



(51) International Patent Classification:
B27K 3/02 (2006.01) *B27K 5/06* (2006.01)
B27K 3/20 (2006.01)

(21) International Application Number:
PCT/US2022/041779

(22) International Filing Date:
27 August 2022 (27.08.2022)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/237,625 27 August 2021 (27.08.2021) US

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(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

(54) Title: WASTE-FREE PROCESSING FOR LIGNIN MODIFICATION OF FIBROUS PLANT MATERIALS, AND LIGNIN-MODIFIED FIBROUS PLANT MATERIALS

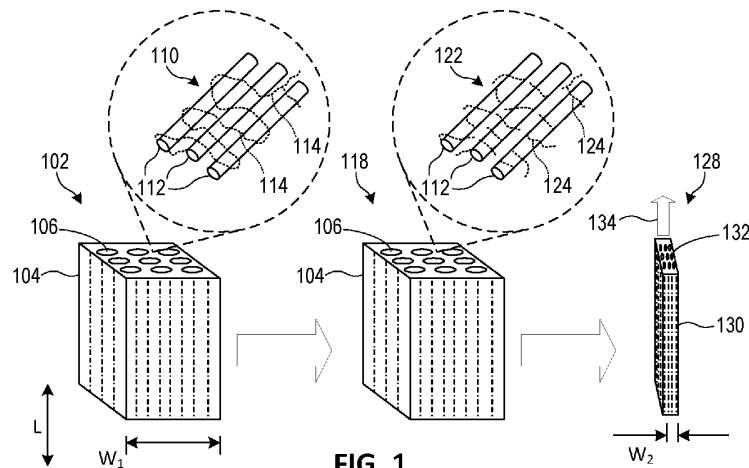


FIG. 1

(57) Abstract: A piece of natural fibrous plant material, such as wood or bamboo, can be infiltrated with a chemical solution and subsequently subjected to a temperature of at least 80 °C to produce a softened piece of fibrous plant material having modified lignin therein. The content of modified lignin in the softened piece can be at least 90% of the content of native lignin in the natural fibrous plant material. The modified lignin retained in the softened piece can have shorter macromolecular chains than that of the native lignin. The softened piece can be subjected to densification, for example, to yield a high-strength structural material, or to subsequent drying, for example, to yield a flexible or anisotropically-elastic material. The processing of the natural fibrous plant material can avoid, or at least reduce, the production of black liquor or other waste liquids.

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*