

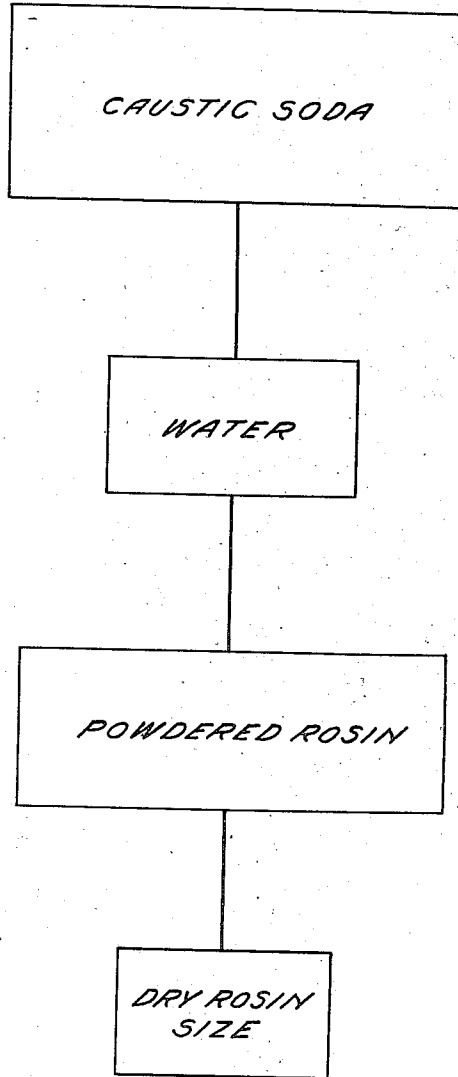
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J. F. FREDRIKSSON

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DRY SIZE

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Inventor

J. F. FREDRIKSSON,

By *St. C. Bismar* Attorney

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DRY SIZE

John F. Fredriksson, Westwood, N. J., assignor
to American Cyanamid & Chemical Corpora-
tion, New York, N. Y., a corporation of Dela-
ware

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The present invention relates to a dry rosin size and a method of making the same.

Rosin sizes for paper as heretofore produced have involved a reaction between caustic soda or potash and rosin to form sodium resinate, which when added to water in the form of an emulsion is used in the paper industry as a size. Various methods have been proposed for the compounding of these ingredients, but as far as applicant is aware, these procedures have always involved the production of a considerable amount of heat during the compounding operation, that is, during the production of the size in solid form. This heat is extremely detrimental if the size is to be used to produce a white floc by adding the size emulsion to alum solutions. It has been found that if either a high degree of heat for a short period of time or even a relatively low temperature exists for an appreciable length of time in the manufacture of such sizes, a dark color develops either in the size itself or in the floc when added to the alum solution. If this undesirable color develops, then the eventual size cannot be used for high grade white papers.

It is, therefore, one of the principal objects of the present invention to produce a rosin size which will not develop a dark color either in itself or in the floc when added to alum solutions.

Another important object of the invention is the production of a rosin size in solid form direct as a solid, without passing through the liquid and subsequent drying stage. Such a procedure is of distinct advantage, not only because the dry size may be shipped to the consumer in light waterproof paper or fabric bags instead of the heretofore heavy barrels or drums, but also from the standpoint that the drying step is expensive.

To this end, the invention contemplates the production of an initially dry rosin size without passing through the step of solution, by mixing together sufficient quantities of caustic soda and powdered rosin in such a manner that at no time during the procedure will the temperature rise to a detrimental degree so as to affect the color of the eventual floc.

A preferred method of carrying out the invention consists in making an aqueous solution of caustic soda and permitting the same to cool to atmospheric temperatures. This relatively cold solution is then sprayed or otherwise suitably mixed with powdered or ground rosin, the caustic addition and the mixing step being so conducted as to prevent the formation of a liquid mix and any undue rise in temperature,

It is well known that when caustic soda and rosin are mixed together, a reaction progresses with evolution of heat. However, if the combination of these two ingredients is made slowly, with thorough mixing, preferably in a container furnished with cooling means to dissipate this developed heat, substantially no, or only a very slight reaction will take place between the ingredients and no appreciable heat will be developed. As a consequence, if the temperature is kept down, those particles of caustic and rosin which do react immediately, solidify as sodium resinate and cover or coat the aggregates consisting of unreacted caustic and rosin and prevent further reaction between the two.

