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PRINT ROLL COMPOSITION

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This invention relates to improved print roll compositions and more particularly to a print roll composition containing a softener comprising a mixture of glycerine and sorbitol.

It is an object of my invention to provide a print roll composition having, under average conditions, a life several times that of known print roll compositions.

It is a further object of my invention to provide a print roll composition which has greater resistance to changes in atmospheric conditions than the known print roll compositions and which retains its tack throughout the life of the roller.

A still further object of my invention comprises the provision of a print roll composition which retains its original surface without blemish when washed with the organic solvents customarily used for this purpose.

A still further object of my invention is to provide a print roll composition which has excellent inking qualities and capable of being used with a wide range of printing inks.

Other objects of the invention will hereinafter more fully appear.

Prior to my invention, conventional print roll compositions comprised a mixture of softener, binder and water, the softener usually consisting entirely of glycerine and the binder consisting of gelatin or glue. Rollers of such composition have proved objectionable since with variations in humidity the composition absorbed or gave up moisture in considerable amounts, thereby changing the physical characteristics of the roller, producing shrinkage, etc. Indeed, the changes in physical character of such compositions with varying weather conditions are so great that, in general, rollers made therefrom cannot be used outside of the season for which they were formulated.

As a consequence, customary practice requires a change of rollers with seasonal variation, regardless of the age of the roller. The print roller manufacturer has found it necessary to manufacture print rollers of many different formulas, each formula being suitable for a particular section of the country during a particular season.

It has been suggested that other polyhydric alcohols, and the esters and the ethers thereof, be substituted for glycerine as the softener in print roll compositions in an effort to cure the above-mentioned difficulties. Heretofore, however, no softener has been found which was capable of producing a roller materially superior to the glycerine-softened rollers. Although certain characteristics might improve with the substitution of the proposed softener for glycerine, other disadvantages arose which entirely offset any single improved characteristic.

I have found that the use of a softener comprising from 30 to 75% sorbitol, and the remainder glycerine, produces a superior print roll composition. Instead of employing pure sorbitol, I have used a technical syrup such as is obtained on the reduction of certain hexoses or mixtures of these. This technical syrup contains other hexahydric alcohols and water in addition to sorbitol. It also contains relatively small amounts of ash, sugar, and other organic impurities. The use of sorbitol in excess of 75% of the softener results in greater brittleness of the composition, greater hardness of the surface and poorer inking qualities, and rolls having a softener consisting entirely of sorbitol, case harden and are definitely too hard surfaced to be useful.

The ratio of softener to glue which I employ may vary with the composition of the softener (ratio of sorbitol to glycerine) and with the quality of the glue. Using a good grade of hide glue and a softener containing between 50 and 75% sorbitol the ratio of softener to glue may be as high as 2.5 to 1. To make the composition more resistant to softening by heat, this ratio may be decreased to as low as 1.5 to 1 or even lower in exceptional cases.

Likewise there is a considerable range of moisture content compatible with satisfactory print roll compositions, this range depending for its exact definition upon the proportions of the other ingredients present. However, I preferably use only a limited amount of water. When the moisture content of the composition is greater than 30%, the roll is subject to excessive shrinkage under any but very humid conditions. Unless allowance is made for such shrinkage and elaborate precautions are taken to predetermine the degree of shrinkage, compositions having in excess of 30% moisture are unsatisfactory. Consequently, in order to produce a composition usable over a wide range of humidities I prefer to maintain the moisture content below 30%. This is of particular importance with sorbitol-glycerine softened print roll composition because the longer life of such rollers brings the problem of shrinkage into more prominence than heretofore. The minimum amount of moisture must be at least 12% by weight of the composition in order to permit proper handling and working

of the ingredients of the composition. Consequently, it can be seen that control of moisture content is a determining factor in the quality of the finished roller.

Pronounced improvement in the physical properties of print rolls is effected by the use in the softener of the compositions of amounts of sorbitol as small as 30%. The extent to which improvement as regards resistance to moisture exchange may be effected is limited only by the tendency of rolls softened with sorbitol alone to become case hardened, thus impairing inking qualities. I have found that a preferred roller softener contains from 50% to 60% sorbitol and the remainder glycerine. In such compositions, toughness, long life and inking qualities reach their optimum, the hygroscopicity is greatly decreased, and the tendency to case harden is completely inhibited. By limiting the water content of the finished composition to in the neighborhood of 14% to 18%, print rolls may be manufactured which are suitable for use in nearly all seasons, in nearly any given section of the country. Under conditions of extremely high temperature and humidity, print roll compositions of higher water content may be used.

