temperature of kiln drying, breakages, etc., etc. In fact, many artificially slated boards have been ruined because of a lack of uniformity in the structure of the crayons.

The crayons heretofore available have been primarily made for structuarl iron workers who use them to mark I beams, channels, angles, plates, etc. For these purposes uniformity of quality is not necessary because the surfaces on which they are used are always quite rough and it is immaterial whether the crayons are at times softer and at other times harder. In contracts to such rough surfaces, artificial slatings with a fine granular surface require a uniform crayon quality. This necessitates the use of special materials and cooperative treatment in their production.

As an exemplification of my procedure, I may use the following proportions of materials, or modifications of these or their substitutes as may be found desirable for white or colored crayons: Kaolin 69%, steatite 18%, talc 7%, gum arabic 6%, coloring matter as desired.

Of the above ingredients the kaolin may represent 69 pounds, steatite 18 pounds, talc 7 pounds and gum arabic 6 pounds in a total of 100 pounds of material aside from the coloring matter. The parts of the composition may be designated as ounces, grams, etc., as well as pounds.

In the above formula the kaolin, or china-clay as it is sometimes called, consists of hydrated silicate of alumina, a constituent of decomposed granitic rock, which forms a base for my crayons. The steatite resembling soapstone serves as a lubricant for the finished crayons and prevents them scratching the blackboards. This is somewhat related to saponite which is a hydrated silicate of magnesia and alumina. The talc, prob-

ably an acid magnesium silicate, supplements the steatite and the kaolin. Talc in its massive state is substantially steatite or soapstone. In its finer crystalline state it is known as French chalk. The gum arabic serves as a binder for holding the various powders together as finished crayons.

In producing crayons I thoroughly mix all the dry ingredients including the powdered gum arabic, and add luke warm water to form a thin putty-like consistency, which is allowed to set or season for about twelve hours when it may be kneaded similar to bread dough, rolled out smooth, cut into strips or suitable portions and fed into a so-called tubing machine (not shown). The die of the machine has its center removed so that the extruded material is delivered without an opening throughout its center. The material passes from the machine in a continuous length, at the rate of about two-thousand feet per hour, more or less. The continuous length of material delivered by the machine is cut into, approximately, five inch pieces which are assembled on suitable boards or holders where they are held spaced apart without being confined so that the air has free circulation to spontaneously dry them at room temperature. This air drying entirely eliminates gas or other heated kilns and simplifies the process, and reduces the cost of production without in any way lowering quality. The crayons are so treated for about seventy-two hours more or less.

In making dustless colored crayons, the desired color in powdered form such as red, yellow, green, blue, etc., is added to the other ingredients in the required quantity according to the intensity of the color desired. To make colored crayons harmless, coloring matter of vegetable or other origin may be employed similar to that used in the manufacture of confectionery etc., and thus such crayons will not be injurious to the user.

Ordinary school crayons are very brittle, and full of disagreeable dust, in consequence they are entirely unavailable for the purposes to which my crayons are specially applicable. Other crayons having a wax or paraffin base combined with a pigment are also unfit for use in connection with slated surfaces.

Heretofore, it has been impracticable to produce colored dustless crayons for use on slated surfaces, blackboards, etc., but the production of such crayons is now practicable through the use of my process. It is to be understood that I do not in the broadest sense limit myself to the specific materials that have been mentioned, as any combination of bases, ingredients, colors etc., which can be formed into the desired shape, that are not injurious to persons, to slated or similar surfaces, that are dustless, and that are readily erased, come within the spirit of my invention. In using the designation "a suitable base" or "a base" in the claims I refer to ingredients such as kaolin, steatite, talc etc., or their practical equivalents.

It has been found impracticable to use so-called soapstone pencils because of the slowness of production due to its being necessary to saw the soapstone into pencil shapes and individually treat each shape to form a round pencil, in consequence the only way to secure ample production is to form crayons according to my process which admits of their being stacked away while in a plastic state on suitable holders placed on shelves or otherwise in any desired quantity.

It is of course understood that crayons of this type must be free from injurious substances because of the fact that they are largely used by children, in consequence, I claim the use of any non-deleterious materials in the production of dustless white or colored crayons for the base and accessory substances.

Recognized authorities refer to kaolin as having been used internally for Asiatic cholera, gastro-enterites, and dysentery; also as a chemical antidote in cases of strychnine or other poisoning through its absorption of toxic alkaloids. Kaolin is found in various chemical combinations and it is said to contain approximately 47% silica, 40% alumina and 13% water. Among different substitutes for kaolin "fuller's earth" an argillaceous earth may be mentioned. Other ingredients such as talc, steatite, etc., are quite harmless being used in infant powders and toilet preparations. Gum arabic is extensively used for pharmaceutical purposes in the formation of pills, troches, etc., in consequence it is quite harmless.

A unique feature of my invention is found in the double use that can be made of my crayons. They are serviceable for blackboard use and at the same time, if the end is momentarily dipped into water, they can be applied direct to paper, somewhat similar to pastels to lay in large color masses with a palette knife or by means of a brush and water they can be used the same as water colors to lay in body colors, tints, details etc. Contrary to the use of pastel crayons, the results produced by means of my crayons are not damaged by abrasion. They are quite set without the use of fixatifs, etc. This property enlarges the field of usefulness very much because children can try out their skill on a desk blackboard from which the try-outs may be erased. For preserving more perfect productions or even first efforts the child can draw on paper.