As a result of the above procedure, there may be produced a dry size direct from the mixing step without passing through a solution stage, and eliminating the usual expensive drying operation, with its attendant disadvantages. This dry size is substantially unreacted and will remain as such until it is added to an excess amount of water by the customer to form the usual emulsion. This dry size may be conveniently packed and shipped in light waterproof paper or fabric bags and will absorb no appreciable moisture during shipment nor will the size unduly cake during shipment or storage.

In the accompanying drawing, which comprises a flow sheet, the invention is diagrammatically illustrated.

As a specific embodiment of the invention, I prefer to make a solution of caustic soda either saturated or super-saturated, but, in any event, cooling the resulting liquid to a temperature that substantially no caustic will salt out. It is important that this temperature be such that when the solution is added to the powdered rosin, it will not be high enough to cause any darkening of the color during the mix.

This caustic solution, preferably cooled to room temperature, is then added to ground or powdered rosin preferably of a size which will pass a 60 mesh screen. The mixing operation may take place in any desired type of apparatus, it being only important that the addition of the caustic be made in such a manner and the mix be agitated to such an extent that no appreciable rise in temperature will result. If this fact is ignored, the reaction between the caustic and the rosin will proceed to an undesirable completion, with consequent rise in temperature either throughout the batch or in spots therein, with the result that when the completed size is added to alum solu-

tion, dark flocs will be produced which cannot be used for the sizing of white paper.

It is extremely difficult to give specific temperatures which will cause this detrimental color, for the reason that it has been found that even slightly elevated temperatures above room temperatures, if maintained for appreciable lengths of time, will cause an undesirable color in the eventual floc, or on the other hand, if the addition of the caustic to the rosin is such that the temperature of the mix rises, for instance, to the boiling point of water, even though momentarily, and the mix is then immediately cooled, an undesirable color will result. Specific temperatures, therefore, cannot be given, as the time factor will determine what temperature is a detrimental one. It will be recognized, of course, that in dry mixture, while the temperature of the entire batch may be well within the safe range, yet if a large volume of caustic solution is added at any one point, the temperature at that point will be locally raised within the detrimental range. Even upon a thorough mixing of this heat pocket with the rest of the batch, which thereby immediately reduces the temperature, this volume of detrimentally heated size will contribute its dark color to the entire batch.

For the above reason, it has been found desirable to spray the caustic solution onto the powdered rosin so that no great volume of caustic will be added to the rosin at any particular point. In order to insure the maintenance of a suitably low temperature, the mix is subjected during the addition of the caustic to thorough and complete agitation and mixing. This serves the purpose of completely dissipating any developed heat due to any slight reaction which might take place between the caustic and the rosin, and also prevents the localizing of any heat pockets.

By carrying out the procedure as above set forth, a dry rosin size is produced direct from the mixing operation. It is believed that this dry size consists of aggregates of unreacted caustic and rosin coated with a solid coating of sodium resinate. This coating appears to be of sufficient thickness to prevent absorption of further moisture by the unreacted caustic and hence further reaction between the unreacted ingredients, and also prevents undue caking of the aggregates in the packages during shipment of storage.

When the customer receives this dry size, he then adds the same direct to water, with violent agitation, taking care that the addition of the size is made in such a manner that no undue rise in temperature will exist at that point. Due to the fact that the size contains unreacted rosin and caustic, there will be developed heat as soon as these materials are placed in water. It, therefore, is necessary, for this reason, to violently agitate the mixture and dissipate this heat of reaction so as to maintain the entire batch below the detrimental range.

The size emulsion thus produced, of any concentration desired by the paper maker, may then be added to the paper stock in the beater and at an appropriate time the alum solution to produce a desirable white floc, all of which is well known.

Various proportions of caustic, water and rosin may be used to carry out the above procedure. I have found a desirable proportion to be technical caustic soda 11 pounds, water 10 pounds and rosin 100 pounds. These proportions may be considerably varied, however, and a satisfactory product has been made if the above precautions are

observed, by using from 8 to 16 lbs. of the technical solid caustic and from 5 to 15 lbs. of water for each 100 lbs. of ground or powdered rosin.

