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PROCESS FOR DYEING AND COLORING SAND AND THE LIKE

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6 Claims. (Cl. 91—68)

Our invention relates to processes for dyeing and coloring sand and the like, such as gravel and stone, and more particularly to processes for dyeing and coloring sand utilized in play tables of schools, play grounds and the like, bathing beaches, advertising devices, etc., and it consists in the combinations and operations herein shown and described.

Heretofore, it has been difficult to obtain a means for coloring sand utilized on play tables in public schools and play grounds for making sand maps and for other operations, that will not adhere to the hands of the children or others working in the same due to moisture on said hands. This failure of ordinary dye methods to color the sand or the like so that the color will adhere thereto exists because the sand is not absorbent and the dye takes hold merely on the surface thereof. It is, therefore, a primary object of our invention to provide a process of dyeing and coloring sand that will color said sand with a dye that will adhere thereto despite handling thereof by people working in the same.

A further object of our invention is to provide a process for dyeing and coloring sand or the like that will enable the same to be utilized on golf courses, bathing beaches, swimming pools, and other places, where the same is subjected to moisture, without having the color dissolved from the same by the presence of said moisture.

A still further object of our invention is to provide a process for dyeing and coloring sand or the like that will so dye and color the sand that the same will be rendered fireproof, thus enabling the use thereof in advertising displays and other places where the same is subjected to heat or flame.

A further object of our invention is to provide a process of the type described which will preserve the original fineness of the individual grains.

A further object of our invention is to provide a process of the class described which consists of a few simple steps and requires no appreciable amount of apparatus for performing the required steps.

In carrying out the process in accordance with our invention, the desired quantity of sand which it is wished to color is selected. Any good water soluble dye of the desired color is then utilized. The amount of dye used depends upon the depth and tone of the color desired, the amount of sand to be dyed and the concentration of the dye color. A quantity of water is then taken for dissolving this dye. The quantity of water used is also dependent upon the quantity of the sand which is being dyed. In practice, it has been found that water in quantity about three percent of the amount of sand being dyed performs an efficient operation.

The water is then heated to approximately 100° F. and the dye is dissolved therein.

A glue solution is then prepared. Any good grade of unprepared animal glue may be used. The solution may consist of one part glue to four parts water. In practice, it has been found that a glue solution in quantity equal to two percent of the amount of sand to be dyed is most effective.

This glue solution must be carefully tested chemically to determine whether it is acidic or basic. If an acidic dye is used the glue must also be acidic, and if basic the glue must be basic.

The dye solution and the glue solution are then thoroughly mixed and added to the sand. The whole mixture is then thoroughly stirred and mixed, a revolving iron mixer being preferable for performing this operation. In this operation the mixture may be put under steam pressure for expediting the operation.

When each grain of sand is equally coated, the mixture is removed from the mixing receptacle and dried. This drying operation may be accomplished by placing the mixture in a circulation drier, in a warm room or by other means.

When the mixture is thoroughly dried, it is rolled between wooden rollers and then put through a sieve for separating the grains.

If the sand is to be used in sand tables, displays for advertising purposes and the like where an absolutely insoluble color is not essential but where a fire-proof color is a strong feature, the sand after it has been treated as above to color it is then mixed with an additional quantity of the glue solution prepared as outlined above in quantity equal to about four percent of the mixture. It is only necessary in this operation to see that just sufficient glue solution is added to coat thoroughly each grain of sand. This quantity as above stated has been found to be about four percent. This mixing operation should not be an extensive one but should be terminated as soon as the grains are coated with the glue solution.

The mixture is then removed, dried, rolled and sifted as above, after which it is ready for use. It will be found that sand treated as above outlined is absolutely fire-proof.

If the sand, however, is to be used in places where an insoluble color is desired, such as swimming pools, gold fish bowls, etc., instead of treating the same with the four percent glue solution

mentioned above, after the dyeing operation, the same is treated with a solution of rosin.

In preparing this solution any high grade solvent may be used to bring the rosin into solution, a one part rosin and four part solvent having been found to be a desirable one. The amount of solution required should preferably be about four or five percent of the quantity of dyed sand with which it is mixed.

The rosin solution is then applied to the dyed sand and the whole is thoroughly mixed as in the previous case.

After this operation it is removed, dried, rolled and sifted as before, when it is ready for use. It will be found that this sand so treated is practically insoluble in water.

It will also be found that in both cases above the sand will preserve its original fineness, the grains being separated without adherence to one another.

It is thus seen that we have provided a process for dyeing and coloring sand which will so dye and color said sand that the same may be utilized in swimming pools, and the like, where an insoluble color is desired and which further so treats said sand that the same may be rendered fire-proof for bathing beaches, golf courses, advertising displays and the like.

It is also further seen that we provide a process for dyeing and coloring sand which does not destroy the original fineness of said sand.

We claim:

1. A process of dyeing and coloring sand which consists in coating the same with a solution of a water-soluble dye and a solution of glue, drying the coated sand, applying to the coated sand an additional glue solution, and subsequently drying, rolling and sifting the sand.

2. A process of dyeing and coloring sand which consists in coating the sand with a solution of a water-soluble dye and a solution of glue, drying the coated sand, applying to the coated sand a solution of rosin and subsequently drying, rolling and sifting the sand.

3. A process of dyeing and coloring sand which consists in coating the sand with a solution of a water-soluble dye and a solution of glue, drying the coated sand, applying to the coated sand a solution of rosin and drying, rolling and sifting the sand, said rosin solution being in quantity equal to four or five percent of the mixture with which it is combined.

4. A process of dyeing and coloring sand which consists in coating the sand with a solution of a water-soluble dye in quantity equal to three percent of the quantity of sand with which it is combined, and a solution of glue in quantity equal to two percent of the mixture with which it is combined, drying, rolling and sifting the sand thus treated, and subsequently applying to the sand a glue solution of a quantity equal to four percent of the mixture with which it is combined, and subsequently drying, rolling and sifting the sand.

5. A process of dyeing and coloring sand which consists in coating the sand with a solution of a water-soluble dye in quantity equal to three percent of the sand with which it is mixed, and a solution of glue equal to two percent of the sand with which it is mixed, drying, rolling and sifting of the sand, applying to the sand a solution of rosin in quantity equal to four percent of the mixture with which it is combined, and subsequently drying, rolling and sifting the sand.

6. A process of dyeing and coloring sand which consists in coating the sand with a solution of a water-soluble dye and a solution of glue, drying of the sand, applying to said dried mixture a cementitious solution to form a protective coating, and subsequently drying, rolling and sifting the sand with its protective coating.

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