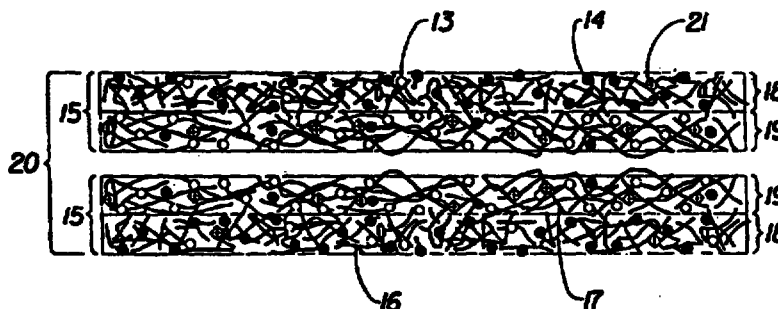




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(21) International Application Number: PCT/US94/11844 (22) International Filing Date: 17 October 1994 (17.10.94) (30) Priority Data: 08/141,320 22 October 1993 (22.10.93) US (71) Applicant: THE PROCTER & GAMBLE COMPANY [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US). (72) Inventors: OSTENDORF, Ward, William; 6331 Oregon Pass, West Chester, OH 45069 (US). KELLY, Stephen, Robert; 6669 Frontier Drive, Independence, KY 41051 (US). TROKHAN, Paul, Dennis; 1356 Warvel Road, Hamilton, OH 45013 (US). PHAN, Dean, Van; 6512 Tylers Crossing, West Chester, OH 45069 (US). HERSKO, Bart, Steven; 10159 Lochcrest Drive, Cincinnati, OH 45231 (US). (74) Agents: REED, T., David et al.; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217 (US).	(81) Designated States: AM, AU, BB, BG, BR, BY, CA, CN, CZ, EE, FI, GE, HU, JP, KG, KP, KR, KZ, LK, LR, LT, LV, MD, MG, MN, NO, NZ, PL, RO, RU, SI, SK, TJ, TT, UA, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> This Sheet Has Been Replaced 	

(54) Title: MULTI-PLY FACIAL TISSUE PAPER PRODUCT COMPRISING BIODEGRADABLE CHEMICAL SOFTENING COMPOSITIONS AND BINDER MATERIALS



(57) Abstract

Multi-ply facial tissue paper products comprising biodegradable chemical softener compositions and a combination of a wet strength binder, either permanent or temporary, and a dry strength binder is disclosed. The multi-ply facial tissue paper products contain a biodegradable chemical softening composition comprising a mixture of a biodegradable quaternary ammonium compound and a polyhydroxy compound. Preferred biodegradable quaternary ammonium compounds include diester dialkyl dimethyl ammonium salts such as diester di(touch hardened)tallow dimethyl ammonium chloride and/or diester di(touch hardened)tallow dimethyl ammonium methyl sulfate. Preferred polyhydroxy compounds are selected from the group consisting of glycerol, polyglycerols having a weight-average molecular weight of from about 150 to about 800, polyoxyethylene glycols and polyoxypropylene glycols having a weight average molecular weight from about 200 to 1000. The multi-ply facial tissue paper products also contain an effective amount of a wet strength binder, either permanent or temporary, and a dry strength binder to control linting and/or to offset the loss in tensile strength, if any, resulting from the use of the biodegradable chemical softening compositions. The use of both wet strength binder, either permanent or temporary, and dry strength binder also improves the retention of the chemical softening composition in the sheet. This results in improving one or more of the following properties of the multi-ply facial tissue paper product: the flexibility, the slip-stick coefficient of friction, the FFE-Index and the HTR-Texture. Preferably, the majority of the biodegradable chemical softening compositions will be disposed on the outer layers of the multi-ply facial tissue paper products where they are most effective. In other words, the biodegradable chemical softening compositions and the wet strength binder, either permanent or temporary, and the dry strength binder can be selectively distributed within the multi-ply facial tissue paper product to enhance the softness, absorbency, and/or lint resistance of a particular layer or ply.