



US008486208B2

(12) **United States Patent**  
**Gorman**

(10) **Patent No.:** **US 8,486,208 B2**  
(45) **Date of Patent:** **Jul. 16, 2013**

(54) **COLD CRACK ADDITIVE ON PAVING  
ADVERTISING AND RELATED METHODS**

(75) Inventor: **Gregory Winfield Gorman**, Golden, CO  
(US)

(73) Assignee: **ParkMarx Advertising, LLC**, Arvada,  
CO (US)

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 436 days.

(21) Appl. No.: **12/271,477**

(22) Filed: **Nov. 14, 2008**

(65) **Prior Publication Data**

US 2009/0075040 A1 Mar. 19, 2009

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 11/186,310,  
filed on Jul. 21, 2005, which is a continuation-in-part  
of application No. 10/633,943, filed on Aug. 4, 2003,  
now abandoned.

(60) Provisional application No. 60/988,676, filed on Nov.  
16, 2007.

(51) **Int. Cl.**  
**E04F 13/07** (2006.01)  
**E04F 13/072** (2006.01)  
**B29C 65/50** (2006.01)  
**B32B 37/00** (2006.01)  
**B32B 38/10** (2006.01)  
**B32B 43/00** (2006.01)

(52) **U.S. Cl.**  
USPC ..... **156/71; 156/247; 156/249; 156/277**

(58) **Field of Classification Search**

USPC 156/71, 247, 249, 277; 404/12-15; 428/40.1,  
428/41.7, 41.8, 42.1, 43, 192, 201; 40/594  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

3,230,842	A *	1/1966	Denton et al.	156/71
4,415,395	A *	11/1983	Paque	156/384
5,246,757	A *	9/1993	Condon et al.	428/40.9
5,795,637	A	8/1998	Wilson et al.	
5,830,937	A *	11/1998	Shalov et al.	524/297
5,928,761	A	7/1999	Hedblom et al.	
5,941,655	A	8/1999	Jacobs et al.	
6,012,818	A	1/2000	Araki	
6,051,297	A	4/2000	Maier et al.	
6,127,020	A *	10/2000	Bacon et al.	428/161

(Continued)

**FOREIGN PATENT DOCUMENTS**

WO WO0238870 5/2002

**OTHER PUBLICATIONS**

3M, "Pavement Surface Preparation and Application Procedures for  
3M™ Stanmark™ Disabled Pavement Marking Symbols" Series  
SMS-917 DS and SMS-918 DS, Jul. 1997, pp. 1-6.

(Continued)

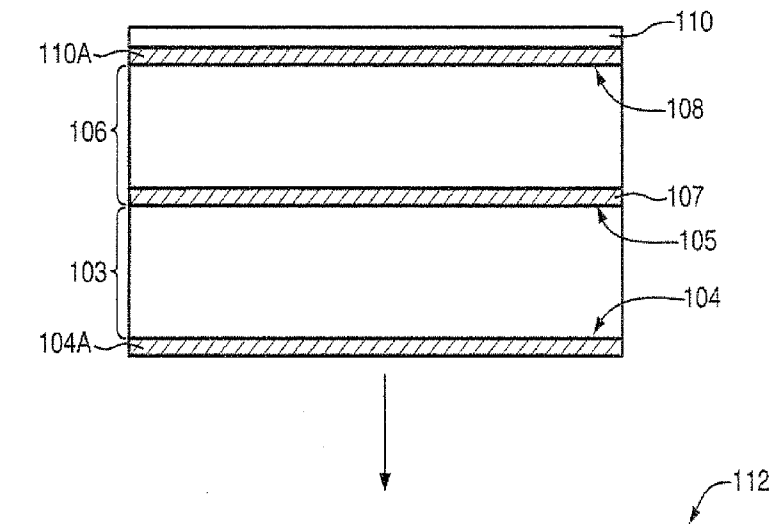
*Primary Examiner* — Sing P Chan

(74) *Attorney, Agent, or Firm* — McCormick, Paulding &  
Huber LLP

(57) **ABSTRACT**

A paving advertisement has an elongated flexible tape body  
with a base substrate layer. The base substrate layer has front  
and rear faces, the front face having at least one text message  
that conveys information. The base substrate layer is treated  
with a cold crack additive, thereby increasing strength and  
flexibility.

**12 Claims, 19 Drawing Sheets**



## U.S. PATENT DOCUMENTS

6,156,442	A	12/2000	Phillips	
6,180,228	B1 *	1/2001	Mueller et al.	428/354
6,288,842	B1	9/2001	Florczak et al.	
6,326,053	B1	12/2001	Stump et al.	
6,365,262	B1	4/2002	Hedblom	
6,376,045	B1	4/2002	Wong et al.	
6,416,911	B1	7/2002	Mehta et al.	
6,432,528	B1	8/2002	Faust et al.	
6,469,199	B1	10/2002	Hansen et al.	
6,479,132	B2	11/2002	Hedblom et al.	
6,482,288	B1	11/2002	Kreckel et al.	
6,491,781	B1	12/2002	Kreckel et al.	
6,514,655	B2	2/2003	Bastiaens et al.	
6,515,649	B1	2/2003	Albert et al.	
6,524,412	B2 *	2/2003	Smith	156/71
6,531,230	B1	3/2003	Weber et al.	
6,537,649	B1	3/2003	Martin et al.	
6,576,074	B1	6/2003	Cabrera et al.	
6,589,636	B2 *	7/2003	Emslander et al.	428/195.1
6,863,100	B2 *	3/2005	Neal et al.	150/165
6,914,540	B2 *	7/2005	Gongolas	340/908.1
2002/0096248	A1	7/2002	Bastiaens et al.	
2003/0123930	A1	7/2003	Jacobs et al.	
2003/0147695	A1 *	8/2003	Hong et al.	404/75

## OTHER PUBLICATIONS

“3M™ Stanmark™ Disabled Pavement Marking”, [www.3m.com/products/s\\_index/Symbol\\_3M\(TM\)\\_Stanmark\(TM\)\\_Disabled\\_Pavement](http://www.3m.com/products/s_index/Symbol_3M(TM)_Stanmark(TM)_Disabled_Pavement) . . . , May 14, 2003, 1 page.

3M, “Application of Stanmark™ Pre-Cut Symbols and Legends”, Information Folder 5.8, May 2002, pp. 1-10.

3M, “Cutting, Matching, Premasking and Prespacing of 3M™ Scotchlite™ Reflective Sheetings and Films”, Information Folder 1.10, Apr. 1998, 9 pages.

“3M™ Wet Reflective Pavement Marking Tapes Keep Roadways Visible in the Rain”, [www.3m.com/us/safety/tcm/news/WetReflective012503.jhtml](http://www.3m.com/us/safety/tcm/news/WetReflective012503.jhtml), Feb. 2003, pp. 1-2.

3M “Series 750 Wet Reflective Removable Tape”, [http://products3.3m.com/catalog/us/en001/safety/traffic\\_control/node\\_1Z1NDZ90GJbe/root\\_GST1T4S9TCgv/vroot\\_IPGXVV](http://products3.3m.com/catalog/us/en001/safety/traffic_control/node_1Z1NDZ90GJbe/root_GST1T4S9TCgv/vroot_IPGXVV) . . . , May 14, 2003, pp. 1-2.

“3M Reflectivity”, © 3M 1997, 2 pages.

3M, “3M Scotchlite™ Diamond Grade™ LDP Reflective Sheeting Long Distance Performance (LDP) Series 3970”, Product Bulletin 3970, Feb. 2003, pp. 1-7.

3M, “3M Scotchlite™ Transparent Screen Printing Ink Series 2900”, Product Bulletin 2900, Aug. 2001, pp. 1-3.

3M, “3M Stanmark™ Intersection Grade Tape Series A420n and N420 Tape, Series L420 Sheeting and Series SMS-L420 Precut Symbols and Legends”, Product Bulletin 420, Feb. 2002, pp. 1-3.

3M, “3M Hand Squeeze Roll Applicators HSRA-48, HSRA-36 and HSRA-12”, Information Folder 1.6, Oct. 1997, pp. 1-7.

3M, “Series 145 Removable Black Line Mask”, [http://products3.3m.com/catalog/us/en001/safety/traffic\\_control/node\\_GS1LG1J44Dbe/ro](http://products3.3m.com/catalog/us/en001/safety/traffic_control/node_GS1LG1J44Dbe/ro) . . . , May 14, 2003, 1 page.

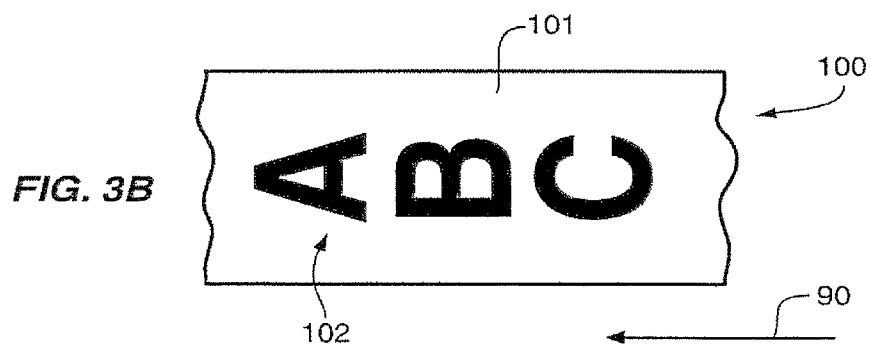
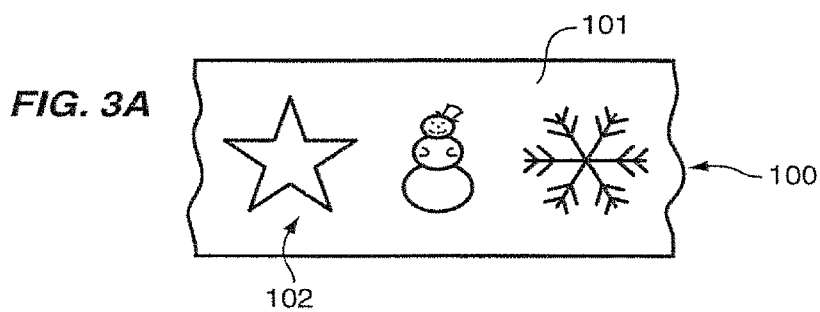
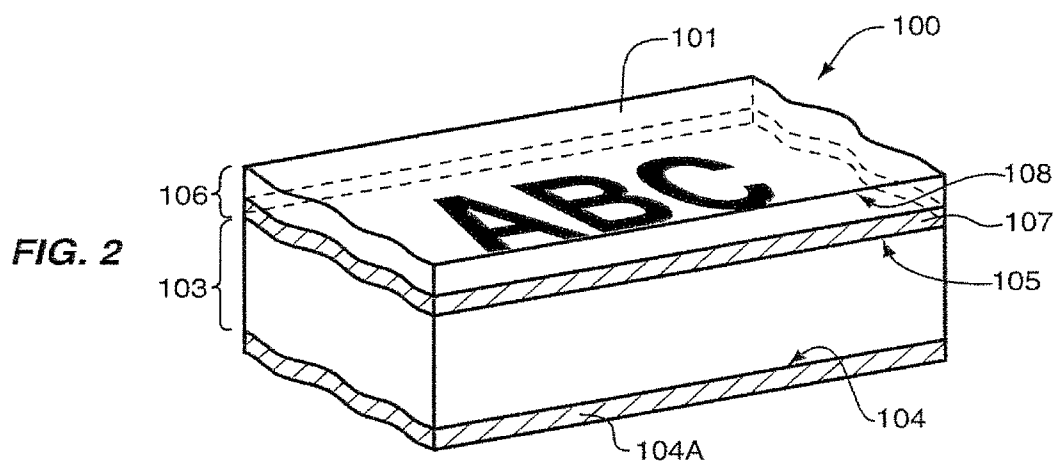
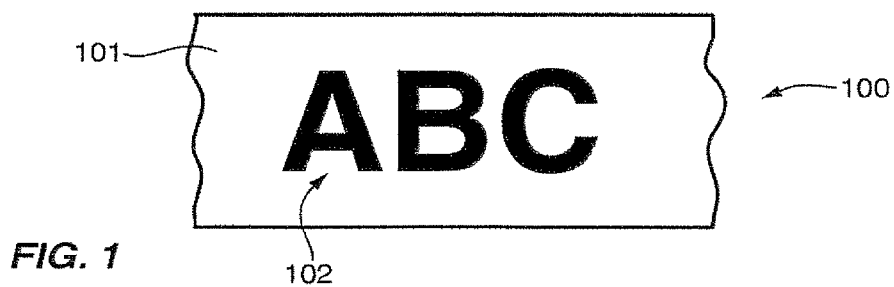
“Top Tape & Label”, [www.levitt-safety.com](http://www.levitt-safety.com), 3 pages.

3M, “3M Stanmark™ High Performance Contrast Tape Series 380I-5” Product Bulletin 380I-5, Jul. 1998, 4 pages.

Select File History from related U.S. Appl. No. 11/186,310, filed Jul. 21, 2005, dated Jul. 3, 2008 through Dec. 3, 2008, 58 pages.

Select File History from related U.S. Appl. No. 10/633,943, filed Aug. 4, 2003, dated Jan. 24, 2005 through Dec. 4, 2008, 385 pages.

