

(54) **METHOD OF MANUFACTURING A SHINGLE WITH REINFORCED NAIL ZONE**

(56) **References Cited**

(75) Inventors: **Donn Vermilion**, Newark, OH (US); **Stephanie A. Rinne**, Granville, OH (US); **Michael S. Ugorek**, New Albany, OH (US); **John Scowden**, Gahanna, OH (US); **Barry M. Lewis**, Newark, OH (US); **D. Greg Hendershot**, Columbus, OH (US); **Russell L. Ault**, Newark, OH (US); **James S. Belt**, Utica, OH (US)

(73) Assignee: **Owens Corning Intellectual Capital, LLC**, Toledo, OH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 26 days.

(21) Appl. No.: **13/193,868**

(22) Filed: **Jul. 29, 2011**

(65) **Prior Publication Data**

US 2013/0025768 A1 Jan. 31, 2013

(51) **Int. Cl.**

E04F 13/16 (2006.01)
B29C 65/52 (2006.01)
B32B 37/12 (2006.01)
B32B 37/20 (2006.01)
C09J 5/02 (2006.01)
C08J 5/12 (2006.01)

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

USPC **156/71**; 156/279; 156/297; 156/307.3; 156/307.7

(58) **Field of Classification Search** 156/71, 156/182, 278–280, 297, 298, 307.1, 307.3–307.5, 156/307.7

See application file for complete search history.

U.S. PATENT DOCUMENTS

1,597,135	A	8/1926	Wittenberg
1,601,731	A	10/1926	Flood
1,665,222	A	4/1928	Robinson
1,701,926	A	2/1929	Kirschbraun
1,799,500	A	4/1931	Brophy
2,161,440	A	6/1939	Venrick
2,798,006	A	7/1957	Oldfield et al.
2,847,948	A	8/1958	Truitt
3,252,257	A	5/1966	Price et al.
3,377,762	A	4/1968	Chalmers
3,468,086	A	9/1969	Warner
3,468,092	A	9/1969	Chalmers

(Continued)

FOREIGN PATENT DOCUMENTS

CA	1207975	7/1986
CN	2176391	9/1994

(Continued)

OTHER PUBLICATIONS

Chinese Office Action for Chinese Application 2006 80028893.4 dated Apr. 24, 2009.

(Continued)

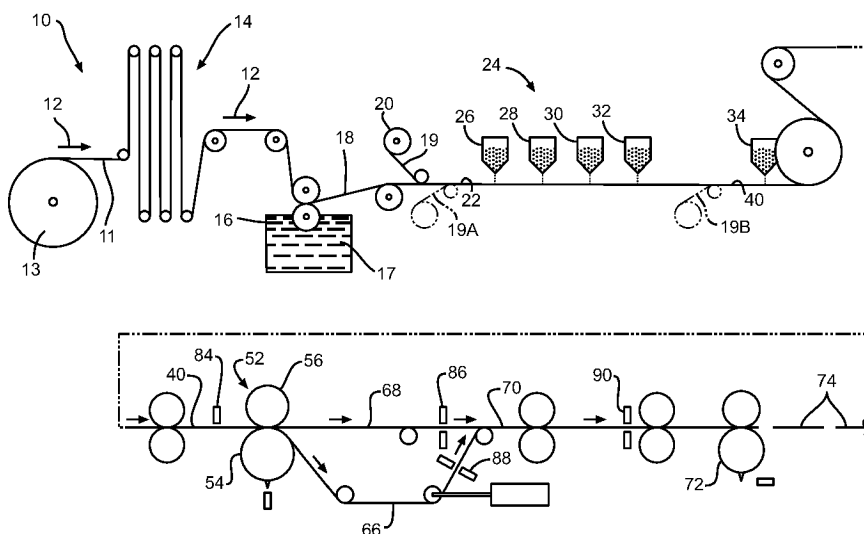
Primary Examiner — Sing P Chan

(74) *Attorney, Agent, or Firm* — Calfee, Halter & Griswold LLP

(57) **ABSTRACT**

A method of manufacturing a roofing shingle includes applying an asphalt coating to a substrate to define an asphalt coated sheet, the asphalt coated sheet including a headlap portion and a tab portion. Reinforcement material is applied from a spool to the asphalt coated sheet, wherein the reinforcement material is wound in a waywind pattern on the spool. The reinforcement material is then secured to the headlap portion of the asphalt coated sheet.

