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Patented Mar. 6, 1934

1,950,060

UNITED STATES PATENT OFFICE

1,950,060

GLUE

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No Drawing. Application May 15, 1933,
Serial No. 671,202

21 Claims. (Cl. 87-17)

156-78

My invention relates more particularly to glues comprising vegetable seed meal bases and consists in modifying the usual glue formula by adding thereto a small portion of an additive aldehyde compound which has the effect of permitting the reduction of the caustic soda and of increasing the lime and silicate of soda content.

The objects of my invention are to produce a glue which spreads further, sticks better, and reduces the panel staining which was formerly due to the large amount of caustic soda found to be necessary heretofore.

Vegetable seed residue glues produced from soya bean, peanut, cottonseed, linseed, and like seeds, have been known for some time and have been successfully used, therefore no claim to the glue base nor the other usual materials found therein, is made. The materials usually contained in such glues are:—Seed-residue flour or meal; caustic soda; salts of a strong base with weak acids, such as soda ash, trisodium phosphate, and sodium fluoride; sodium silicate; lime; and carbon bisulphide.

A good formula for such a glue, as formerly made, is as follows:—

	Pounds
Meal flour (soya bean, peanut or other seed residue meal).....	100
Water.....	340
Caustic soda.....	11
Lime.....	3
Silicate of soda.....	20
Trisodium phosphate.....	2
Sodium chloride.....	2
Carbon bisulphide.....	2

This glue will spread approximately 2900 square feet of three-ply panels.

I have found by experiment that I can produce a glue using the above-mentioned bases, and chemicals, that spreads further, thus using less glue per thousand square feet of panels, is improved in its adhesive qualities, and is of greater water resistance, by adding thereto a small proportion of an additive aldehyde compound, thereby permitting the reduction of the caustic soda content therein and also permitting an increase in the lime and the silicate of soda content.

The additive aldehyde compounds which may be used in my new glue include formaldehyde bisulphite

$\text{CH}_2(\text{OH})(\text{O}\cdot\text{SO}_2\text{N})$,
acetaldehyde bisulphite

$\text{CH}_3\text{CH}(\text{OH})(\text{O}\cdot\text{SO}_2\text{Na})$,
benzaldehyde bisulphite

$\text{C}_6\text{H}_5\text{CH}(\text{OH})(\text{O}\cdot\text{SO}_2\text{Na})$,
aldehyde ammonia

$(\text{CH}_3\text{CHO}\cdot\text{NH}_2)_3$

or other additive aldehyde compounds. However, I prefer to use formaldehyde bisulphite because of its ease of manufacture but other additive aldehyde compounds are equally effective.

By the addition of two parts of the additive aldehyde compound I find that I can cut the caustic soda content down from eleven parts to four-and-a-half parts, and can increase the lime content from three parts up to twenty parts and the silicate of soda from twenty parts up to thirty parts and in this way I am able to lower the cost per pound of the glue and at the same time, and of still greater importance, the same weight of glue base which formerly would spread only 2900 square feet of three-ply panel will now spread 3600 square feet thereof while still retaining the same dry strength and water resistance; therefore, my improved glue reduces the cost of the glue line per thousand square feet of three-ply panel about 40 cents or about 20% of the glue user's ordinary glue cost.

The formaldehyde bisulphite is prepared from the following formula:—

Water.....	15 lbs.
Sodium acid sulphite.....	12 lbs. 15 oz.
Formaldehyde.....	8 lbs. 7 oz.

The formaldehyde bisulphite thus prepared may be shipped either as a liquid, separate from the glue powder, or it may be evaporated to a crystal and added to the dry glue mixture as a dry powder but, in that case, it is necessary to ship the glue powder in air-tight containers. When the liquid form of the formaldehyde bisulphite is used, two pounds thereof is used in a formula calling for 100 pounds of vegetable seed meal base, but if the dry form is used then only nine-tenths of a pound of the powder is used for the same quantity of the glue base. Though I have given the above quantities of the additive aldehyde compound, I wish it to be understood that the amount may be varied from 0.5 to 5 pounds depending on the amount of water that it is desired to put in the glue.

The formula of one of my glues, varying somewhat from that of the ordinary glue above quoted would be as follows:—

	Parts
Soya bean or other seed flour.....	100
Water.....	380
Caustic soda.....	4½
Lime.....	20
Silicate of soda.....	30
Trisodium phosphate.....	2
Sodium carbonate.....	5
Carbon bisulphide.....	2
Formaldehyde bisulphite:	
If liquid.....	2
If powder.....	16

Heretofore from ten to twelve pounds of caustic soda was necessary to bring 100 pounds of the flour glue base to a suitable degree of fluidity and adhesiveness, but this large amount of caustic soda caused considerable trouble by staining the panel faces. A reduction of the quantity of caustic soda, as provided in my improved glue, is, therefore, greatly to be desired in the veneer panel industry. Also, the most lime that could be used without detracting from the strength of the glue has been about seven pounds to a mixture with 100 pounds of the flour glue base, so that an increase in the quantity of lime and of sodium silicate, as provided in my improved glue, is also highly desirable because of their cheapness, thus reducing the glue cost, and because they naturally increase the water resistance of the glue line.