\* cited by examiner



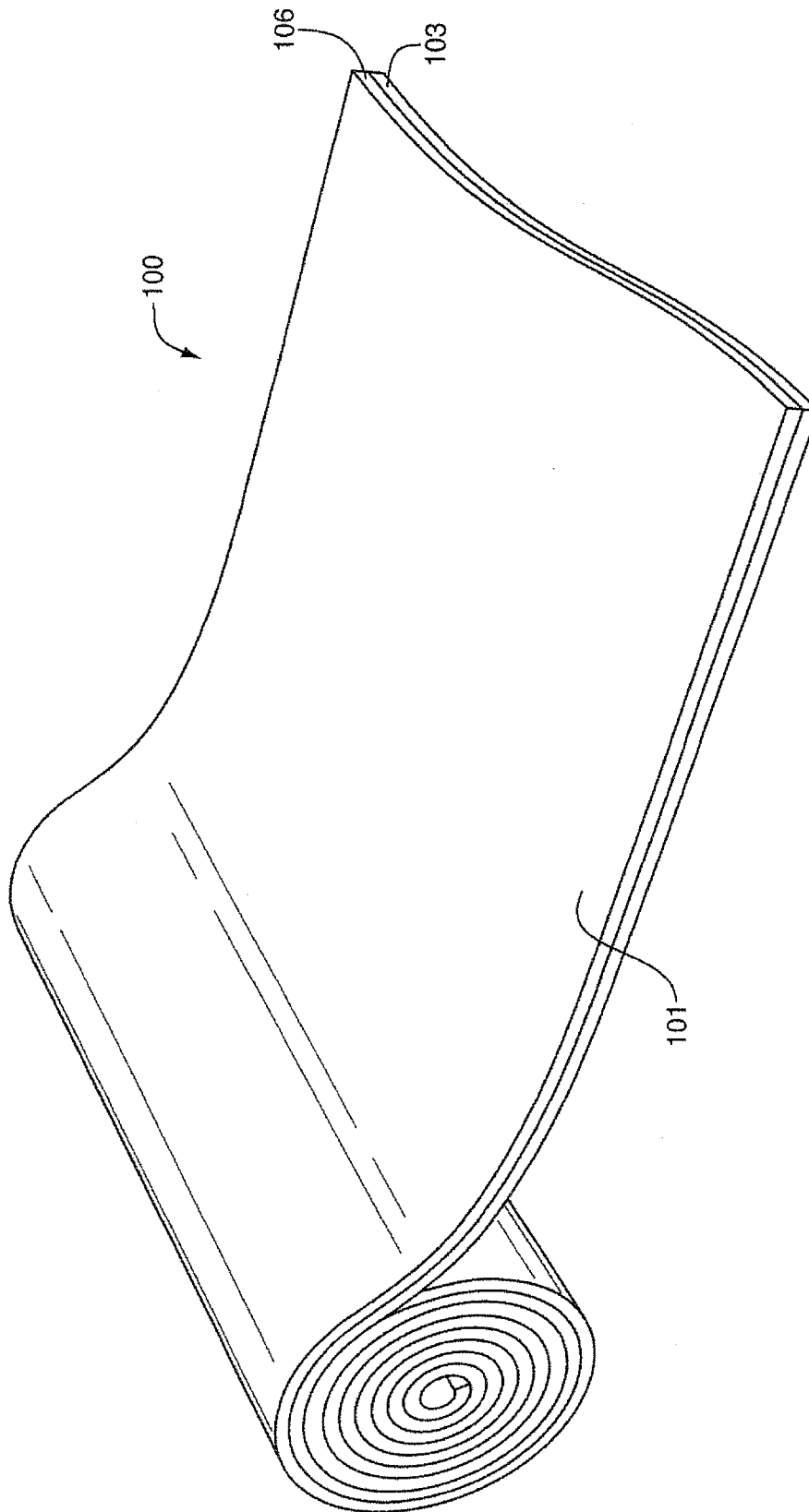


FIG. 3C

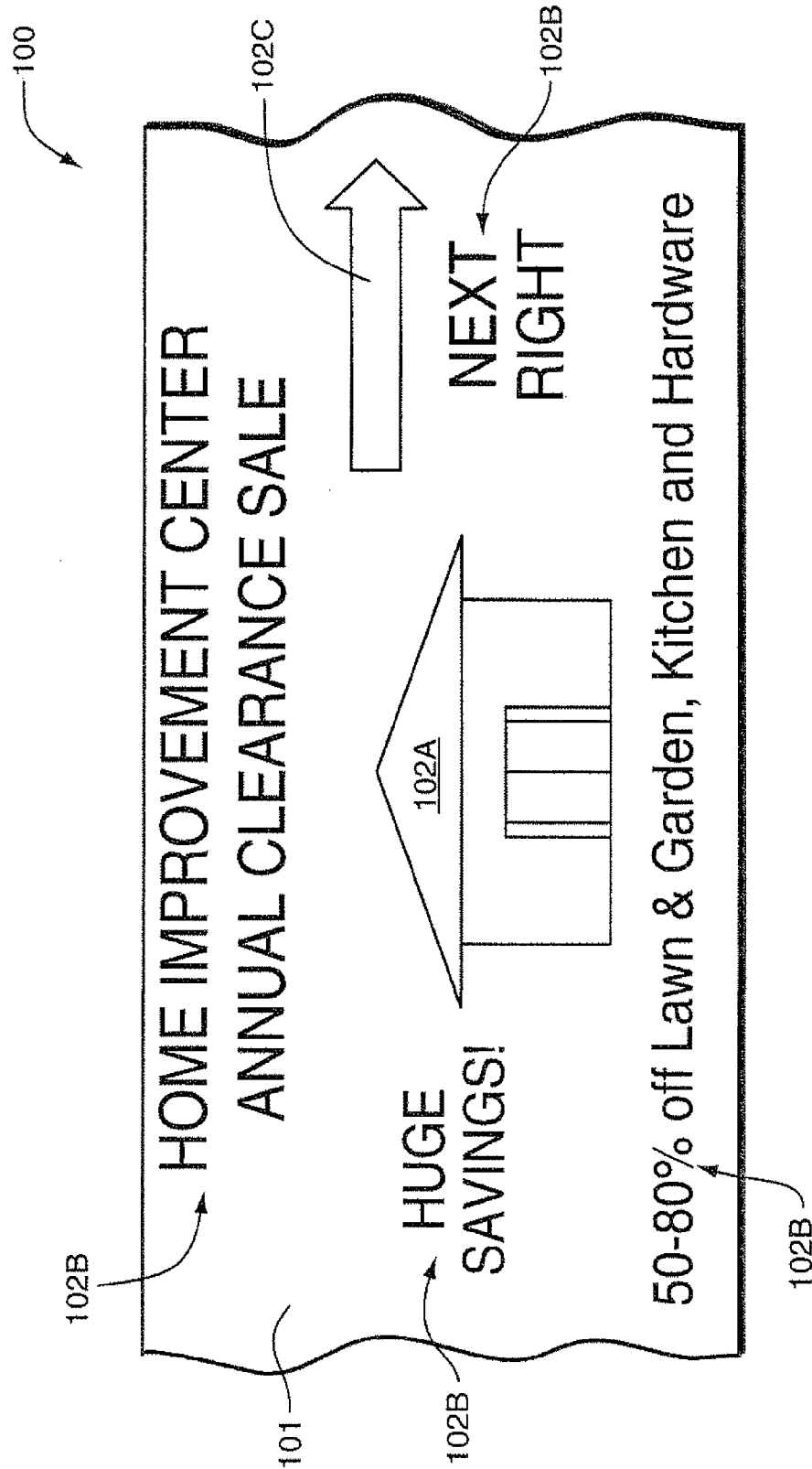
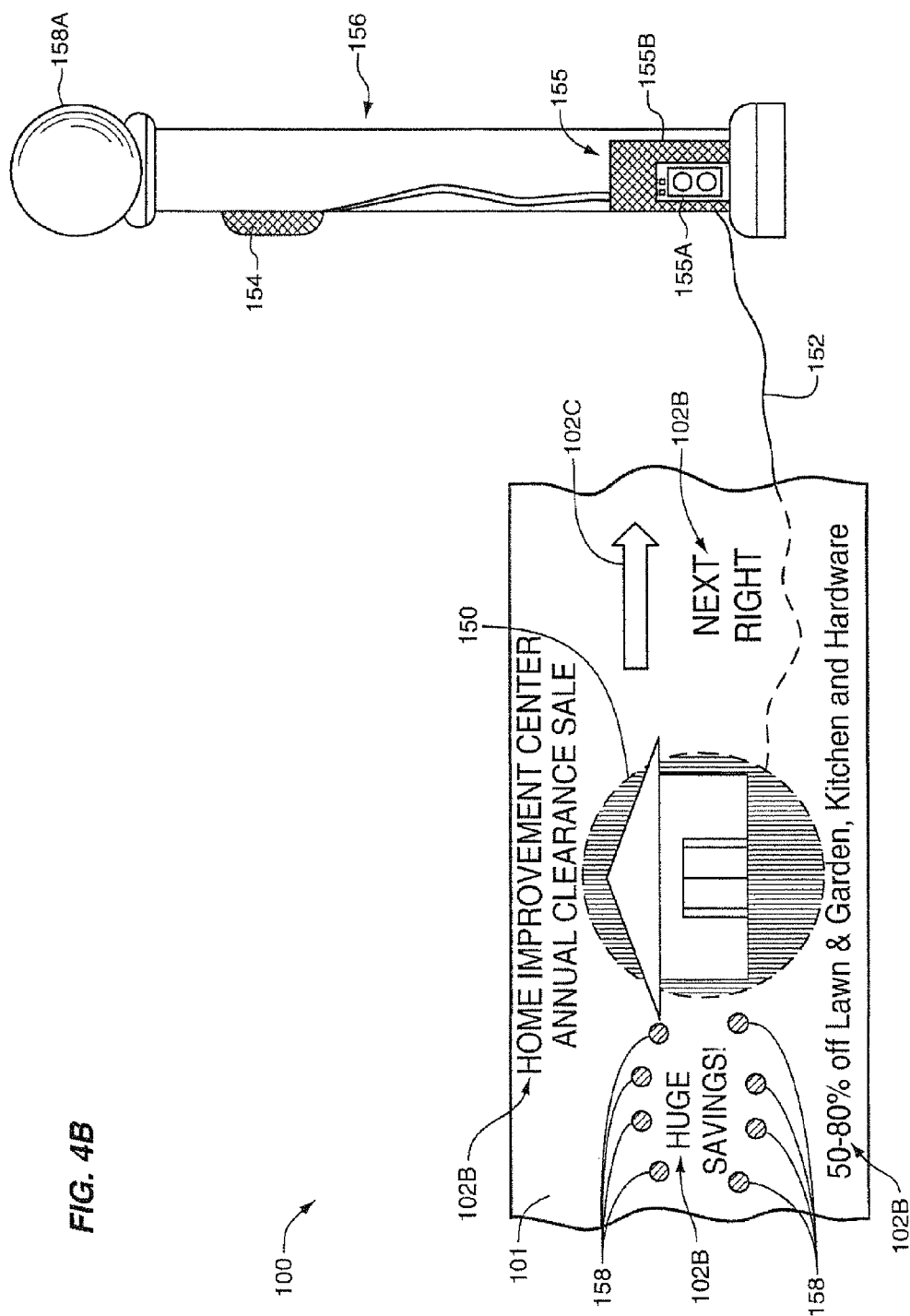
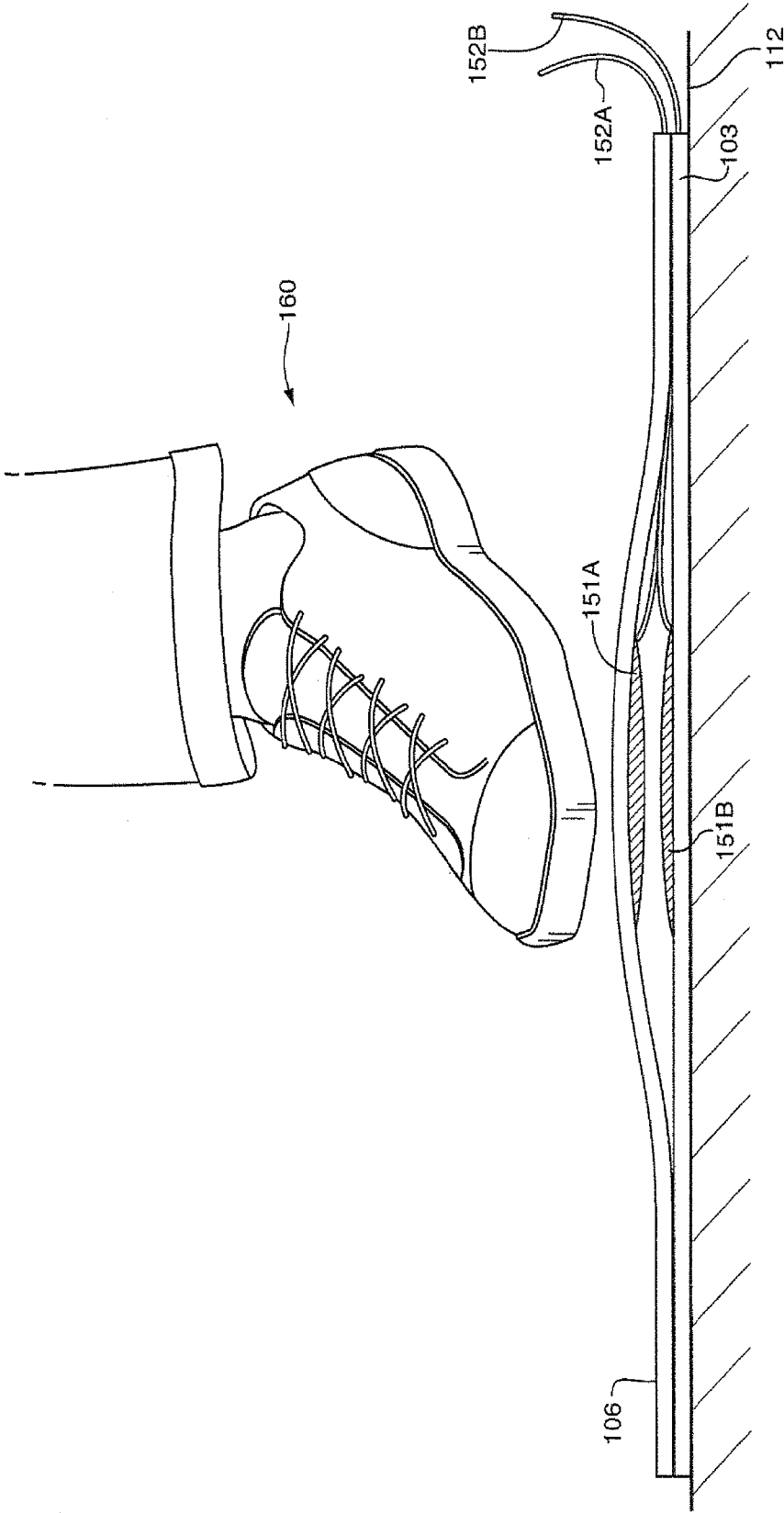