20 Claims, 6 Drawing Sheets



U.S. PATENT DOCUMENTS

3,624,975 A 12/1971 Morgan et al.
 3,664,081 A 5/1972 Martin et al.
 4,459,157 A 7/1984 Koons
 4,680,909 A 7/1987 Stewart
 4,706,435 A 11/1987 Stewart
 4,717,614 A 1/1988 Bondoc et al.
 4,755,545 A 7/1988 Lalwani
 4,817,358 A 4/1989 Lincoln et al.
 4,824,880 A 4/1989 Algrim et al.
 4,848,057 A 7/1989 MacDonald et al.
 5,181,361 A 1/1993 Hannah et al.
 5,209,802 A 5/1993 Hannah et al.
 5,239,802 A 8/1993 Robinson
 5,426,902 A 6/1995 Stahl et al.
 5,571,596 A 11/1996 Johnson
 5,577,361 A 11/1996 Grabek, Jr.
 5,660,014 A 8/1997 Stahl et al.
 5,822,943 A 10/1998 Frankoski et al.
 5,901,517 A 5/1999 Stahl et al.
 5,916,103 A 6/1999 Roberts
 5,950,387 A 9/1999 Stahl et al.
 6,010,589 A 1/2000 Stahl et al.
 6,021,611 A 2/2000 Wells et al.
 6,038,826 A 3/2000 Stahl et al.
 6,044,608 A 4/2000 Stahl et al.
 6,083,592 A 7/2000 Chich
 6,145,265 A 11/2000 Malarkey et al.
 6,148,578 A 11/2000 Nowacek et al.
 6,199,338 B1 3/2001 Hudson, Jr. et al.
 6,220,329 B1 4/2001 King et al.
 6,343,447 B2 2/2002 Geissels et al.
 6,355,132 B1 3/2002 Becker et al.
 6,397,546 B1 6/2002 Malarkey et al.
 6,397,556 B1 6/2002 Karpinia
 6,471,812 B1 10/2002 Thompson et al.
 6,487,828 B1 12/2002 Phillips
 6,502,779 B1 * 1/2003 Jelinek et al. 242/413.5
 6,523,316 B2 2/2003 Stahl et al.
 6,610,147 B2 8/2003 Aschenbeck
 6,652,909 B2 11/2003 Lassiter
 6,679,020 B2 1/2004 Becker et al.
 6,679,308 B2 1/2004 Becker et al.
 6,708,456 B2 3/2004 Kiik et al.
 6,709,994 B2 3/2004 Miller et al.
 6,758,019 B2 7/2004 Kalkanoglu et al.
 6,804,919 B2 10/2004 Railkar
 6,823,637 B2 11/2004 Elliott et al.
 6,990,779 B2 1/2006 Kiik et al.
 7,082,724 B2 8/2006 Railkar et al.
 7,118,794 B2 10/2006 Kalkanoglu et al.
 7,765,763 B2 8/2010 Teng et al.
 7,781,046 B2 8/2010 Kalkanoglu et al.
 2001/0049002 A1 12/2001 McCumber et al.
 2003/0040241 A1 2/2003 Kiik et al.
 2003/0093963 A1 5/2003 Stahl et al.
 2004/0055240 A1 3/2004 Kiik et al.
 2004/0083673 A1 5/2004 Kalkanoglu et al.
 2004/0083674 A1 5/2004 Kalkanoglu et al.
 2004/0206035 A1 10/2004 Kandalgaonkar
 2004/0258883 A1 12/2004 Weaver
 2006/0032174 A1 2/2006 Floyd
 2006/0179767 A1 8/2006 Miller et al.
 2006/0265990 A1 11/2006 Kalkanoglu et al.
 2008/0134612 A1 6/2008 Koschitzky
 2010/0077689 A1 4/2010 Kalkanoglu et al.
 2010/0143667 A1 6/2010 Collins et al.
 2010/0310825 A1 12/2010 Kalkanoglu et al.