Non-limiting examples of my print roll composition are as follows:

A

Glue (dry basis)	27.0%	
Softener (dry basis)	57.0%	(52% sorbitol—48% glycerine)
Water	16.0%	

B

Glue (dry basis)	25.5%	
Softener (dry basis)	56.5%	(54% sorbitol—46% glycerine)
Water	18.0%	

C

Glue (dry basis)	28.0%	
Softener (dry basis)	52.0%	(58% sorbitol—42% glycerine)
Water	20.0%	

D

Glue (dry basis)	24.0%	
Softener (dry basis)	51.0%	(52% sorbitol—48% glycerine)
Water	25.0%	

The foregoing examples were prepared by weighing the glycerine and water into a steam jacketed kettle and heating to from 160° to 180° F. Any evaporated water was replaced and the glue added. The glue was cooked with intermittent stirring until the mixture was smooth. Evaporated water was again replaced, the sorbitol added and the mixture heated with continuous agitation until smooth. The water balance was then adjusted once more, the mixture stirred until smooth and then poured into the mold.

The foregoing procedure is not to be considered as limiting, however. For example, it is not necessary to dissolve the glue in the glycerine and water before adding the sorbitol. Moreover, it is not necessary to replace evaporated water, since water may be added at the beginning of the operation so that an amount sufficient to permit handling and molding of the composition remains at the end of the heating operation.

For purposes of illustration another non-limiting example is as follows:—

E

29 pounds of glycerine containing 2% water, 42 pounds of sorbitol syrup containing 9.4% water, and 17 pounds of water were placed in a kettle together and brought to a temperature of from 160° to 170° F. 42 pounds of glue containing 13% water were then added and the whole mixed thoroughly. No make-up water was added and in less than an hour the batch had cooked to a smooth consistency and was ready for pouring.

Although the final moisture content of the composition of example E is dependent upon the heating time, temperature, area exposed to evaporation, agitation, etc., I prefer to limit the evaporation so that the final moisture content is between 14 and 18% by weight of the total composition.

Rollers produced from the foregoing compositions are much tougher, more resistant to abrasive action of type and to damage of handling, and consequently are more durable than composition rollers heretofore available. Moreover, these rollers have excellent inking properties and are not susceptible to material change during periods of extreme humidity and temperature conditions.

While I have referred to the use of sorbitol in the form of a technical syrup, it is to be understood that my invention is not to be limited to print roll compositions made from sorbitol syrup but that the use of sorbitol in other physical form is within the scope of my invention.

What I claim is as follows:

1. A print roll composition containing a binder, a softener and water, said softener comprising sorbitol and glycerine, the sorbitol being present in an amount of from 30 to 75% by weight of the total softener content.

2. A print roll composition as recited in claim 1 and wherein the water is present in an amount not exceeding 30% by weight of the composition.

3. A print roll composition as recited in claim 1 and wherein the water is present in an amount in the neighborhood of from 14% to 18% by weight of the composition.

4. A print roll composition containing a binder, a softener and water, said softener comprising sorbitol and glycerine, the sorbitol being present in an amount of from 50% to 60% by weight of the total softener content.

5. A print roll composition as recited in claim 4 and wherein the water is present in an amount not exceeding 30% by weight of the composition.

6. A print roll composition as recited in claim 4 and wherein the water is present in an amount in the neighborhood of from 14% to 18% by weight of the composition.

7. A print roll composition containing a binder, a softener and water, the binder and softener being present in said composition in a ratio of one part binder to from 1.5 to 2.5 parts softener, said softener comprising sorbitol and glycerine, the sorbitol being present in an amount of from 30 to 75% of the weight of the total softener content.

8. A print roll composition as recited in claim 7 and wherein the water is present in an amount not exceeding 30% by weight of the composition.

9. A print roll composition as recited in claim 7 and wherein the water is present in an amount in the neighborhood of from 14% to 18% by weight of the composition.

10. A print roll composition containing a binder, a softener and water, the binder and softener being present in said composition in a ratio of one part binder to from 1.5 to 2.5 parts

softener, said softener comprising sorbitol and glycerine, the sorbitol being present in an amount of from 50% to 60% by weight of the total softener content.

11. A print roll composition as recited in claim 10 and wherein the water is present in an amount not exceeding 30% by weight of the composition.

12. A print roll composition as recited in claim 10 and wherein the water is present in an amount in the neighborhood of from 14% to 18% by weight of the composition.

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