FIG. 4A





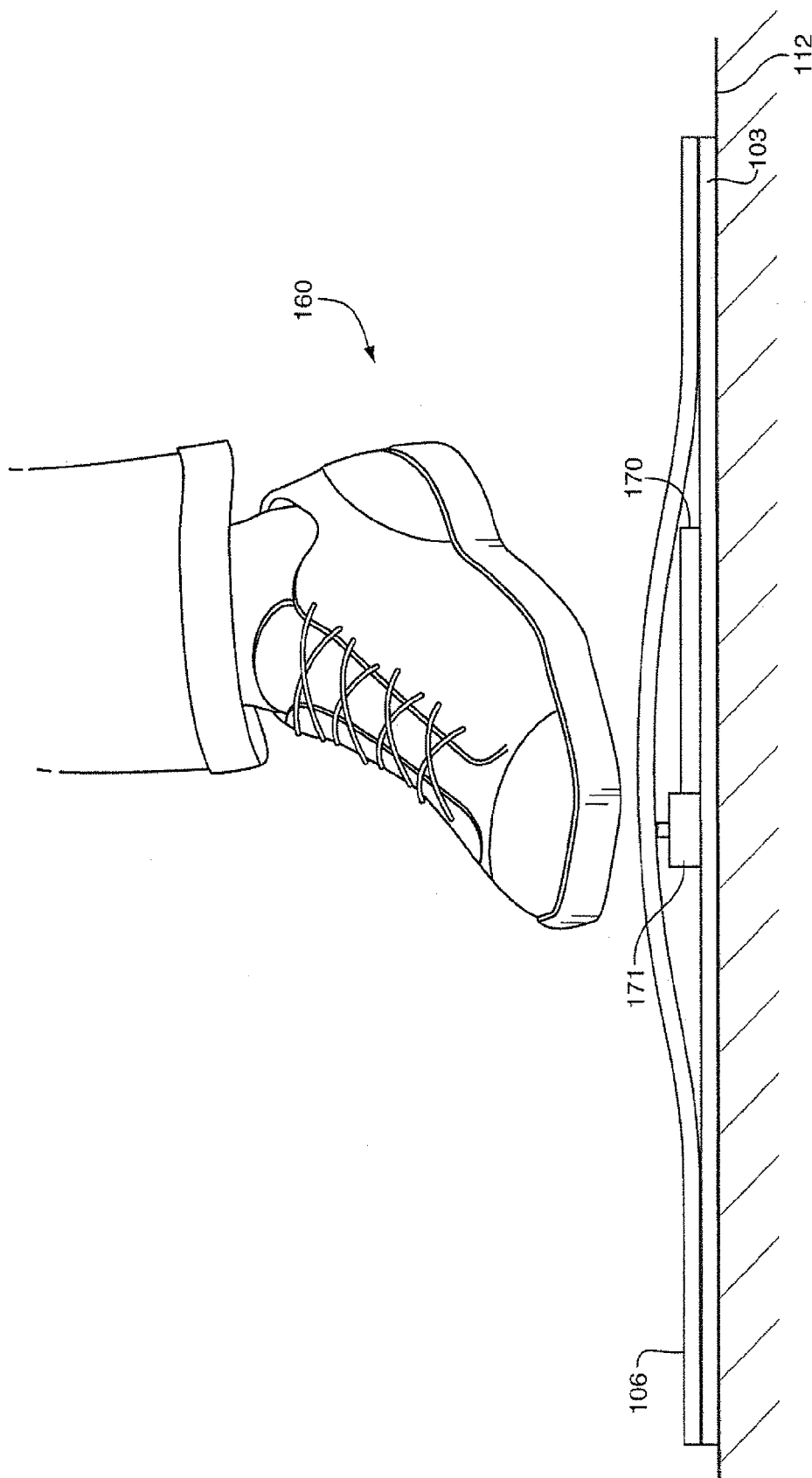


FIG. 4D



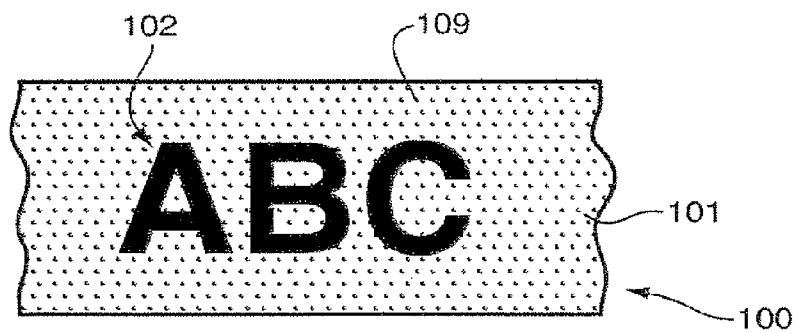


FIG. 5A

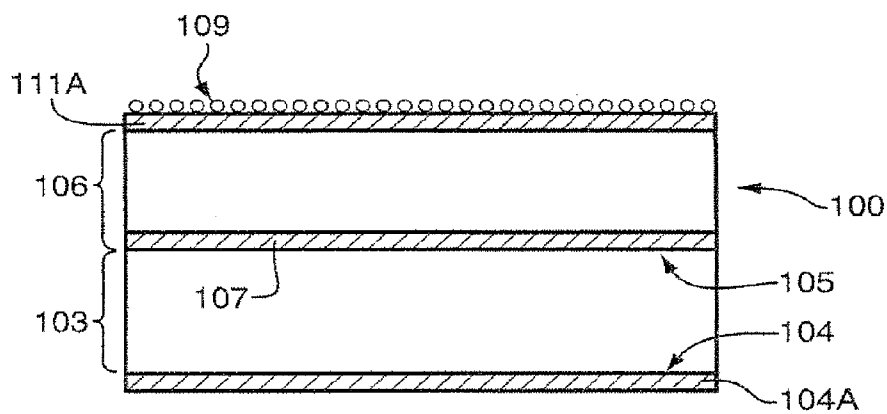


FIG. 5B

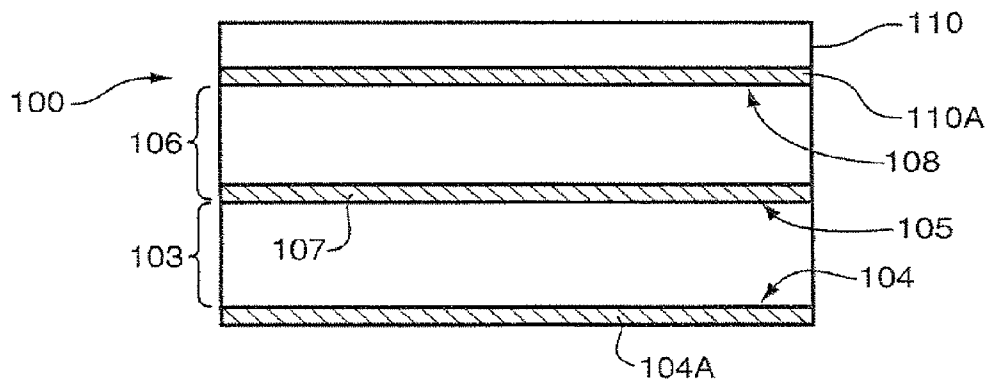


FIG. 6

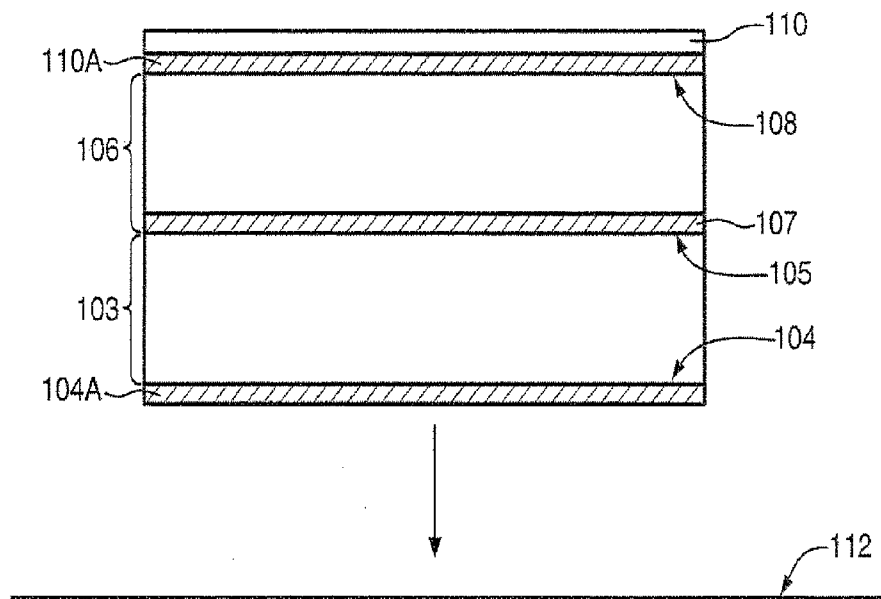


FIG. 7A

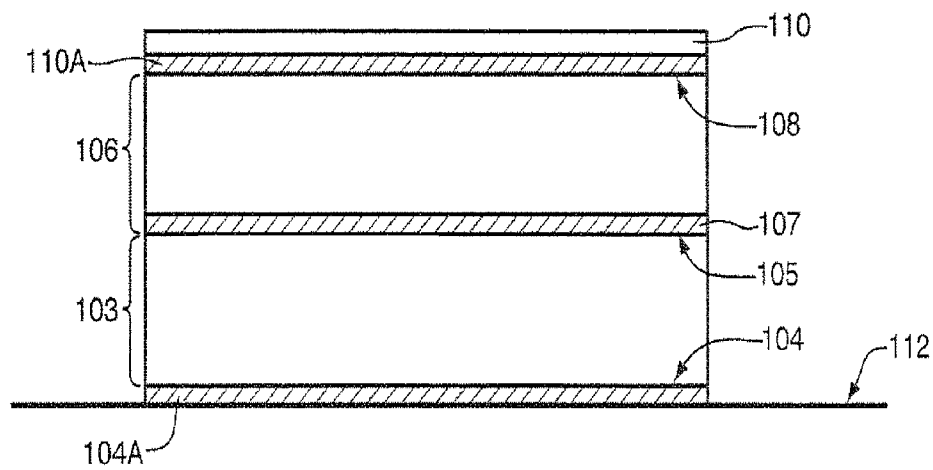


FIG. 7B

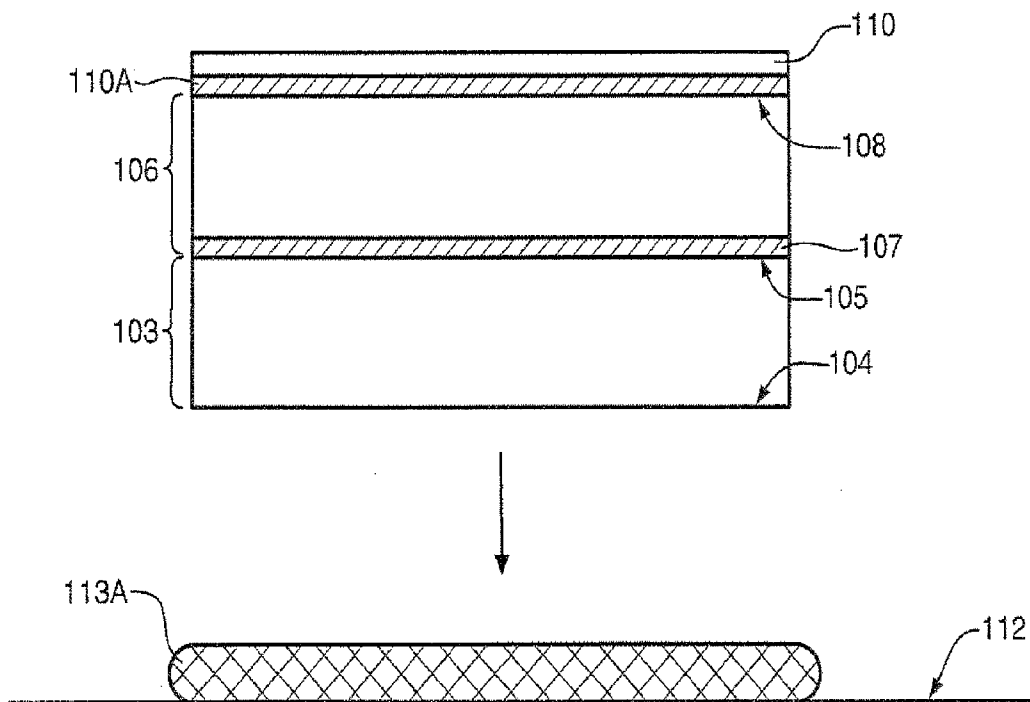