In order that crayons may be used dry directly on paper for chalk talks, etc., they may be made of a softer quality by appropriately varying the ingredients but such

crayons would be specials and not supplied for home or school use.

What I claim is:

1. The process of producing dustless crayons, which consists in combining hydrated silicate of alumina and magnesia, in adding a binder thereto, in thoroughly mixing these ingredients, in applying moisture to form a thin putty-like mixture, in allowing the same to season, in moulding the material into the desired shape, and in subjecting the moulded product to spontaneous air drying so that the resulting physical properties of the product make it available for direct marking in a dry state and when moistened with water to the desired degree it becomes available as a water color and also serves as a painting medium in plastic form.

2. The process of forming dustless colored crayons, which consists in combining kaolin, steatite, talc, gum arabic and the desired color with moisture to form a thin putty-like mixture, in seasoning the same, subsequently forming desired shapes of the mixture, and in spontaneously drying the same so that the resulting product will have such physical properties as to be available for direct marking on receptive surfaces, to be dissolvable in water as a water color and according to the desired extent of moisture also serve as a paint-like plastic medium.

3. The process of forming crayons, which consists in combining a suitable base, any desired color, and a cooperating binder with moisture to form a plastic mass, in forming crayons from such mass after the same has seasoned, and in spontaneously drying the crayons at room temperature so that the product thus produced will have physical characteristics which make it available for use in a dry state as a crayon, in a wet state as a water color, and in a moist state as a plastic medium.

4. The process of forming crayons, consisting in mixing relatively dry powders which comprise silicate of alumina, silicate of magnesia, a desired color, and a binder, in applying moisture to change the ingredients into a plastic mass, in seasoning the same, in forming it into pencil or crayon shapes, and in air drying the product so that there is produced a product whose physical properties made it available by the addition of water to form a liquid water color, by the addition of less water to form a plastic medium, and when dry to be used as a crayon.

5. The process of forming crayons, which consists in combining suitable cooperating powders with moisture to form a plastic mass, in seasoning the same for approximately twelve hours, in dividing the mass into separate units of the desired shape, and in drying the product at room temperature for approximately seventy-two hours so that there is produced a product available in a dry state as a marking crayon, in a wet state according to the degree of moisture as a plastic medium serviceable with a palette knife and also as a water color for use with a brush.

6. The process of forming crayons, consisting in combining approximately 69% of kaolin, 18% steatite, 7% talc and 6% gum arabic, in thoroughly mixing such ingredients, in applying sufficient moisture to form a plastic mass, in seasoning the same, in forming pencils or crayons therefrom while in a plastic state, and in subsequently drying the formed product to set the same so that the resulting product will have such physical properties as to be available for direct marking on receptive surfaces, to be dissolvable in water as a water color and according to the desired extent of moisture also serve as a paint-like plastic medium.

7. The process of forming various purpose crayons which consists in combining a suitable base in powder form having lubricating properties with a cooperating silicate of alumina, in adding a binder, in thoroughly mixing these ingredients with an aqueous medium in seasoning the mixture, in shaping the same to the desired form, and in drying the product, whereby a crayon is produced having such physical properties as to be suitable for marking on receptive surfaces and at the same time is dissolvable in water to form a plastic medium or a paint according to the desired amount of water used.

8. The process of forming crayons, which consists in thoroughly mixing powdered ingredients comprising kaolin, soapstone, a coloring agent, and a binder, in adding moisture to form a plastic mass, in seasoning the same, in forming the same into separate plastic rods, and in causing the same to become set by exposing them to air at approximately 68 degrees F. so that the resulting product will have such physical properties as to be available for direct marking on receptive surfaces, to be dissolvable in water as a water color and according to the desired extent of moisture also serve as a paint-like plastic medium.

9. The process of forming crayons, which consists in combining powders of silicates of alumina and magnesia, in adding thereto a coloring medium and a suitable binder, in thoroughly mixing the ingredients, in adding water to form a thin putty-like mass, in allowing the same to set, in forming plastic crayons therefrom, and in subjecting the crayons to air drying at approximately room temperature so that there is secured a product having physical characteristics which make it available as a crayon in a dry state and as a painting medium in a moist state.

10. The process of producing dustless crayons, consisting in thoroughly mixing powdered non-injurious ingredients as a base with a coloring agent and a binder, in adding moisture to form a plastic mass, in seasoning the mass, in forming the same into the desired shape, and in spontaneously drying the product so that the physical properties of the product are such that it is available in a moist state as a painting medium for use with a palette knife and also with a brush according to the degree of moisture and in a dry state as a marking crayon.

11. The process of forming dustless crayons for use on slate-like surfaces in a dry state and on paper in a moist condition, which consists in thoroughly mixing a suitable base in a powder form, in adding a coloring agent, in combining therewith a suitable binder, in applying moisture to form a plastic mass, in seasoning the mass, in shaping it into the desired form, and in causing the product to harden by air drying so that there is attained a product having certain definite physical properties which make it available as a marking crayon when in a dry state and as a painting medium when used with the desired amount of water.

12. The process of forming different purpose crayons, which consists in thoroughly mixing a finely divided mineral suitable as a base with a desired color and a binder, in applying moisture to the mixture to control the density of the finished crayons and also form a plastic mass, in seasoning the same, in forming it into the desired shape, and in causing the product to harden to the desired density whereby a crayon having such physical properties as to be suitable for marking on receptive surfaces and at the same time is dissolvable in water to form a plastic medium or a paint according to the amount of water used.

In testimony whereof I affix my signature.

JOHN A. HAUFF.