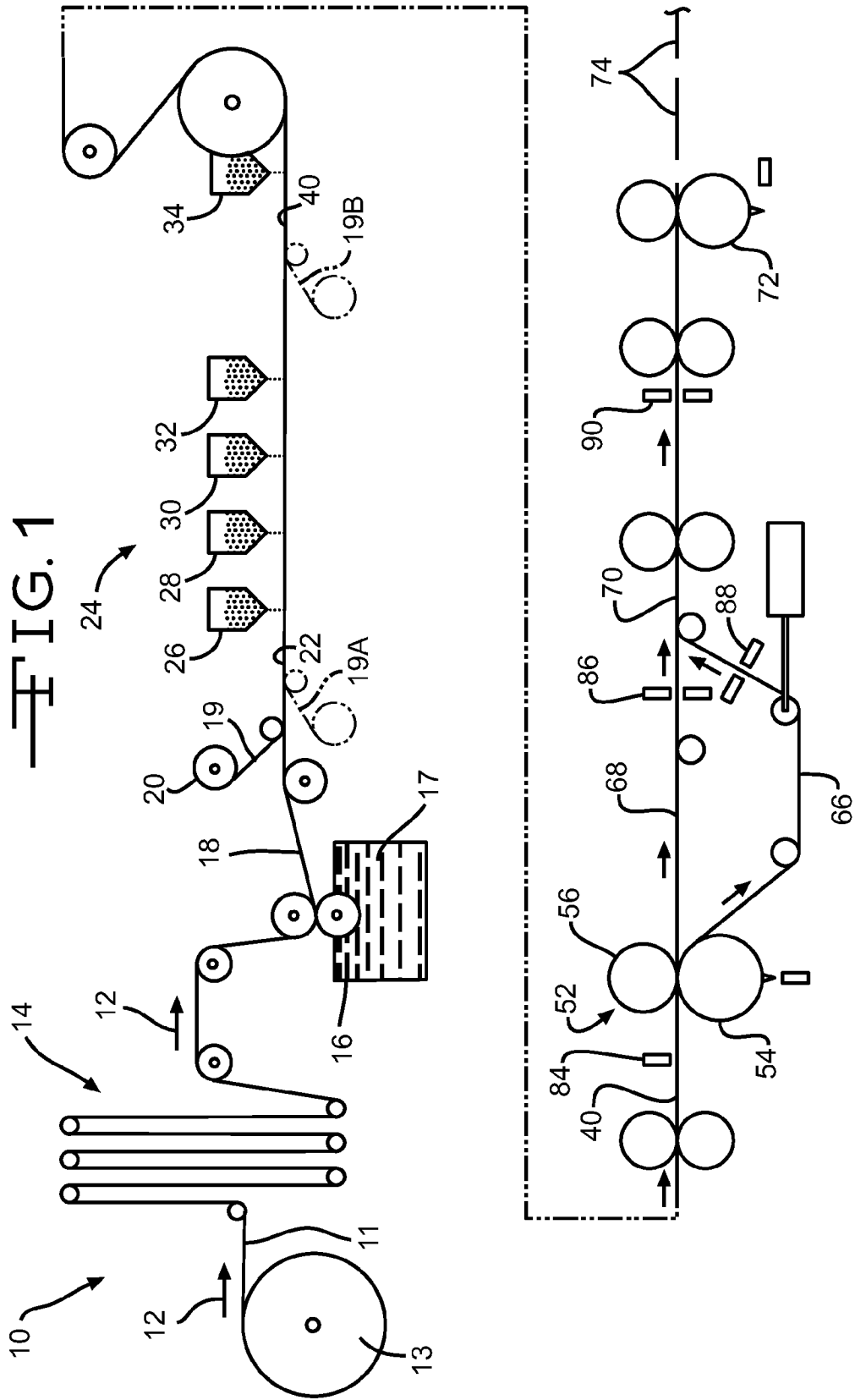
FOREIGN PATENT DOCUMENTS

JP 50002937 1/1975
 WO WO 2007019399 A1 * 2/2007
 WO 2007108846 9/2007
 WO 2008052029 5/2008

OTHER PUBLICATIONS

International Search Report, PCT/US2006/030633 dated Nov. 28, 2006.
 International Search Report, PCT/US2007/007827 dated Aug. 29, 2007.
 US Office Action dated May 11, 2011, U.S. Appl. No. 12/895,195, filed Sep. 30, 2010.
 US Office Action dated Mar. 2, 2011, U.S. Appl. No. 11/997,657, filed Nov. 5, 2008.
 US Office Action dated Dec. 22, 2010, U.S. Appl. No. 12/895,195, filed Sep. 30, 2010.
 US Office Action dated Mar. 18, 2010, U.S. Appl. No. 11/396,498.
 US Office Action dated Mar. 4, 2010, U.S. Appl. No. 11/198,522, filed Aug. 5, 2005.
 US Office Action dated Aug. 21, 2009, U.S. Appl. No. 11/396,498.
 US Office Action dated Aug. 4, 2009, U.S. Appl. No. 11/198,522, filed Aug. 5, 2005.
 US Office Action dated Sep. 30, 2008, U.S. Appl. No. 11/198,522, filed Aug. 5, 2005.
 US Office Action dated Feb. 20, 2008, U.S. Appl. No. 11/198,522, filed Aug. 5, 2005.
 US Office Action dated Oct. 31, 2007, U.S. Appl. No. 11/198,522, filed Aug. 5, 2005.
 US Office Action dated Apr. 17, 2007, U.S. Appl. No. 11/198,522, filed Aug. 5, 2005.
