United States Patent [19]

Sollner

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[54] **WATER SOLUBLE ESSENTIALLY LINEAR POLYMER HAVING A PLURALITY OF AMIDE, IMIDE AND ESTER GROUPS THEREIN, AND A METHOD OF MAKING THE SAME AND APPLYING THE SAME TO SUBSTRATES**

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[52] **U.S. Cl.** ..... **260/29.2 N**; 260/29.2 E; 260/30.2; 260/32.4; 260/32.6 N; 260/33.4 P; 428/458; 428/480; 428/425.8; 525/180; 525/181; 525/183; 525/403; 525/406; 525/422; 528/128; 528/188; 528/189; 528/226; 528/228; 528/229; 528/288; 528/289; 528/290; 428/473.5

[58] **Field of Search** ..... 528/289, 226, 228, 229, 528/288, 290, 128, 188, 189; 428/474, 480, 458; 260/29.2 N, 29.2 E, 30.2, 32.4, 32.6 N, 33.4 P; 525/180, 181, 183, 403, 406, 422

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[57] **ABSTRACT**

An essentially linear polymer having a plurality of amide, imide and ester groups therein, which is the condensation product of (1) at least one polycarboxylic acid imide-forming reactant, (2) at least one ethylenically unsaturated polycarboxylic acid carboxypyrrolidone-forming reactant, (3) at least one polycarboxylic acid ester-forming reactant, (4) at least one glycoly, (5) at least one other polyfunctional hydroxyl compound, and (6) at least one polyfunctional amino compound having at least one primary amine group thereon. The equivalent molar ratio of the functional hydroxyl groups of the glycols and hydroxyl compounds to the functional ester-forming carboxyl groups of the acid reactants is from about 1.0 to 1 to about 3.0 to 1. The equivalent molar ratio of the functional imide-forming groups of the acid reactants and the polyfunctional amino reactants and the functional carboxypyrrolidone-forming groups of the ethylenically unsaturated acid reactants and the polyfunctional amino reactants to the functional ester-forming carboxyl groups of the acid reactants is from about 0.2 to 1 to about 1.0 to 1. The equivalent molar ratio of said functional imide-forming groups of the acid reactants and the polyfunctional amino reactants to the functional carboxypyrrolidone-forming groups of the ethylenically unsaturated acid reactants and the polyfunctional amino reactants are from about 0.5 to 1 to about 3.0 to 1.

20 Claims, 1 Drawing Figure