The ingredients used may be of the easily obtainable commercial type; for example, ordinary city or tap water, commercial sodium acid sulphite, and the ordinary commercial 40% aqueous solution of formaldehyde, which solution is known in the trade as "formaldehyde".

I have referred to specific embodiments of my invention but have done so merely by way of illustration and not as a limitation of the invention the scope of which is defined in the appended claims.

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

1. An adhesive composition comprising the reaction-product of a vegetable seed residue meal or flour as its adhesive base, an aqueous alkaline medium and an additive aldehyde compound functioning to reduce the alkali requirement of the adhesive, the latter having increased spreading properties as compared to an adhesive without the additive aldehyde compound.

2. An adhesive composition comprising the reaction-product of soya bean meal or flour as its adhesive base, an aqueous alkaline medium and an additive aldehyde compound functioning to reduce the alkali requirement of the adhesive, the latter having increased spreading properties as compared to an adhesive without the additive aldehyde compound.

3. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base; an aqueous alkaline medium, and an additive aldehyde bisulphite compound functioning to reduce the alkali requirement of the adhesive, the latter having increased spreading properties as compared to an adhesive without the additive aldehyde bisulphite compound.

4. An adhesive composition comprising the reaction-product of 100 parts vegetable seed residue flour, $4\frac{1}{2}$ parts caustic soda, 30 parts silicate of soda, 20 parts of lime, 2 parts of carbon bisulphide, and 2 parts of a liquid additive aldehyde compound functioning to reduce the alkali requirement of the adhesive, the latter having increased spreading properties as compared to an adhesive without the additive aldehyde compound.

5. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base an aqueous alkaline medium, an alkali earth metal hydroxide, and an additive aldehyde compound functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar

adhesive without the additive aldehyde compound.

6. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, and an additive aldehyde compound functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

7. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, an alkali carbonate, an alkali phosphate, and an additive aldehyde compound functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

8. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, an alkaline earth metal hydroxide, a soluble alkali metal silicate, sodium carbonate, trisodium phosphate, and an additive aldehyde compound functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

9. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkali medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, an alkali carbonate, an alkali phosphate, carbon bisulphide, and an additive aldehyde compound functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

10. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkali medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, sodium carbonate, trisodium phosphate, carbon bisulphide, and an additive aldehyde compound functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

11. An adhesive composition comprising a reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkali medium, an alkali earth metal hydroxide, a soluble metal silicate, sodium carbonate, trisodium phosphate, carbon bisulphide, and an aldehyde bisulphite compound functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive

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without the additive aldehyde bisulphite compound.

12. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, and a proportion of an additive aldehyde compound equal to about $\frac{1}{2}\%$ to 5% of seed meal or flour functioning to reduce the alkali requirement of the adhesive, the latter having increased spreading properties as compared to an adhesive without the additive aldehyde compound.

13. An adhesive composition comprising the reaction-product of soya bean meal or flour as its adhesive base, an aqueous alkaline medium, and a proportion of an additive aldehyde compound equal to about $\frac{1}{2}\%$ to 5% of seed meal or flour functioning to reduce the alkali requirement of the adhesive, the latter having increased spreading properties as compared to an adhesive without the additive aldehyde compound.

14. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, and a proportion of a formaldehyde bisulphite compound equal to about $\frac{1}{2}\%$ to 5% of said meal or flour, the formaldehyde bisulphite compound functioning to reduce the alkali requirement of the adhesive, the latter having increased spreading properties as compared to an adhesive without the formaldehyde bisulphite compound.

15. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, an alkali earth metal hydroxide, and a proportion of an additive aldehyde compound equal to about $\frac{1}{2}\%$ to 5% of said meal or flour functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

16. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, and a proportion of an additive aldehyde compound equal to about $\frac{1}{2}\%$ to 5% of said meal or flour functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

17. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, an alkali carbonate, an alkali phosphate, and a proportion of an additive aldehyde compound equal to about $\frac{1}{2}\%$ to 5% of said meal or flour functioning to reduce the alkali require-

ment of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

18. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkaline medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, sodium carbonate, trisodium phosphate, and a proportion of an additive aldehyde compound equal to about $\frac{1}{2}\%$ to 5% of said meal or flour functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

19. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkali medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, an alkali carbonate, an alkali phosphate, carbon bisulphide, and a proportion of an additive aldehyde compound equal to about $\frac{1}{2}\%$ to 5% of said meal or flour functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

20. An adhesive composition comprising the reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkali medium, an alkali earth metal hydroxide, a soluble alkali metal silicate, sodium carbonate, trisodium phosphate, carbon bisulphide, and a proportion of an additive aldehyde compound equal to about $\frac{1}{2}\%$ to 5% of said meal or flour functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde compound.

21. An adhesive composition comprising a reaction-product of a vegetable seed meal or flour as its adhesive base, an aqueous alkali medium, an alkali earth metal hydroxide, a soluble metal silicate, sodium carbonate, trisodium phosphate, carbon bisulphide, and a proportion of an aldehyde bisulphite compound equal to about $\frac{1}{2}\%$ to 5% of said meal or flour functioning to reduce the alkali requirement of the adhesive and increase the adaptiveness of the adhesive to said alkali metal hydroxide, said adhesive having increased spreading properties as compared to a similar adhesive without the additive aldehyde bisulphite compound.

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