 US Notice of Allowance and Fee(s) Due, U.S. Appl. No. 12/895,195, filed Sep. 30, 2010.
 Applicant's Submission dated Apr. 14, 2011 for U.S. Appl. No. 12/895,195.
 Applicant's Submission dated Mar. 2, 2011 for U.S. Appl. No. 11/997,657.
 Applicant's Submission dated Feb. 16, 2011 for U.S. Appl. No. 12/895,195.
 Applicant's Submission dated Jan. 21, 2011 for U.S. Appl. No. 12/895,195.
 Applicant's Submission dated Sep. 3, 2010 for U.S. Appl. No. 11/198,522.
 Applicant's Submission dated Apr. 19, 2010 for U.S. Appl. No. 11/396,498.
 Applicant's Submission dated Jan. 4, 2010 for U.S. Appl. No. 11/198,522.
 Applicant's Submission dated Nov. 20, 2009 for U.S. Appl. No. 11/396,498.
 Applicant's Submission dated Mar. 30, 2009 for U.S. Appl. No. 11/198,522.
 Applicant's Submission dated Aug. 20, 2008 for U.S. Appl. No. 11/198,522.
 Applicant's Submission dated Jan. 31, 2008 for U.S. Appl. No. 11/198,522.
 Applicant's Submission dated Aug. 17, 2007 for U.S. Appl. No. 11/198,522.
 Notification of Ground(s) for Rejection, Application No. JP2008-525265, Dated Dec. 12, 2011.
 Notification of Ground(s) for Rejection Translation, Application No. JP2008-525265, Dated Dec. 12, 2011.