A rosin size produced by the use of the above proportions, and following the above procedure, contains substantially no free rosin, which is extremely desirable from the paper makers viewpoint.

The above procedure may be somewhat modified, as for instance, the dry caustic, the water and the rosin may be mixed together as individual ingredients rather than making a caustic solution first. The former procedure is not as desirable as the latter, however, due to the fact that not only does the operator have to cope with the heat of reaction of the rosin and caustic, but he must likewise dissipate the heat of solution of the caustic in the water. It can be done, however, but it is more difficult to control the temperature of the batch if such procedure is followed.

While several procedures have been above outlined for the making of dry size according to this invention, it is to be noted that wherever water enters into the reaction it must be deliberately added as such.

While the invention has been described with particular reference to certain specified steps and proportions, yet obviously the invention is to be construed broadly and limited only by the scope of the claims.

I claim:

1. A method of preparing a dry rosin size which consists in mixing caustic soda, powdered rosin and liquid, water in an amount sufficient to produce a reaction of at least a part of the materials present while maintaining the mix at substantially room temperature, the proportions of the ingredients being insufficient to produce a liquid product.

2. A method of preparing a dry rosin size which consists in mixing caustic soda, powdered rosin and liquid, water in an amount sufficient to produce a reaction of at least a part of the materials present while preventing substantial reaction in the mix, the proportions of the ingredients being insufficient to produce a liquid product.

3. A method of preparing a dry rosin size which consists in mixing a caustic soda solution and powdered rosin while maintaining the mix in a substantially non-reacting temperature, the amount of water present being such that a direct dry product will result.

4. A method of preparing a dry rosin size which consists in mixing a cold caustic soda solution with powdered rosin while preventing a material rise in temperature, the proportions of the ingredients being insufficient to produce a liquid product.

5. A method of preparing a dry rosin size which consists in mixing a cold caustic soda solution with powdered rosin while agitating the mix so as to thoroughly distribute the ingredients and prevent a material rise in temperature, the proportions of the ingredients being insufficient to produce a liquid product.

6. A method of preparing a dry rosin size which consists in mixing from 8 to 16 lbs. of dry technical caustic soda and from 5 to 15 lbs. of water per 100 lbs. of powdered rosin, and thoroughly agitating the mix so as to produce a dry product.

7. A method of preparing a dry rosin size which consists in spraying a cold caustic solution consisting of about 11 lbs. of dry technical caustic soda in about 10 lbs. of water onto 100 lbs. of

powdered rosin, thoroughly agitating the mix during the caustic addition so as to prevent an undue rise in temperature, and to produce a dry product.

5 8. A composition of matter comprising aggregates containing caustic soda, and rosin coated with sodium resinate.

10 9. A composition of matter comprising aggregates containing caustic soda, and rosin coated with sodium resinate, said coating being of sufficient thickness to prevent further reaction between the caustic and rosin while in that state, but adapted upon addition of water to permit the reaction to go to completion.

15 10. A composition of matter comprising aggregates containing caustic soda, and rosin coated with sodium resinate, said coating being of sufficient thickness to prevent absorption of water by the caustic and thus further reaction between the caustic and rosin while in that state, but adapted upon addition of water to completely dis-

20 solve and thus permit the unreacted rosin and caustic to react to form a rosin size containing substantially no free rosin.

25 11. A composition of matter in the form of a

dry powder, containing a resinate, sodium hydroxide and rosin.

12. A granular mass containing sodium resinate, sodium hydroxide and rosin.

13. A size in the physical form of discrete particles, said particles containing sodium resinate, caustic soda and rosin. 5

14. A method of preparing a size in the form of solid particles which consists in mixing solid particles of caustic alkali, solid particles of rosin and liquid water in a quantity insufficient to produce a liquid product but sufficient to produce a reaction of at least a part of the materials present. 10

15. A method of preparing a size in the form of solid particles which consists in mixing solid particles of rosin with a caustic alkali solution in an amount insufficient to produce a liquid product. 15

16. A composition for use as size consisting of discrete solid particles of caustic alkali, rosin, and an alkali metal resinate. 20

17. A composition for use as size consisting of discrete solid particles of sodium hydroxide, rosin and sodium resinate.

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