FIG. 8A

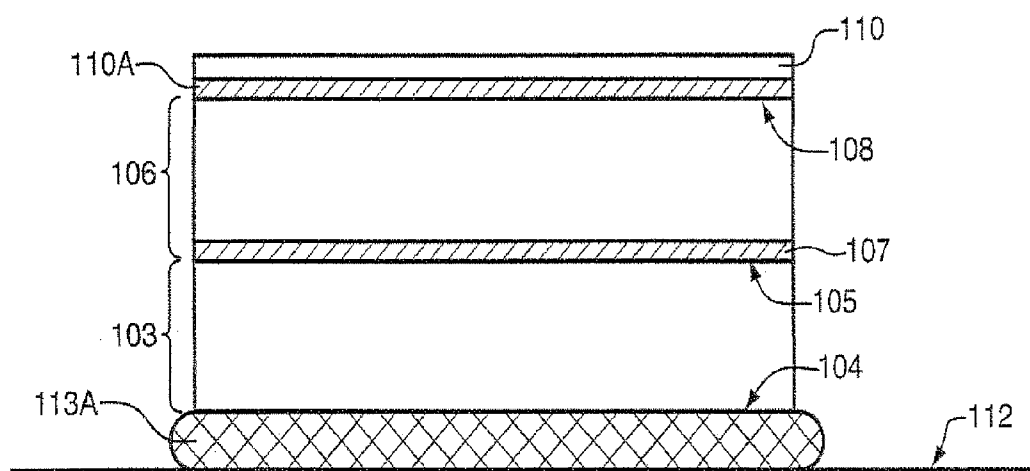


FIG. 8B

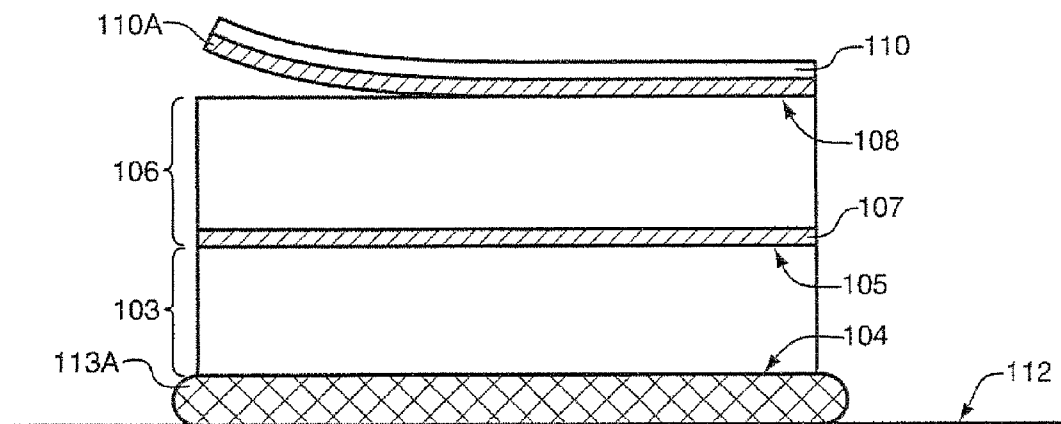


FIG. 9

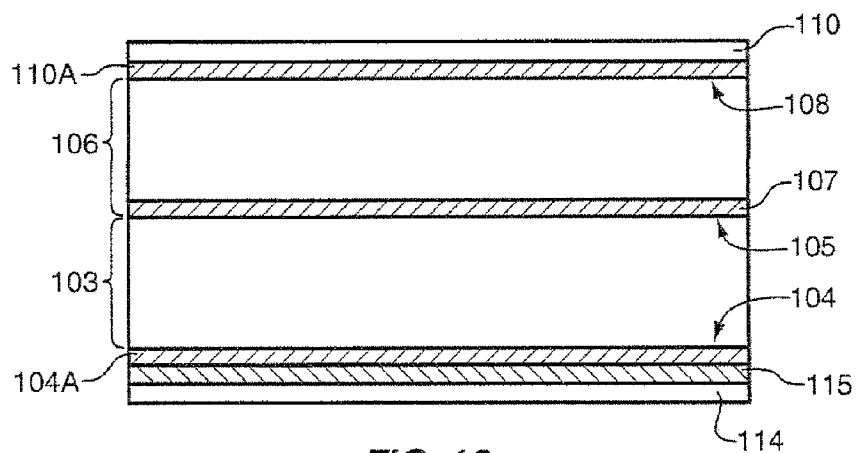


FIG. 10

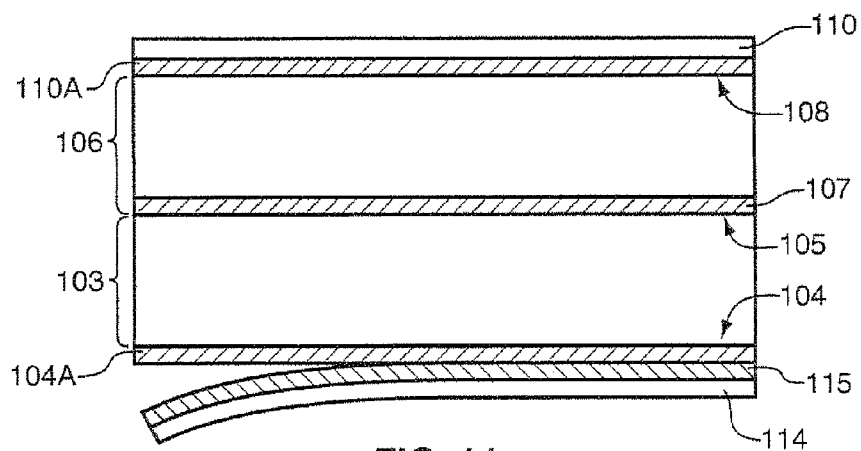


FIG. 11

FIG. 12A

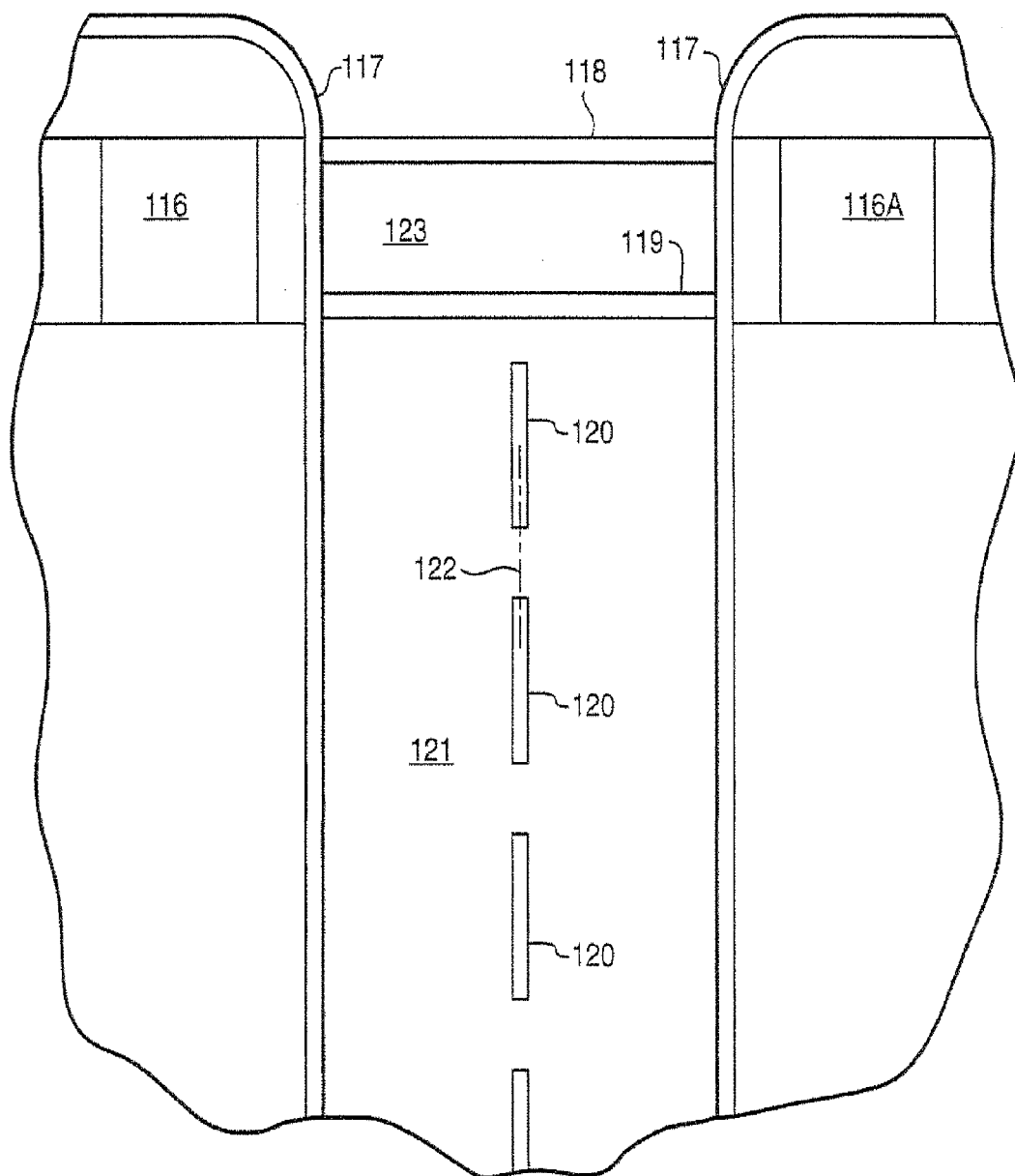


FIG. 12B

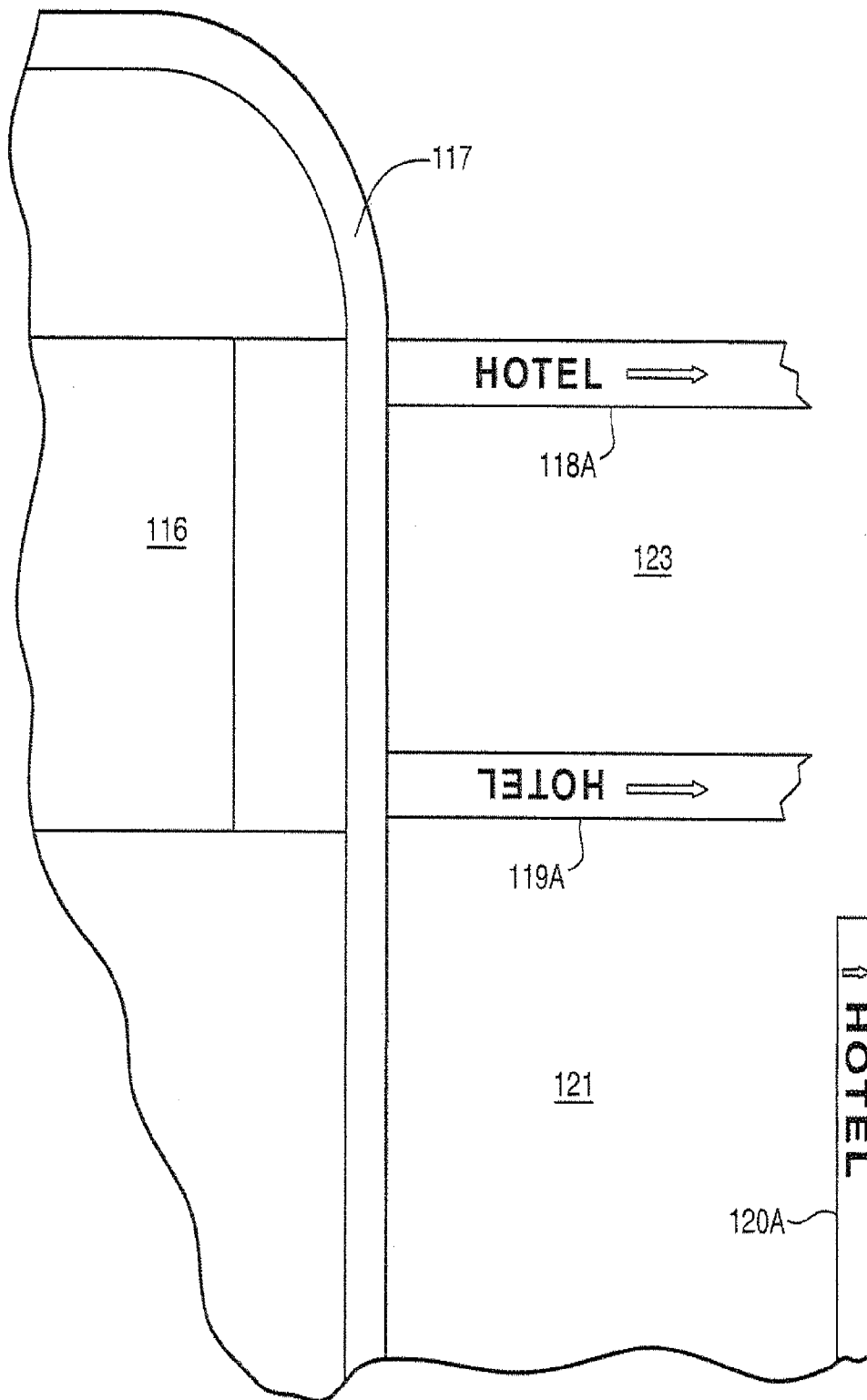
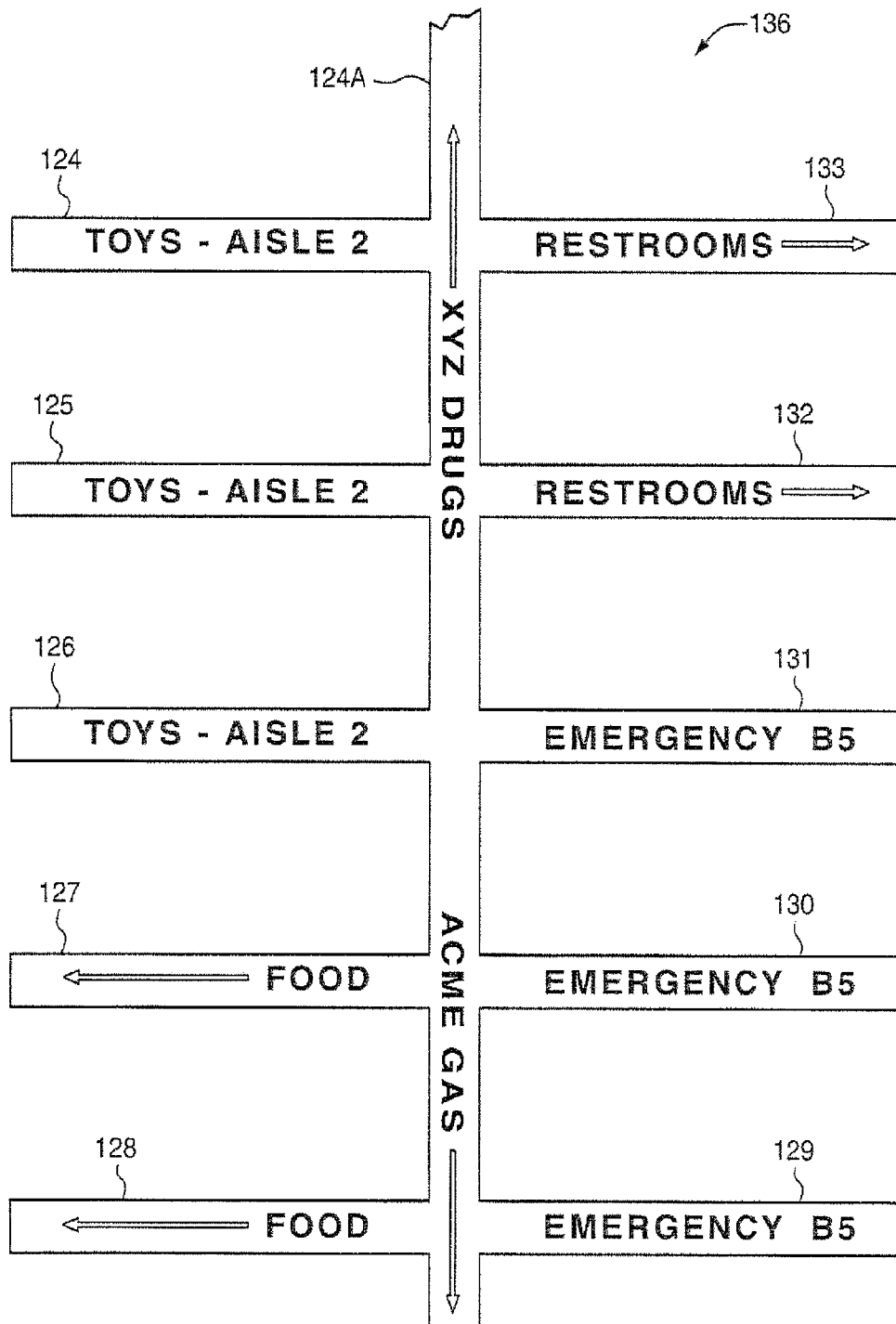