* cited by examiner



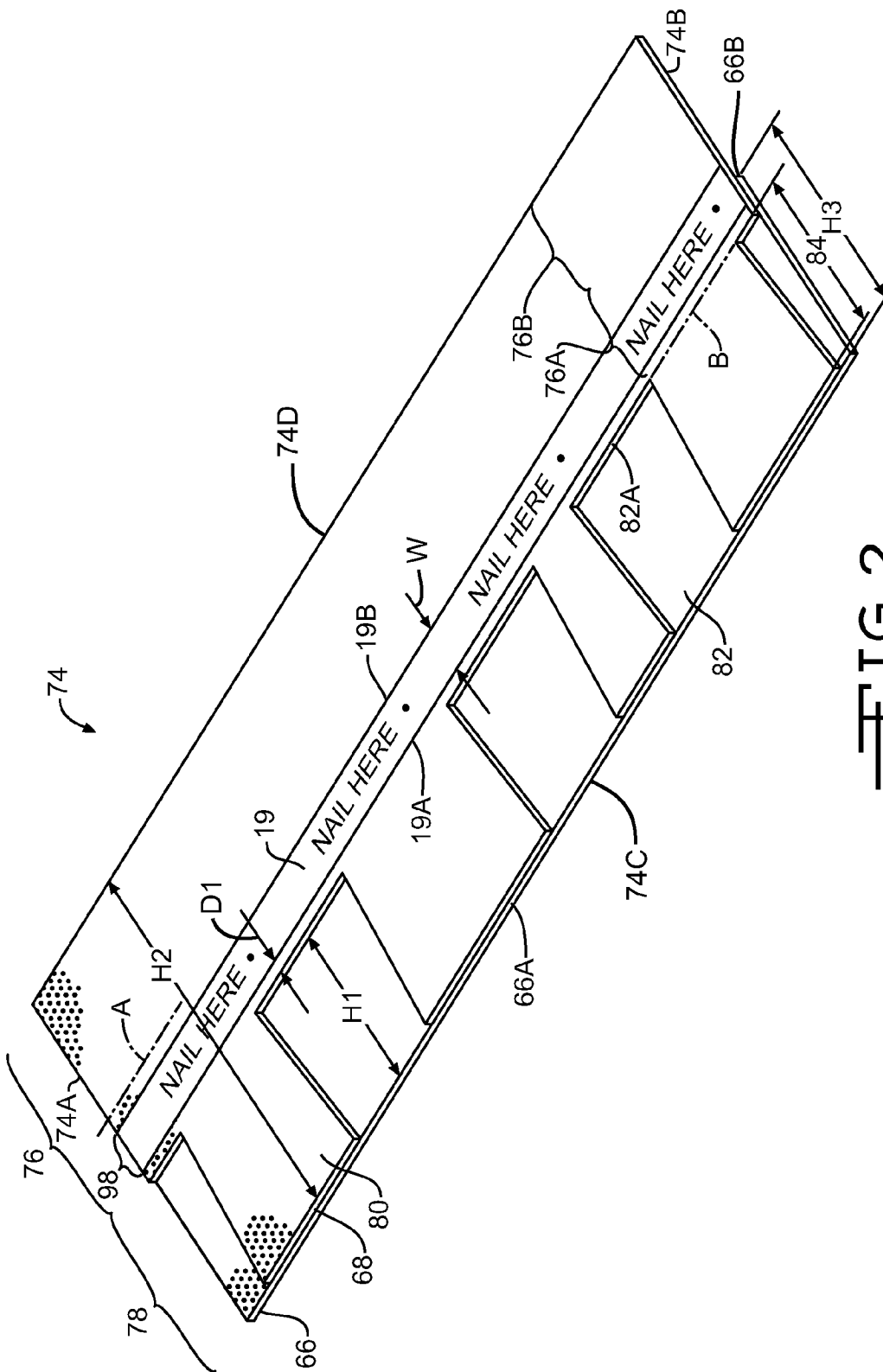


FIG. 2

