



US009510722B2

(12) **United States Patent**
Sumnicht et al.

(10) **Patent No.:** **US 9,510,722 B2**

(45) **Date of Patent:** ***Dec. 6, 2016**

(54) **METHOD OF CLEANING RESIDUE FROM A SURFACE USING A HIGH EFFICIENCY DISPOSABLE CELLULOSIC WIPER**

(71) Applicant: **Georgia-Pacific Consumer Products LP**, Atlanta, GA (US)

(72) Inventors: **Daniel W. Sumnicht**, Hobart, WI (US); **Joseph H. Miller**, Neenah, WI (US)

(73) Assignee: **Georgia-Pacific Consumer Products LP**, Atlanta, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/611,324**

(22) Filed: **Feb. 2, 2015**

(65) **Prior Publication Data**

US 2015/0144157 A1 May 28, 2015

Related U.S. Application Data

(60) Division of application No. 14/168,071, filed on Jan. 30, 2014, now Pat. No. 8,980,011, which is a continuation of application No. 13/430,757, filed on Mar. 27, 2012, now Pat. No. 8,778,086, which is a division of application No. 12/284,148, filed on Sep. 17, 2008, now Pat. No. 8,187,422, which is a continuation-in-part of application No. 11/725,253, filed on Mar. 19, 2007, now Pat. No. 7,718,036.

(60) Provisional application No. 60/994,483, filed on Sep. 19, 2007, provisional application No. 60/784,228, filed on Mar. 21, 2006, provisional application No. 60/850,467, filed on Oct. 10, 2006, provisional application No. 60/850,681, filed on Oct. 10, 2006, provisional application No. 60/881,310, filed on Jan. 19, 2007.

(51) **Int. Cl.**

- B08B 1/00** (2006.01)
- D21H 13/08** (2006.01)
- D21H 21/18** (2006.01)
- D21H 21/20** (2006.01)
- D21H 17/52** (2006.01)
- D21H 17/55** (2006.01)
- D21H 11/18** (2006.01)
- A47L 13/16** (2006.01)
- C11D 17/04** (2006.01)
- D21H 11/04** (2006.01)
- D21H 11/20** (2006.01)
- D21H 17/27** (2006.01)
- D21H 27/00** (2006.01)

(52) **U.S. Cl.**

CPC **A47L 13/16** (2013.01); **B08B 1/006** (2013.01); **C11D 17/049** (2013.01); **D21H 11/04** (2013.01); **D21H 11/18** (2013.01); **D21H 11/20** (2013.01); **D21H 13/08**

(2013.01); **D21H 17/27** (2013.01); **D21H 17/52** (2013.01); **D21H 17/55** (2013.01); **D21H 21/18** (2013.01); **D21H 21/20** (2013.01); **D21H 27/002** (2013.01); **D21H 27/005** (2013.01); **D21H 27/007** (2013.01); **Y10T 428/249965** (2015.04); **Y10T 428/2904** (2015.01); **Y10T 428/2965** (2015.01)

(58) **Field of Classification Search**

CPC D21H 11/17; D21H 13/07; D21H 27/002; D21H 21/18; B08B 1/006; A47K 13/16
USPC 162/109, 141, 146, 149-150, 157.1, 162/157.6, 157.7, 158, 164.1, 164.3, 162/164.6, 168.1, 168.2, 179, 177; 428/292.1, 304.4, 428/311.11, 311.51, 428/311.7, 359, 364-365, 393; 442/333-335, 414; 134/6, 25.1, 25.2, 40; 15/208, 209.1; 51/303

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 2,428,046 A 9/1947 Sisson et al.
- 2,440,761 A 5/1948 Sisson et al.
- 2,996,424 A 8/1961 Voigtman et al.
- 3,009,822 A 11/1961 Drelich et al.
- 3,047,445 A 7/1962 Gresham
- 3,175,339 A 3/1965 McDowell
- 3,209,402 A 10/1965 Riley et al.
- 3,337,671 A 8/1967 Drisch et al.
- 3,351,696 A 11/1967 Drisch
- 3,382,140 A 5/1968 Henderson et al.

(Continued)

FOREIGN PATENT DOCUMENTS

- EP 1 302 146 A2 4/2003
- EP 1 302 592 A1 4/2003

(Continued)

OTHER PUBLICATIONS

Dymrose-Peterson, Katharine. "Smart Materials for Liquid Control," Nonwovens World, Oct.-Nov. 1999, pp. 95-99.

(Continued)

Primary Examiner — Jose Fortuna

(74) Attorney, Agent, or Firm — Laura L. Bozek

(57) **ABSTRACT**

A method of cleaning residue from a surface includes providing a disposable cellulosic wiper including a percentage by weight of pulp-derived papermaking fibers, and a percentage by weight of regenerated independent cellulosic microfibers having a number average diameter of less than about 2 microns and a characteristic Canadian Standard Freeness (CSF) value of less than 175 ml. The microfibers are selected and present in amounts such that the wiper exhibits a relative wicking ratio of at least 1.5. The wiper is applied, with a predetermined amount of pressure, to a residue-bearing surface. The surface is wiped with the applied wiper, while applying the predetermined amount of pressure, to remove residue from the surface, such that the surface has less than 1 g/m² of residue after being wiped under the predetermined amount of pressure.