FIG. 12C



*FIG. 12D*

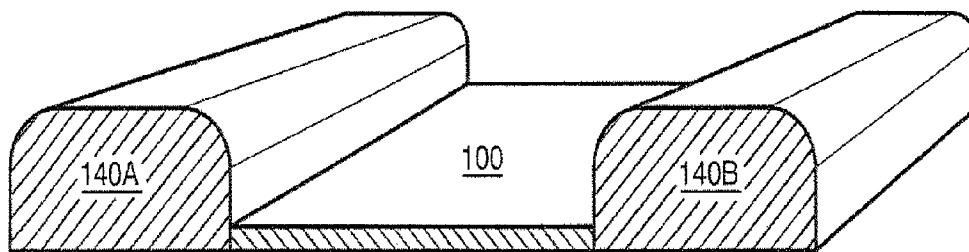




FIG. 13

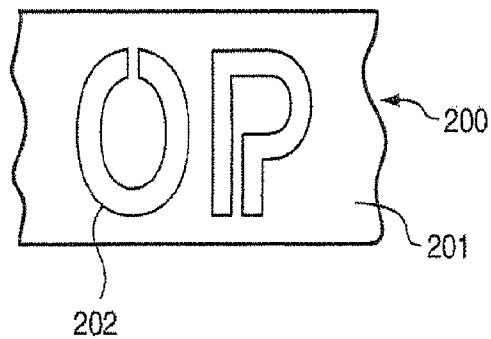


FIG. 14

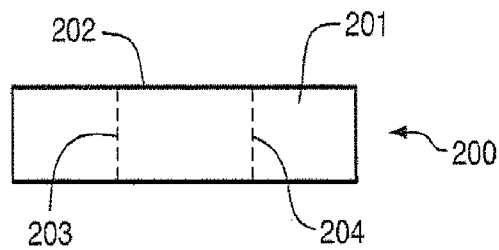
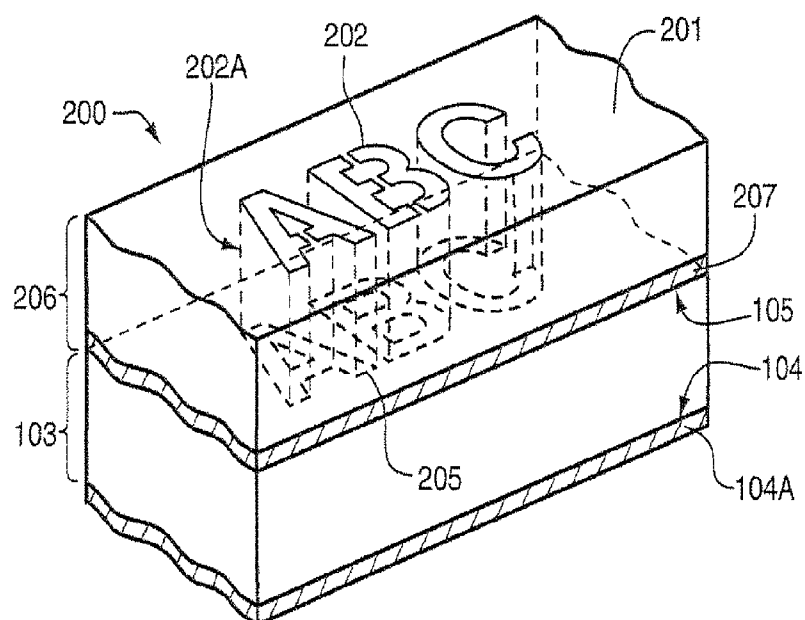


