

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
23 September 2021 (23.09.2021)



(10) International Publication Number
WO 2021/188652 A1

(51) International Patent Classification:
B65D 5/10 (2006.01) *B65D 25/54* (2006.01)
B65D 77/06 (2006.01)

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.

(21) International Application Number:
PCT/US2021/022735

(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,
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).

(22) International Filing Date:
17 March 2021 (17.03.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/990,540 17 March 2020 (17.03.2020) US
63/054,309 21 July 2020 (21.07.2020) US

Published:
— with international search report (Art. 21(3))

(71) Applicant: LIQUI-BOX CORPORATION [US/US]; 901
East Byrd Street, Suite 1105, Riverfront Plaza, Richmond,
Virginia 23219 (US).

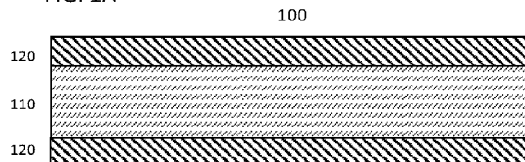
(72) Inventors: FARKAS, Nicholas; 943 Ellen Avenue, P.O.
Box 198, Glenburnie, Ontario KOH 150 (CA). CHOPIN,
Lamy; 3418 Stepping Stone Lane, Missouri City, Texas
77459 (US).

(74) Agent: SINGER, Christopher P.; McAndrews, Held &
Malloy Ltd., 500 West Madison Street, 34th Floor, Chica-
go, Illinois 60661 (US).

(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, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, IT, 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,

(54) Title: RECYCLABLE FLEXIBLE FILMS AND BAGS FOR PACKAGING FLOWABLE MATERIALS

FIG. 1A



(57) Abstract: The disclosure provides ethylene/ -olefin copolymer based co-extruded, multi-layer films, including barrier films and non-barrier films, and articles of manufacture that include the films, such as flexible bags and containers for flowable materials. The films and articles that include the films have improved flex-crack resistance and toughness. The films and articles that include the films have good barrier properties as the barrier films include a core layer of ethylene-vinyl alcohol (EVOH) copolymer having a high ethylene content. The low amount of EVOH copolymer in the total film that is needed to achieve the flex-crack resistance, toughness, and good barrier properties, further allow for the recycling of the films and articles of manufacture.

WO 2021/188652 A1