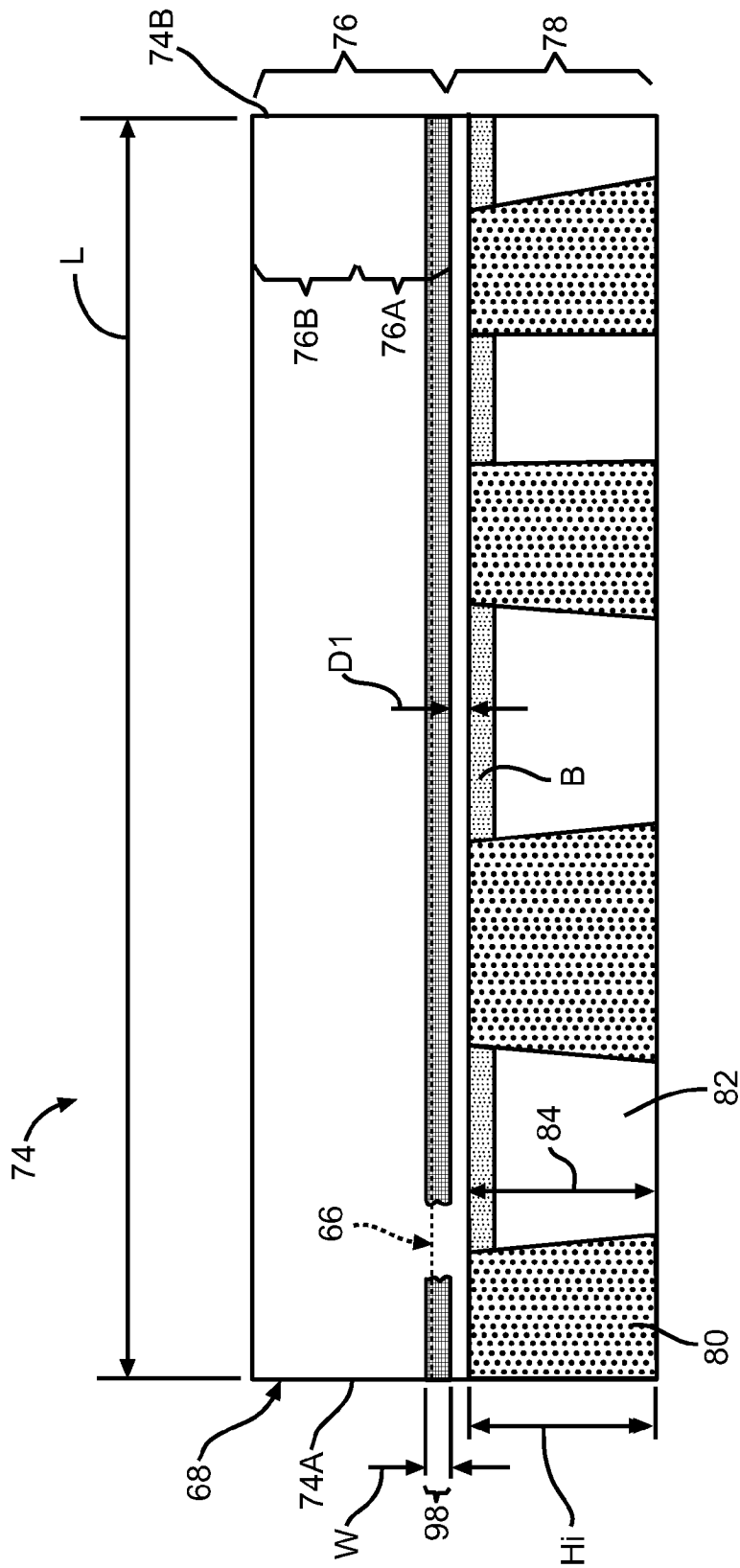


FIG. 3

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.