FIG. 15



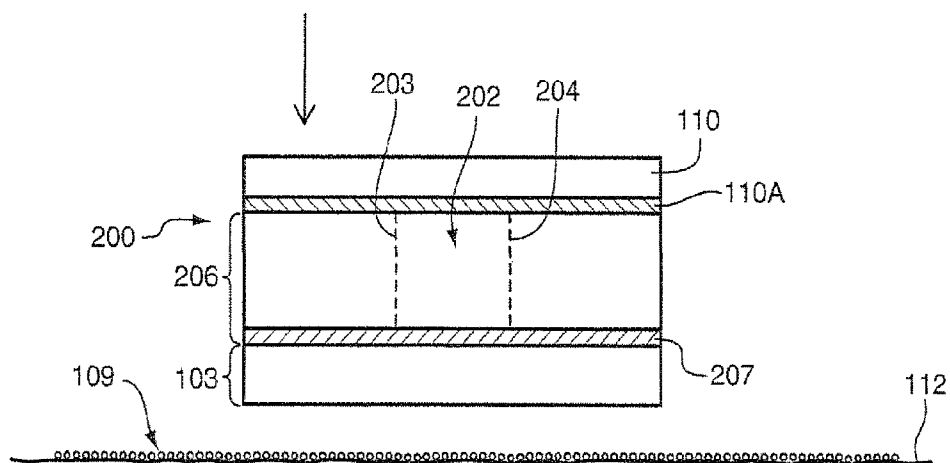


FIG. 16

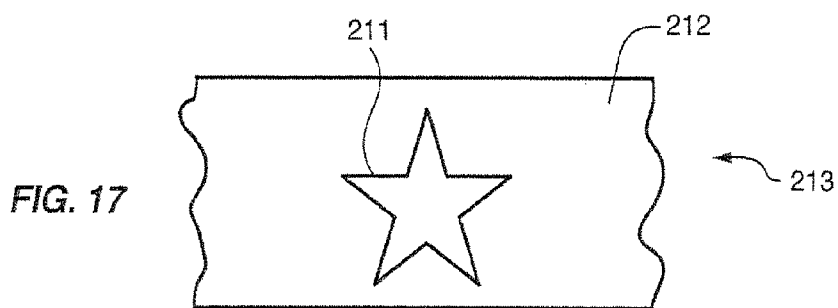


FIG. 17

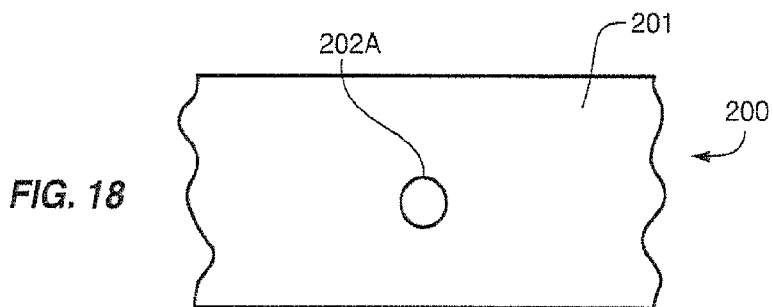


FIG. 18

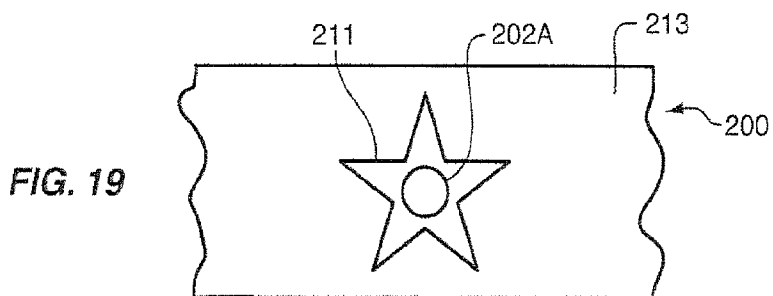


FIG. 19

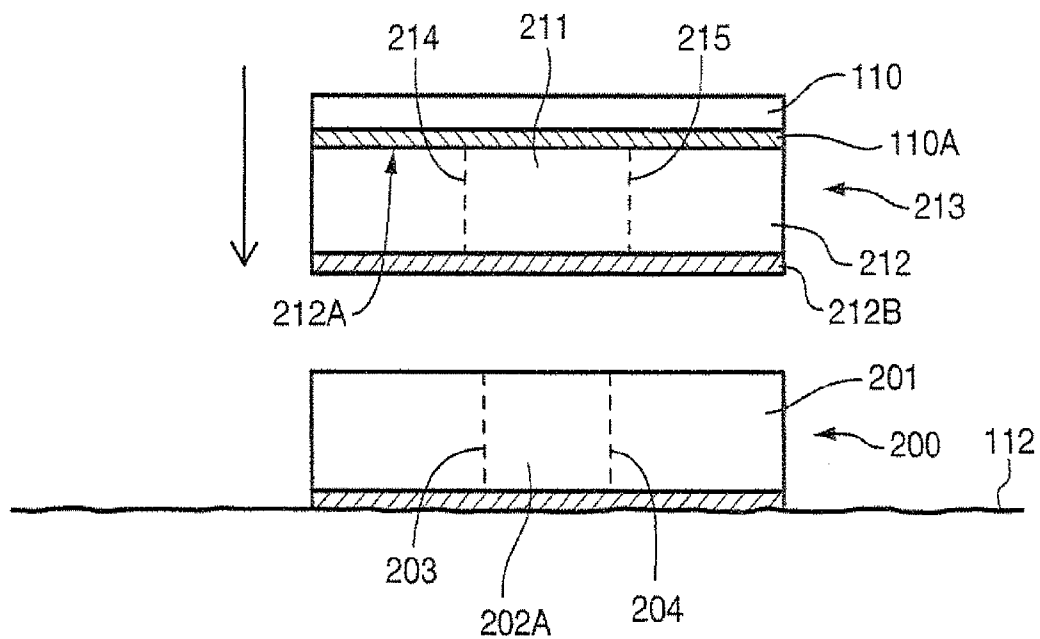


FIG. 20

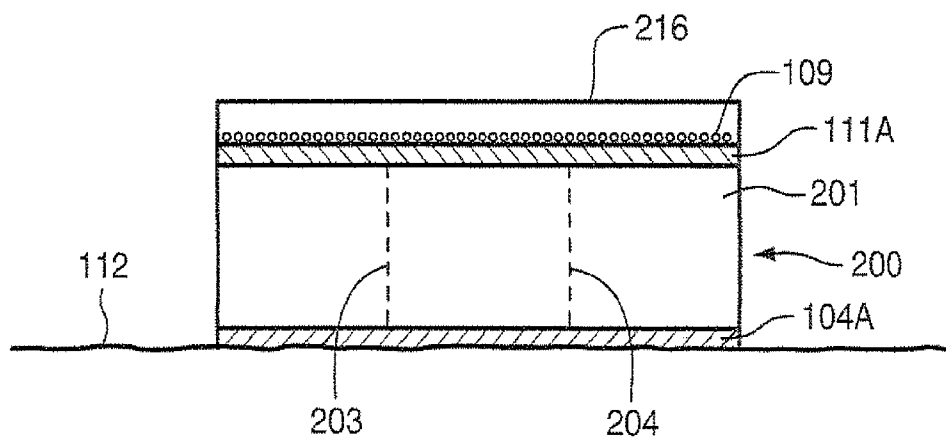


FIG. 21

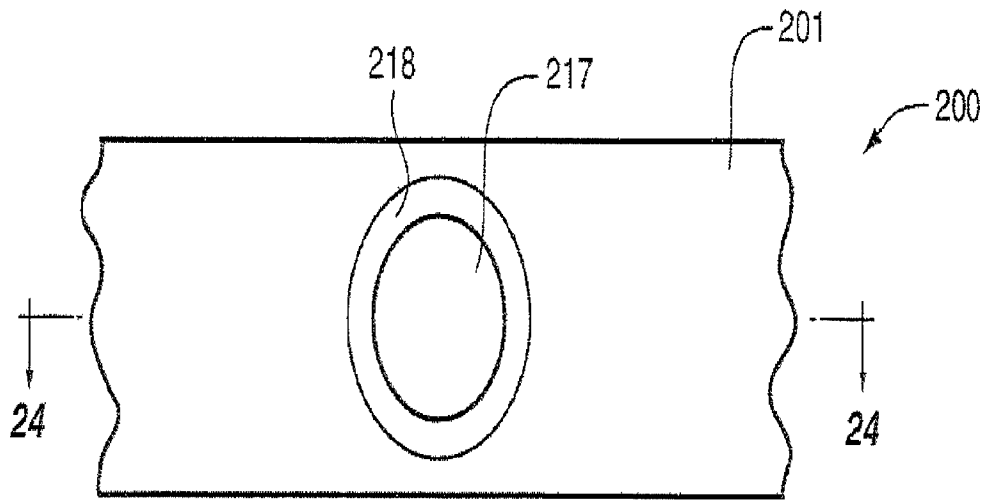


FIG. 22

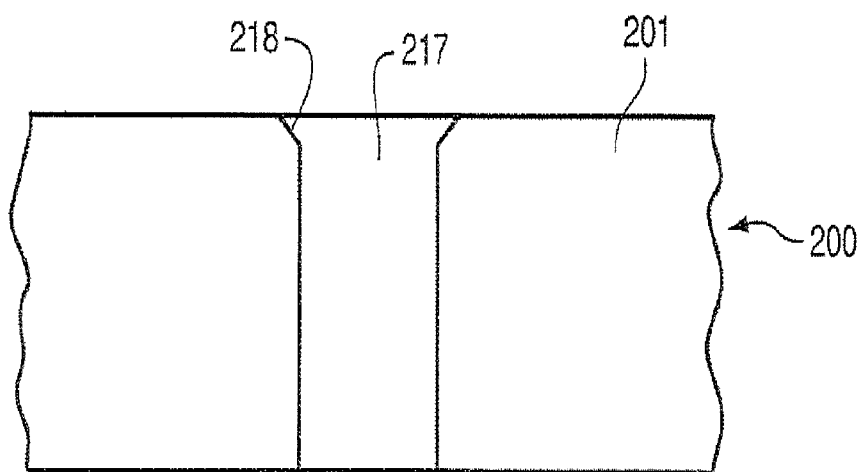
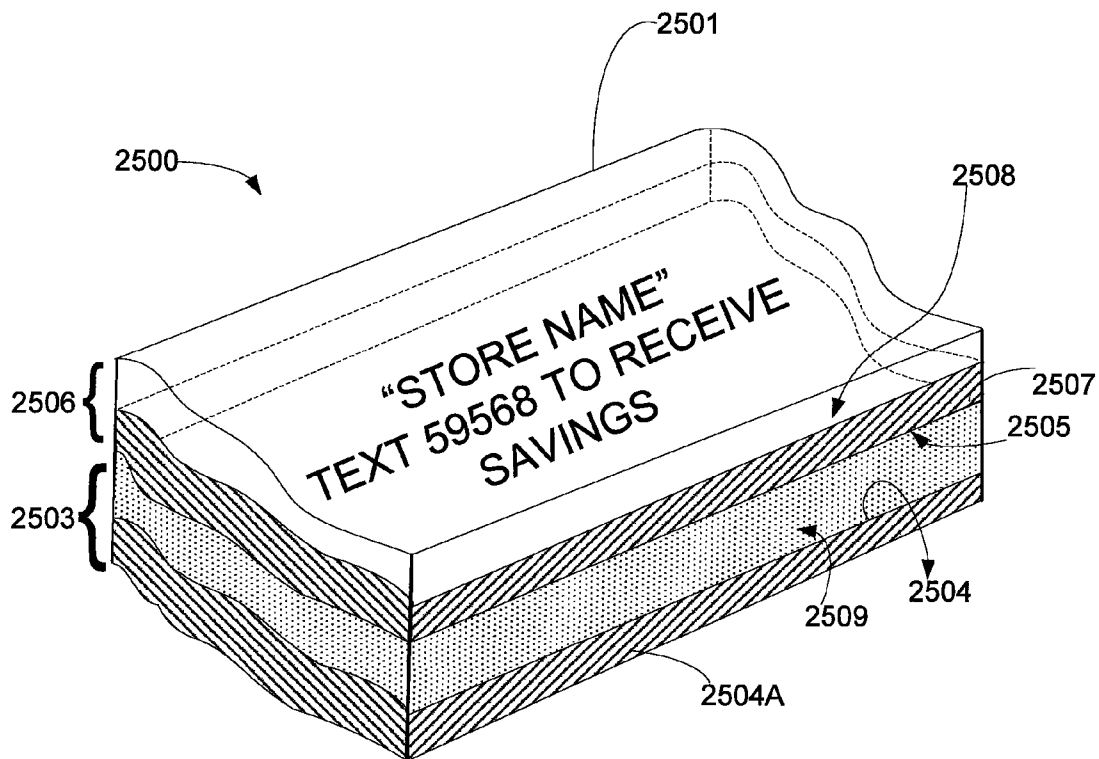
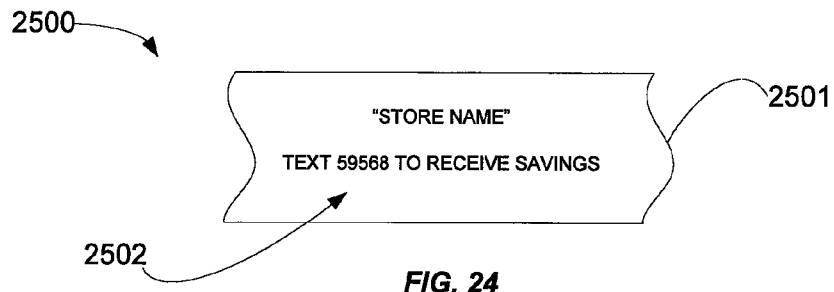


FIG. 23



# COLD CRACK ADDITIVE ON PAVING ADVERTISING AND RELATED METHODS

## RELATED APPLICATIONS

This application claims the benefit of priority to U.S. Provisional Patent Application Ser. No. 60/988,676, filed Nov. 16, 2007, which is incorporated by reference herein. This application is also a continuation-in-part of U.S. patent application Ser. No. 11/186,310 filed Jul. 21, 2005, which is a continuation-in-part of U.S. patent application Ser. No. 10/633,943 filed Aug. 4, 2003, now abandoned both of which are incorporated herein by reference.

## BACKGROUND

Pavement marking was an early method used for directing motor and foot traffic. In the era of brick roads, different colored bricks were used to convey safety information. Later, paint was used; however, early paints had poor durability under the demanding conditions of foot and motorized traffic and the environment. In addition, pavement painting was usually a time consuming and disruptive task. Paint required drying time and traffic had to be kept off the painted surface until drying was complete. Rain, cold and heat adversely affected the drying time and the success of the operation. Once paint was dry and in use, it was often difficult to remove when changes in the traffic pattern were required.

More recently, pavement tapes have been used for marking pavement, for example, to delineate pedestrian crossings and lane markings. Although pavement tapes could be applied more quickly than paint, reducing traffic disruptions, early pavement marking tapes had limited visibility and poor durability under many road conditions. Improved tapes permitted long-term or temporary application and provided skid resistance, low-temperature durability, high-temperature durability and reflectivity.

## SUMMARY

Despite advances in pavement-marking tapes, motorists and pedestrians have been provided with minimal information, such as sidewalk and crosswalk delineation, centerlines and other road markings, at best. On the other hand, Applicant's information-conveying pavement tape may provide, for example, information of a commercial nature, and in a manner that is efficient, effective and safe. "Commercial information", as used herein, may include the following: commercial advertising, for example, advertising of available real-estate, tourist attractions and businesses such as home improvement stores, hardware stores, department stores and other shops, restaurants, bars, beer, liquor, grocery stores, gas stations, hotels, motels, entertainment venues and the like; event advertising, such as advertising for sales, concerts, theater productions, festivals and other events; directional information, for example, maps, compass points, mile markers and directions to area businesses or tourist attractions; tourist information such as interesting area facts, things to do in the area, operating hours of area attractions and the like; solicitations, for example, by community agencies or charitable institutions; and/or public safety information, including information about traffic conditions, road conditions, detour requirements,

turn requirements, the presence of pedestrians, and safety reminders such as "be a designated driver," and the like.

The claims at the end of this specification set forth a full and accurate description of Applicant's information-conveying pavement tape, which may illustratively include one or more of the following embodiments.

In one embodiment, a paving advertisement comprises an elongated flexible tape body having a base substrate layer with front and rear faces, the front face comprising at least one text message that conveys information where the base substrate layer is treated with a cold crack additive for increasing strength and flexibility.

In one embodiment, a method of conveying information from pavement includes treating a base substrate layer of an elongated flexible tape with cold crack additive; printing at least one text message conveying information on a front face; combining an upper substrate layer with the front face of the base substrate layer; and bonding a rear face of the base substrate layer to a section of pavement.

## DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts a top view of a section of a continuous pavement tape.

FIG. 2 depicts a perspective view of the pavement tape of FIG. 1.

FIG. 3A depicts a top view of a section of another continuous pavement tape.

FIG. 3B depicts a top view of a section of another continuous pavement tape.

FIG. 3C depicts a roll of continuous pavement tape.

FIG. 4A depicts a top view of an information bearing pavement tape including a composite advertisement conveying commercial information.

FIG. 4B shows a top view of an information bearing pavement tape including a composite advertisement with light and audio components.

FIG. 4C shows a side view of a continuous pavement tape with audio components.

FIG. 5A shows a continuous pavement tape with reflective glass beads.

FIG. 5B depicts an end view of the pavement tape of FIG. 5A.

FIG. 6 depicts a detailed end view of the pavement tape of FIG. 1 with a protective tape.

FIG. 7A depicts a process of bonding to pavement the composite tape structure of FIG. 6.

FIG. 7B depicts completion of the bonding process of FIG. 7A.

FIG. 8A depicts a process of bonding to the composite tape structure of FIG. 6 to pavement adhesive.

FIG. 8B depicts completion of the bonding process of FIG. 8A.

FIG. 9 depicts removal of the protective tape from the bonded composite tape structure of FIG. 6.

FIG. 10 depicts the composite tape structure of FIG. 6 with a release tape.

FIG. 11 depicts removal of the release tape from the composite tape structure of FIG. 10.

FIG. 12A depicts a section of a standard pedestrian crosswalk.

FIG. 12B depicts a detail of the pedestrian crosswalk of FIG. 12A with pavement tapes bearing commercial information.

3

FIG. 12C depicts a section of pavement in a parking lot with pavement tapes bearing commercial and other information.

FIG. 12D depicts a mid-section of pavement marking tape with protective railings.

FIG. 13 depicts a top view of a section of a continuous perforated pavement tape.

FIG. 14 depicts an end view of the tape section of FIG. 14.

FIG. 15 depicts a perspective view of a composite tape structure including the continuous perforated tape section of FIG. 14.

FIG. 16 depicts the bonding of the composite tape structure of FIG. 16 to a pavement pre-bonded to reflective glass beads.

FIG. 17 depicts a mask tape with a single mask perforation.

FIG. 18 depicts a perforated pavement tape with a single symbol perforation.

FIG. 19 depicts a placement of the FIG. 17 mask tape over the perforated pavement tape of FIG. 18.

FIG. 20 depicts the bonding of a composite form of the mask tape of FIG. 17 to a pre-applied perforated pavement tape of FIG. 18.

FIG. 21 depicts a composite form of the perforated pavement tape of FIG. 16 with a protective coating.

FIG. 22 depicts a top view of the perforated pavement tape of FIG. 18 with a chamfered edge.

FIG. 23 depicts a sectional side view of the perforated pavement tape of FIG. 22.

FIG. 24 depicts a pavement tape comprising a tape body and a text message.

FIG. 25 depicts a perspective view of pavement tape with tape body.

#### DETAILED DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts a top view of a section of a continuous pavement tape 100. An elongated, flexible tape body 101 includes a series of symbols 102 arrayed on the surface of tape body 101. As shown, symbols 102 define the first three letters of the English alphabet; however, it will be understood and appreciated that symbols 102 may be any combination of letters, numbers or other symbols. Symbols 102 may be letters of a language. For example, in an English speaking country, English language symbols may be chosen for a pavement tape 100, whereas Arabic language symbols may be chosen for pavement tape 100 for use in an Arabic-speaking country. As shown in FIG. 1, tape body 101 has parallel sides; however, depending upon the application, tape body 101 may have sides of a variety of shapes, for example, non-parallel sides, matching or unmatched curved sides and configurations having one straight side and one curved side.

Pavement tape 100 may serve as a pavement sign conveying commercial information, based on the letters of a language. For example, pavement tape 100 may serve to convey information to people traversing the pavement, or to motorists. Pavement signs based on the letters of a language may serve a variety of purposes, including delineating parking spaces in a parking lot, advertising and directing consumers to businesses proximate the parking lot, conveying traffic conditions, road conditions, detour requirements, turn requirements and/or the presence of pedestrians. Lettered pavement signs may, for example, delineate parking areas for the disabled or advertise goods or services of local, national or international purveyors. In other contexts, lettered pavement signs may convey solicitations by community agencies or charitable institutions, directions to community landmarks, public safety reminders, such as "know when to say when," "be a designated driver," and the like. When sponsored

4

by a company or business, such signs may also include the name of the sponsor, allowing the sponsoring company, for example, to leverage their charitable support by advertising and associating their company name with the charity.

Pavement tape 100 may convey commercial information of a particular interest to out of town motorists and pedestrians. For example, pavement tape 100 may include symbols 102 that convey information about and/or directions to tourist attractions; restaurants; bars; hotels; coffee shops; grocery stores; gas stations; entertainment venues; and commercial establishments such as home improvement stores, hardware stores, department stores and malls. Symbols 102 may also convey advertisements for area real-estate and/or special events including concerts, plays, sales, and festivals, for example.

