Patented July 14, 1953 2,645,617

UNITED STATES PATENT OFFICE

2,645,617

PAPER PULP FOAM INHIBITOR

Raymond L. Mayhew, Phillipsburg, and James M. Cross, Belvidere, N. J., assignors to General Aniline & Film Corporation, New York, N. Y., a corporation of Delaware

No Drawing. Application November 6, 1948, Serial No. 58,785

8 Claims. (Cl. 252—321)

1

This invention relates to the treatment of aqueous paper stocks for the purpose of preventing foaming during the paper-making operations.

It is well known that excess foaming is highly disadvantageous in the manufacturing processes as it interferes with the proper operation of the manufacturing equipment such as beaters and frequently results in loss of the aqueous stock.

Because of this, a large number of substances have been prepared and recommended for the prevention of foam with varying success.

In general, there are a large number of compounds or mixtures of compounds which are effective in preventing or combating the foaming of aqueous slurries of paper pulp including fatty acids. Most of these, however, suffer from the disadvantage of producing a deleterious effect on the paper pulp resulting in an inferior product. A large number of these, for example, appear to destroy the sizing used in preparing the paper, thus lowering the water resistance of the paper markedly and allowing too great an ink penetration. Still others markedly effect the dyeing properties of the paper causing uneven dyeing or so-called "specking" of the paper sometimes by reacting with the dyes.

It is, therefore, an object of this invention to prepare an anti-foaming agent which does not have a deleterious effect on the paper sizing resulting in loss of water resistance.

It is a further object of this invention to prepare an anti-foaming agent which does not interfere with the dyeing properties of the paper, i. e., "specking."

These, and other objects of the invention, are attained by the process which comprises incorporating in the aqueous paper stock an anti-foaming agent containing an alkyd resin, and an emulsifying agent, preferably a higher fatty acid plus an alkali. Any of the ordinary alkyd resins may be used and, as well known, these are condensation products of certain polyhydric alcohols and polybasic acids. Many of these alkyd resins contain higher fatty acids as part of the condensation product but it will be understood that the higher fatty acids of the present invention are in addition to the alkyd resin and are not condensed therewith. Examples of the resins which may be used include those sold under the trade names "Paraplex" (condensation polymer of sebacic acid and glycerol), "Duraplex" (condensation polymer of phthalic anhydride, glycerol and oleic acid), "Amberlac" (condensation polymer of maleic anhydride and glycerol) and the like. While various wetting agents may be used, partially saponified fatty acids are preferable. The addition of an alkali is thus desirable to saponify some of the acid. The higher fatty acids include the well-known examples found in fats, such as lauric, myristic, palmitic, stearic and oleic. It will be obvious that in the presence of an alkali these may be transformed partially into the fatty acid salt and thus fatty acid salts or soap would be the obvious equivalents of part of the fatty acids used.

2

In addition to the two ingredients mentioned, other anti-foam agents such as various vegetable and animal oils and waxes may also be incorporated; such as tallow, lard, cocoanut oil, corn oil, cottonseed oil, soyabean oil, sperm oil, and the like. In addition, certain aromatic and aliphatic hydrocarbons may also be incorporated.

The compositions of this invention are preferably added to the aqueous stocks to be defoamed or to prevent foaming in the form of aqueous emulsions. In general, stable emulsions can be prepared which contain 40–50% of water into which has been added a small amount of alkali, 1 to 2% being very effective for this purpose.

A number of batches of the new defoaming agents were prepared from various alkyd resins as follows: 25 parts of the selected alkyd resin and 25 parts of stearic acid were melted together and then 2 parts of 50% sodium hydroxide and 48 parts of hot water were added with vigorous stirring. The resulting emulsions were obtained in the form of smooth almost white pastes.

Example.—Specifically an anti-foam or defoaming agent was prepared as follows:

	Parts
Alkyd resin (Paraplex RG–2 Resinous Products and Chemical Company)	25
Palmitic acid	25
Water	48
50% sodium hydroxide solution	2

Sample paper pulp stocks were prepared as follows:

A. 60 parts rosin size solution ($12\%_{1000}$).
40 parts clay (dry).
5 parts silicate of soda "S."
10 parts starch (dry).
5 starch (cooked to jelly in water).
50 parts bleached sulphite pulp (10% dry).
200 parts alum solution ($18\%_{1000}$).
Made up to 750 parts with cold water.