FIG. 2 depicts a perspective view of pavement tape 100 with tape body 101. As shown in the embodiment of FIG. 2, tape body 101 includes a base substrate layer 103 having a rear face 104 and a front face 105. In one embodiment, base substrate layer 103 is formed with material that may be printed upon, such as a film. Such a film is for example vinyl film, such as PVC film having a thickness of about 0.003-0.004 inches between front and rear faces 105, 104. In one embodiment, base substrate layer 103 is a glossy, white PVC film label having a thickness of about 0.1 mm and a weight of about 130 g/m<sup>2</sup>; however, alternate colors, weights, thickness and finish may also be used. Base substrate layer 103 may also be a calendared vinyl film, such as a 3.2 mil Ritrama Duramark® calendared vinyl film.

Thus, symbols 102 may be printed upon front face 105 of base substrate layer 103. Symbols 102 may be digitally printed upon front face 105, for example using a solvent-based ink jet printer. For outdoor applications, a long-lasting outdoor ink, for example a Scitex® vision 200 series five year outdoor ink, may be used in combination with a Scitex® printer for printing symbols 102 upon front face 105.

A first adhesive layer 104A is for example a pressure sensitive adhesive that couples with rear face 104. The pressure sensitive adhesive may be a weather- and solvent-resistant acrylic adhesive having the following specifications:

thickness≈0.05 mm;  
basic weight≈130 g/m<sup>2</sup>;  
initial tack≥4;  
holding power≥8;  
solvent retention≤1.5;  
temperature range≈-25° C.-80° C., and  
release force 15 kg/25 mm.

First adhesive layer 104A may alternatively be a 0.005 inch rubber adhesive; Ritrama Duramark® part number 3-8590-10000 (also known as VYW-3.25-M-86-50G) may serve as tape body 101 and adhesive layer 104A, for example.

An upper substrate layer 106 protects front face 105 of base substrate layer 103. Upper substrate layer 106 includes a second adhesive layer 107 at least partially covered by a protective layer 108, for example, a vinyl film. Upper substrate layer 106 is for example a pressure sensitive, weather-resistant acrylic adhesive covered with an 18 mm, 235 g/m<sup>2</sup> vinyl PVC film. The acrylic adhesive layer 107 may thus have the following specifications:

thickness≈0.028 mm;  
basic weight≈28 g/m<sup>2</sup>;  
initial tack≥9;  
holding power≥48 hours;  
temperature range≈-25° C.-50° C.;  
180° C. peel adhesive≈0.005 kg/inch, and  
release force≈0.0045 kg/25 mm.

## 5

A smooth, transparent PVC film having a matte finish may provide for easy viewing of symbols **102** while reducing glare from sunlight, streetlights or headlights, for example.

Protective layer **108** may be a suitable protective material, for example a siliconized paper layer, and adhesive layer **107** may be a suitably strong, weather resistant adhesive. Upper substrate layer **106** is for example a plasticized embossed polyvinyl chloride, poly-acrylic ester based adhesive covered with siliconized paper, such as 7.4 mil vinyl GBC Arctic™ Grain produced by GBC Industrial and Print Finishing Group.

Upper substrate layer **106** joins with base substrate layer **103** at front face **105**. For example, upper substrate layer **106** may be joined with base substrate layer **103** by placing upper substrate layer **106** atop base substrate layer **103** such that second adhesive layer **107** contacts and adheres to front face **105**. The joined substrate layers **106**, **103** may be fixed together, for example, by laminating (e.g., cold laminating) upper substrate layer **106** to base substrate layer **103**.

Upper substrate layer may include a release tape for protecting second adhesive layer **107**. For example, Kraft paper coated with polyethylene (PE) and silicon, such as a 120±6 g/m<sup>2</sup> PE lame paper may be releasably bonded to second adhesive layer **107**. Such a release tape is removed from second adhesive layer **107** prior to placing upper substrate layer **106** atop base substrate layer **103**.

As shown in the perspective view of FIG. 2, tape body **101** is relatively thick, and not necessarily to scale. And there is no requirement for this particular thickness. The thickness of tape body **101** is a matter of design choice, depending on the intended application. The size and orientation of symbols **102** is also a matter of design choice. As shown in FIGS. 1 and 2, symbols **102** of pavement tape **100** are approximately half the width of tape body **101**, and are positioned in a line with the vertical axis of the symbols perpendicular to an edge of tape body **101**. This size, position and orientation of symbols **102** is not a requirement, but rather is application dependent. At one extreme, the symbols may take up close to the entire width of the tape. At the other extreme, the symbols may be as small as permitted by the application. For example, smaller symbols may be required where symbols are stacked on top of one another across the width of the tape. Depending upon the application, the symbols may also vary in height as compared to one another. Furthermore, symbols **102** may vary in position and orientation. For example, there is no requirement that a symbol or symbols be oriented with a vertical axis perpendicular to an edge of tape body **101**. Depending on the application, a symbol may have a broad range of angular orientations relative to one or both edges of tape body **101**. Additionally, symbols may have a broad range of angular orientations relative to one another. For example, the vertical axis of one symbol may be perpendicular to the vertical axis of another symbol.

As illustrated by FIG. 3A, the symbols of pavement tape **100** also may be non-language symbols. FIG. 3A depicts a top view of a section of another continuous pavement tape **101**. The symbols **102** of this pavement tape are fanciful, comprising a star, a snowman and a snowflake. Symbols **102** also could relate to motorist activity or safety. Thus, symbols **102** could be turn arrows, stop indicators, road condition indicators, detour indicators, pedestrian or crosswalk indicators, bicycle lane indicators and/or disabled indicators. Beyond this, symbols **102** may be graphic representations or photographs depicting commercial establishments such as hotels, motels, bars, eating establishments, shopping centers, gas stations and/or other services of interest to motorists, cyclists and/or pedestrians. As used herein, the term "motorist"

## 6

includes operators and passengers of vehicles, including cars, trucks, buses, motorcycles and other known vehicles. Symbols **102** may thus include both language-based symbols to form a composite message and/or advertisement for the motorist, cyclist or pedestrian.

As shown in FIG. 3A, the bases of symbols **102** are disposed along the horizontal axis of tape body **101**. However, as previously noted, symbols **102** may have a broad range of angular orientations relative to one or both edges of tape body **101**. For example, FIG. 3B shows alpha-numeric symbols **102** with their sides oriented along the horizontal axis of tape body **101**, such that a motorist, cyclist or pedestrian approaching tape body **101** and moving in the direction of arrow **90** may easily read symbols **102**. Continuous pavement tape **100** may be made, integrated or provided as a roll **10**, for example as shown in FIG. 3C.

FIG. 4A shows a top view of an embodiment of a pavement tape **100** with symbols **102A-C** forming a composite advertisement conveying commercial information. Symbol **102A** depicts a building, for example, a home improvement center. Symbols **102B** are alpha-numeric symbols conveying information about a clearance sale and directions to the sale. Symbol **102C** is an arrow pointing in the direction of the sale. Such a pavement tape may, for example, be affixed to pavement such that motorists, cyclists and pedestrians may read the composite advertisement as they approach pavement tape **100**. For example, such a pavement tape may be affixed to pavement in a parking lot, in order to advertise a business proximate to the parking lot to motorists driving or parking in the lot. Such a pavement tape may provide directions to the business or a department of the business, for example when the business is a home improvement store or other business including multiple departments.

Pavement tape **100** may be placed at or before an intersection, such that approaching motorists, cyclists and pedestrians may read the composite advertisement while approaching the intersection. Pavement tape **100** may also be placed in the center of an intersection, thus allowing motorists, cyclists and pedestrians the opportunity to read pavement tape **100** while stopped at a traffic light. As shown in FIG. 4, the composite advertisement formed by symbols **102A-C** is oriented along the long, horizontal axis of tape body **101**. However, as shown in FIG. 3A, the composite advertisement may also be oriented along the vertical axis of tape body **101** such that pedestrians approaching a pavement tape placed at a crosswalk are able to easily read the tape. Other orientations of the composite advertisement (e.g., symbols **102A-C**) are within the scope of this disclosure.

Alpha-numeric symbols **102** may be printed onto tape body **101** in a color or colors contrasting with the color or colors of tape body **101**. For example, symbols **102** may be digitally printed onto tape body **101** using a palette of outdoor inks that contrast with the colors of tape body **101**. In a specific example, tape body **101** may be red and black; symbols **102** may be printed in red and white ink upon the black portion or portions of tape body **101**, and printed in black and white ink upon the red portion or portions of tape body **101**.

FIG. 4B shows, in a top view, an information-conveying pavement tape **100** with audio and lighting components. An audio switch **150** (further detailed with respect to FIG. 4C) and one or more connected wires **152** are shown disposed beneath upper substrate layer **106** of tape body **101**. Switch **150** may be connected to a power source (not shown), and may be communicatively connected to a speaker **154**, operable for playing pre-recorded audible information, by wires **152**. Speaker **154** is shown attached to a light post **156**; however, it will be understood and appreciated that speaker



154 may be attached at any convenient location, and that wires 152 may be disposed in, on or underneath tape body 101. Further, wires 152 may not be needed when switch 150 and speaker 154 are in wireless communication, or when switch 150 and speaker 154 are replaced by or utilized with

pressure-activated computer sound chips. Further, it should be apparent that switch 150 may also connect to audio storage and playback circuitry 155, which then also connects to speaker 154 by wires 152. Audio storage and playback circuitry 155 may include a recorder 155A, to record and/or store audible information for playback, and/or a memory (not shown), to store recorded audible information; it may also be digitally programmable. Where amplification of the played audible information is desired, for example at a busy intersection, an amplifier 155B may also be included in circuitry 155. Audio storage and playback circuitry 155 is also shown attached to light post 156; however, as with speaker 154, audio storage and playback circuitry 155 may be positioned at any convenient location (e.g., within tape body 101, such as when circuitry 155 is configured as an ASIC), and may not require wires 152 when in wireless communication with switch 150.

Switch 150 may be pressure-activated, such that pressure applied to switch 150 triggers play of pre-recorded information at speaker 154. In the embodiment of FIG. 4B, the pre-recorded information may be commercial information, such as an advertisement for a home improvement store sale; however, pre-recorded information may also include music, public safety announcements, tourist information, event advertising and/or directional information. Switch 150 may also activate lights 158 disposed within, atop, below or remote from tape body 101.

In one embodiment, lights 158 with tape body 101 are LEDs. As shown in FIG. 4B, lights 158 surround a message composed of symbols 102B. Lights 158 may also form symbols 102A-C, provide a border for tape body 101 and/or be otherwise placed so as to draw attention to part or all of tape body 101.

In an example of operation, a person's footstep upon switch 150 triggers lights 158 and/or play of pre-recorded information relating to one or more of symbols 102A-C, forming a composite audiovisual advertisement. Since one or more lights (e.g., light 158A) may be proximate to tape body 101, such a light 158A may be a streetlight, a light mounted on an adjacent building or structure, and/or one or more lights disposed elsewhere upon a section of pavement. Thus, lights 158 may delineate a crosswalk in a street or parking lot, or a curb. A timer (not shown) may also be incorporated into pavement tape 100 such that lights 158 remain illuminated for a selected time following activation of switch 150. Likewise, lights 158 and/or play of pre-recorded information may be activated by a vehicle upon switch 150, and lights 158 may delineate parking spaces or commercial advertising in a parking lot.

FIG. 4C thus depicts one embodiment of a pavement tape 100 with two electrodes 151A, 151B. Electrodes 151A, 151B are shown disposed between upper substrate layer 106 and base substrate layer 103; however, electrodes 151A, 151B may also be disposed beneath both upper and base substrate layers 106, 103, or atop upper substrate layer 106. Pressure applied to a portion of upper substrate layer 106 over electrode 151A (for example by foot 160) repositions electrodes 151A, 151B in contact (e.g., as a switch 150) and completes a circuit between electrodes 151A, 151B, wires 152 and, for example, lights 158, circuit 155, and/or speaker 154. For example, wires 152A, 152B connect electrodes 151A, 151B to an audio output source, for example speaker 154, and to

audio storage and playback circuitry 155 to complete the circuit. As illustrated, speaker 154 and audio storage and playback circuitry 155 may be remote from pavement tape 100. Optionally, wires 152A, 152B may connect electrodes 151A, 151B to one or more lights 158, as described herein above. Additional wires 152 may be implemented as needed, to connect electrodes 151A, 151B to additional lighting and/or audio components.

In one embodiment, sound may be provided by one or more sound chips including pre-recorded information. As shown in FIG. 4D, sound chip 170 is connected to pressure-activated switch 171. Pressure upon switch 171, for example, by foot 160, initiates play of the pre-recorded information from sound chip 170. Multiple sound chips 170 and switches 171 may be included in one pavement tape, such that a person "plays" a composite advertisement including a variety of pre-recorded information while traversing the pavement tape and activating switches 171. Pressure activated switches 171 may likewise activate lights 158, such that wires 152 are not needed. Switches 171 may include electrodes (e.g., electrodes 151A, 151B of switch 150) that complete a circuit upon contacting one another, thus activating sound chip 170, for example.

Pavement tape 100 may also be wholly or partly reflective. For example, symbols 102 may also be printed, in whole or in part, with a reflective ink, such that at least a portion of a symbol 102 is reflective. Alternately or additionally, at least a portion of base substrate layer 103 or upper substrate layer 106 of tape body 101 may be wholly or partially reflective, thus lending a reflective quality to at least a portion of tape body 101. Pavement tape 100 may also be made reflective by affixing glass beads thereto, for example, by affixing glass beads to the front face of the base substrate layer.

FIG. 5A thus depicts a top view of the pavement tape of FIG. 1 coated with reflective glass beads 109. Glass beads such as beads 109 are widely used for road signs and pavement markings. When automobile lights project upon reflective glass beads, the light is scattered and reflected back to the motorist. This makes it easy to see the beads. Reflective glass beads 109 may be arranged in the form of letters and other symbols to convey traffic information and the like to motorists, and to pedestrians as well.