B. Same as A with addition of 1.25 parts of a wetting agent comprising the condensation product of castor oil and polymerized ethylene oxide.

The pulp stock A was agitated in a small beater until foam formed on the surface and then about 0.1% of the composition of the example was added. The foam substantially disappeared. The same results were obtained on pulp stock B. Using our new composition in the pulp stocks before beating, no foam formed when the beater was started.

The product from the example when using the standard foaming solutions A and B was found to be superior to commercial products now being used for this purpose.

Ink penetration tests to determine the effect on the sizing of the paper were also run. The paper used in the test was prepared as follows:

C. 30 parts bleached sulphite pulp (10%).
125 parts water.
5.3 parts rosin size ($^{17}/_{1000}$).
4.0 parts alum ($^{15}/_{1000}$).
3.0 parts anti-foam (1%).

Add in order; stir 1 hour. Dilute to 90 cc.; filter, dry.

Ink penetration time is the average of three observations of the time required for standard testing ink at room temperature to penetrate upward through a 1 in. square sample of paper which is floated thereon. The standard ink is made as follows:

Dissolve 23.4 g. tannic acid USP and 7.7 g. gallic acid crystals in distilled water. Dissolve 30.0 g. ferrous sulfate crystals and 250 cc. hydrochloric acid USP dilute in distilled water and add to above. Dissolve 2.2 g. Ink Blue BJTBNA–80 in distilled water and add to above. Add 1 g. phenol. Makes up to 1 liter with distilled water.

The results of the ink penetration test are as follows:

	Minutes
Pulp sample D, contains emulsion of example	31
Control no anti-foam agent	40

The ink penetration time between the control and the pulp sample D containing emulsion is not substantial and thus the emulsion does not adversely effect ink penetration. These results were substantially better than ink penetration tests on the same pulp with other commercial anti-foam agents.

In order to determine the effect on dyeing, a series of dyeings were made using

1% dyestuff (based on pulp)
2% size
3% alum
1% anti-foam agent of example

The dyes, which were incorporated in the pulp before making the paper included:

Orange RO Extra Conc.
Benzo Fast Orange WSA–CF
Bismarck Brown RRNP Conc.

Very satisfactory dyeings were obtained in every case with no harmful effect from the anti-

foaming agents prepared according to this invention.

Ratio of alkyd resin to higher fatty acid in the anti-foaming agent may vary considerably but an amount sufficient to emulsify the resin may be used and preferably the amounts of resin and fatty acid should be about equal.

The amount of alkyd resin to be used in the aqueous pulp may vary from a trace to about 0.1%. It will be understood that even larger quantities may be used, but that it becomes uneconomical.

The anti-foaming agent of the present invention has been found effective on sulphite, sulphate and kraft pulps. It has been demonstrated that these anti-foam agents do not adversely effect ink penetration and dyeing properties of the paper.

What we claim is:

1. A composition for inhibiting foaming in aqueous paper pulps consisting essentially of about equal parts of an alkyd resin and a partially saponified higher fatty acid.

2. A composition for inhibiting foaming in aqueous paper pulps consisting essentially of an alkyd resin and a partially saponified higher fatty acid in an amount sufficient to emulsify said resin in water.

3. The composition of claim 2 wherein the acid is palmitic.

4. The composition of claim 2 wherein the acid is stearic.

5. A method for treating aqueous paper pulps to prevent foaming during paper making operations which comprises adding thereto a small proportion of an emulsion consisting essentially of 25 parts of an alkyd resin, 40–50 parts of water and a sufficient amount of a partially saponified higher fatty acid to emulsify said resin in the water, the amount of said emulsion being such as to provide from a trace to about 0.1% of said resin based on the pulp.

6. The method of claim 5 wherein the acid is palmitic.

7. The method of claim 5 wherein the acid is stearic.

8. The method of claim 5 wherein the amount of emulsion added is such as to provide about 0.1% of the resin.

RAYMOND L. MAYHEW.
JAMES M. CROSS.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,035,520	Baird	Mar. 31, 1936
2,097,121	Fromm	Oct. 26, 1937
2,101,089	Novak	Dec. 7, 1937
2,169,369	Osterloh	Aug. 15, 1939
2,346,928	Lighthipe	Apr. 18, 1944

FOREIGN PATENTS

Number	Country	Date
356,738	Great Britain	Sept. 7, 1931