In FIG. 5A, reflective glass beads 109 are arranged over the entire front surface of tape body 101, except that symbols 102 are not covered. A motorist viewing pavement tape 100 of FIG. 5A under automobile headlights at night will observe a field of light surrounding symbols 102, which would appear dark by contrast.

Reflective glass beads 109 are not required in the pavement tape of FIG. 5A. Reflective paint may be used in place of reflective glass beads 109. Alternately, other materials that contrast with symbols 102 may accomplish the same or a comparable result, especially when pavement tape 100 is viewed in daylight. In daylight applications, reflective glass beads may be replaced by alternative contrast materials such as bright paints and/or plastics impregnated with bright pigments. Such alternative contrast materials may be superior to reflective glass beads in daylight applications. For example, tape body 101 may usefully be coated on its top surface with a bright paint or plastic rather than reflective glass beads 109, or simply be formed of an appropriately bright material. On the other hand, symbols 102 may be formed of glass beads 109 or other alternative contrast material, leaving tape body 101 relatively dark.

There is no requirement that reflective glass beads 109 or other alternative contrast materials be placed over the entire front surface of tape body 101. Reflective glass beads 109

may be placed over a smaller area of tape body **101** if the application so dictates. Other materials may be used in areas where reflective glass beads **109** are not present. For example, a bright paint might be used to create a pavement tape that is useful in both day and night applications, or a different type of reflective glass bead might be used to enhance night performance. Similarly, an abrasive might be used to enhance traction for pedestrians as well as motorists.

FIG. **5B** depicts an end view of the pavement tape of FIG. **5A**. Reflective glass beads **109** are held in place by reflective glass bead adhesive **111A**. This layer of reflective glass bead adhesive **111A** is securely fastened to both tape body **101** and reflective glass beads **109**. A number of techniques, known in the art, may be used to attach reflective glass beads **109** to a substrate (e.g., to tape body **101**).

FIG. **6** depicts an end view of the pavement tape of FIG. **1** bonded to a protective tape **110**. In particular, protective tape **110** is bonded to pavement tape **100** by adhesive **110A**. Protective tape **110** may be made from a common tape material. In one embodiment, protective tape adhesive **110A** is a low-tack PSA adhesive that bonds weakly to tape body **101** but more strongly to protective tape **110**, allowing protective tape **110** to be removed from the surface of tape body **101** while taking protective tape adhesive **110A** with it. This leaves a clean top surface of tape body **101**. Any one of a number of other adhesives may serve effectively as protective tape adhesive **110A**. In some applications, protective tape adhesive **110A** may be done away with altogether and the necessary release properties incorporated into the bottom surface of protective tape **110**.

FIG. **7A** depicts the composite tape structure of FIG. **6** being lowered onto an area of pavement **112**. Pavement **112** may comprise any one of a wide variety of pavement materials, including bricks, concrete-based compositions, tar-based compositions and rubber-based compositions. Protective tape **110** serves to protect the top surface of tape body **101** from abrasion, denting, burning and injury of other kinds before the pavement tape **100** is installed on pavement **112**. Protective tape **110** may also prevent injury during installation and serve to keep tape body **101** flat and aligned during storage and installation.

The composite tape structure of FIG. **6** is positioned over pavement **112**. The exact placement of the composite structure may be determined and achieved, and the composite tape structure lowered so that first adhesive face **104A** of base substrate layer **103** contacts pavement **112**.

FIG. **7B** depicts the completion of the installation process of FIG. **7A**. The composite tape structure is pressed to pavement **112** until the bond between the composite tape structure (i.e., of FIG. **6**) and pavement **112** (i.e., the bond between rear face **104** and pavement **112**) has met the specifications of the particular application. Pressing, as used in connection with the bonding of the composite tape structure to pavement **112**, signifies applying downward pressure, for example, manually or with a machine, by rolling, brushing with a broom, stamping, walking upon, driving upon and/or other manners of applying downward pressure. The amount and duration of bonding pressure are functions, among other things, of the type of adhesive **104A** used, the composition of tape body **101**, the composition and surface condition of pavement **112**, and the ambient conditions at the time of application.

Although first adhesive layer **104A** may serve to adhere the composite tape to pavement **112**, a bed of pavement adhesive may be utilized (and in such case, first adhesive layer **104A** may be omitted). FIG. **8A** accordingly shows the composite tape structure of FIG. **6**, minus first adhesive layer **104A**, being lowered onto a bed of pavement adhesive **113A**. This

pavement adhesive **113A** may be any one of a number of types of adhesive. Generally speaking, it will be high tack with a high cure strength and low creep, although these and other characteristics will vary with the application.

The composite tape structure is positioned over pavement adhesive **113A** on pavement **112** and the exact placement of the composite tape structure is determined and achieved. The composite tape structure is then lowered so that the bottom of tape body **101** contacts pavement adhesive **113A**, e.g., so that rear face **104** of base substrate layer **103** contacts pavement adhesive **113A**.

FIG. **8B** depicts the completion of the installation process of FIG. **8A**. The composite tape structure is pressed to pavement **112** until the bond between the composite tape structure and pavement **112** (i.e., the bond between rear face **104** and pavement adhesive **113A**) has met the specifications of the particular application. Pressing, as used in connection with the bonding of the composite tape structure to pavement **112**, signifies applying downward pressure, for example, manually or with a machine, by rolling, brushing with a broom, stamping, walking upon, driving upon and/or other manners of applying downward pressure. The amount and duration of bonding pressure are functions, among other things, of the type of adhesive used, the composition of tape body **101**, the composition and surface condition of pavement **112**, and the ambient conditions at the time of application.

FIG. **9** depicts removal of protective tape **110**, with protective tape adhesive **110A**, from the composite tape structure of FIG. **8B**. Protective tape **110**, with protective tape adhesive **110A**, is lifted from one exposed edge of tape body **101** and peeled from the surface of tape body **101**, leaving it clean and ready for use. Protective tape **110** may be reused, recycled or discarded. FIG. **9** shows removal of protective tape **110** from a composite tape structure bonded to pavement adhesive **113A**; however, removal of protective tape **110** may likewise be achieved with a composite tape structure with first adhesive layer **104A** that is adhered directly to pavement **112**, as in FIG. **7B**.

FIG. **10** depicts the composite tape structure of FIG. **6** with a releasably bonded release tape **114**, including a release layer **115**, used to protect adhesive layer **104A**. First adhesive layer **104A** at the bottom of the composite tape may be susceptible to abrasion, denting, burning and injury of other kinds. For example, dirt or dust may impair the effectiveness of first adhesive layer **104A**.

Release tape **114** and release layer **115** protect first adhesive layer **104A**. Release layer **115** may be a low-tack PSA adhesive that bonds weakly to first adhesive layer **104A** but provides a stronger bond to release tape **114**; however, a number of other adhesives may serve effectively as release layer **115**. In some applications, release layer **115** may be done away with altogether and the necessary release properties incorporated into the surface of release tape **114**. For example, in one embodiment, release tape **114** is a wood free paper (e.g., Kraft paper) coated with polyethylene and silicon, for example, a PE lame release paper having a thickness of about 0.125 mm and a basic weight of about 120 g/m<sup>2</sup>. Polyethylene and silicon coatings may provide a releasable bond with first adhesive layer **104A**, such that release tape **114** may be easily peeled or otherwise removed. Release tape **114** may be used independently of pavement adhesive **113A**, such that adhesive layer **104A** alone bonds tape **100** to pavement **112**.

FIG. **11** depicts removal of release tape **114** and release layer **115** from the composite tape structure of FIG. **10**. It is understood that, where first adhesive layer **104A** is omitted (for example, when employing pavement adhesive **113A**),

## 11

release tape and layer 114, 115 may provide protection for rear face 104. Prior to bonding to pavement 112 (or pavement adhesive 113A), release tape 114 and release layer 115 are peeled from first adhesive layer 104A (or rear face 104 when adhesive layer 104A is not present), exposing it for bonding to pavement 112 (or pavement adhesive 113A). Removal of release tape 114 and release layer 115 may be delayed until the composite tape structure of FIG. 10 is at its desired location over pavement 112. This avoids the difficulties that may result from attempting to place a tape coated with a strong, active adhesive (e.g., first adhesive layer 104A). These difficulties include misplacements, wrinkled placements or incorporation of dirt into the adhesive surface, which may diminish or ruin its effectiveness.

FIG. 12A depicts a section of a standard pedestrian crosswalk approximately 30 feet wide. Pavement 121 is bounded by curbs 117. Centerline 122 is defined by centerline markers 120. Pedestrian crosswalk 123 is defined by first crosswalk band 118 and second crosswalk band 119. Sidewalks 116 and 116A terminate at the ends of pedestrian crosswalk 123. All pavement markers are painted in white.

FIG. 12B depicts a detail of the pedestrian crosswalk of FIG. 13A. The painted pavement markers 118, 119 and 120 have been replaced with pavement tapes 118A, 119A and 120A, each of which bears commercial information. In particular, each of the tapes directs the onlooker to a hotel. The tapes may be white with black lettering (among a variety of color options), and may be about 6 to about 12 inches wide and bonded to pavement 121.

The lettering on first crosswalk tape 118A is oriented to face a pedestrian passing through the crosswalk 123, in either direction. The same is true of the lettering on crosswalk tape 119A. The lettering on centerline tape 120A has been oriented so that it is upright to a pedestrian passing from sidewalk 116 through the crosswalk 123, but inverted to a pedestrian passing through the crosswalk in the opposite direction. Were the lettering on centerline tape 120A oriented so as to appear inverted to a pedestrian passing from sidewalk 116 through the crosswalk 123, it would appear upright to a motorist stopped at crosswalk 123.

FIG. 12C depicts a section of pavement in a parking lot 136 with pavement tapes delineating parking spaces and bearing commercial and other information. Parking lot 136 may be an indoor parking structure or pedestrian walkway with limited lighting. Commercial information appears on parking tape segments 124, 125, 126, 127, 128 and on centerline tape 124A. Parking tape segments 124, 125 and 126 refer generically to "TOYS" without identifying a source but rather identifying "AISLE 2" as a location for the toys. This information appears upright to a motorist parking in one of parking spaces 125A, 125B, but inverted to someone riding in the passenger seat. The lettering of the information may be reversed so that it is inverted to the motorist but upright to the passenger.

Parking tape segments 127 and 128 refer generically to "FOOD" and, with an arrow, specify a general direction in which the food, for example a collection of fast-food establishments, may be found. The letters of parking tape segments 127 and 128 may be inverted as discussed above. Parking tapes 129 through 133 relate to services. Tapes 132 and 133 include an arrow pointing out the general direction of "RESTROOMS", while tapes 129 through 131 identify the location of "EMERGENCY" services at a specific location "B5", which may for example be a floor and sector identifier. Here again, the letters of parking tape segments 127-131 may be inverted as discussed above.

Centerline tape 124A sets forth commercial information, for example, indicating the general direction of "XYZ

## 12

DRUG" and "ACME GAS" with opposing "up" and "down" arrows, respectively. These messages are upright to a motorist and passenger parking on the left side of centerline tape 124A but inverted to a motorist parking on the right side. The letters may be inverted to reverse the situation, or only one message may be inverted so that left-side motorists see, for example, "XYZ DRUG" upright and "ACME GAS" inverted. Right hand motorists, of course, would see the opposite. Alternately, each message may be displayed for both the left-side and right-side motorists. For example, each message may be displayed as a mirror image.

The tapes of FIG. 12C may be of any size and shape consistent the needs of a parking lot. The thicknesses and colors of the tapes and letters are limited only by the dictates of the application. Glass beads and other reflective materials may be used, again depending on the dictates of the application.

FIG. 12D depicts a mid-sectional view in perspective of pavement tape 100 with railings 140A, 140B. For ease of illustration, features of pavement tape 100 shown in FIGS. 1-13 are omitted from FIG. 13D. As shown, railings 140A, 140B provide protection such that pavement tape 100 lies in a protective recess between railings 140A, 140B; however, railings 140A, 140B may be greater, less than, or equal to the height of pavement tape 100, as a matter of design choice depending on the application. Railings 140A, 140B may provide protection from traffic or weather damage. Railings 140A, 140B may be built-in to pavement tape 100 or they may be separate structures placed along one or more edges of pavement tape 100. The composition of railings 140A, 140B may include, illustratively, plastic, cement, Styrofoam® or other suitable material.

FIG. 13 depicts a top view of a section of a continuous perforated pavement tape 200. This tape comprises a tape body 201 and a series of symbol perforations 202 through the tape body. The symbol perforations 202 define a series of symbols. In particular, the perforations define the letters "O" and "P" of the English alphabet.

FIG. 14 depicts an end view of the perforated pavement tape of FIG. 13. Dotted line 203 represents the top boundary of symbol perforations 202 and dotted line 204 represents the bottom boundary of symbol perforations 202. This view shows the projection of symbol perforations 202 through the entirety of perforated pavement tape 200; however, this depth of perforation is not required. Tape body 201 is relatively thick. As noted previously, there is no requirement for any particular thickness. The thickness of tape body 201 is a matter of design choice depending on the application. In one embodiment, tape body 201 serves as upper substrate layer 106, and includes adhesive face 107 and protective layer 108, described in detail with respect to FIGS. 2-13. Tape body 201 may also include both upper and base substrate layers and their respective faces and adhesive layers.

FIG. 15 depicts a perspective view of a perforated pavement tape 200 including tape body 201, upper substrate layer 206 and a base substrate layer 103. Symbol perforations 202 convey the first three letters of the English language. This view shows the projection of symbol perforations 202 extending through upper substrate layer 206. Dotted lines 202A represent symbol perforations 202 where they terminate in reverse projection at second adhesive layer 207. Symbol perforations 202, as shown, expose front face 105 of base substrate layer 103. Base substrate layer 103 may be a different color than upper substrate layer 206. Base substrate layer 103 may also have different reflective properties from or be made of a different material than upper substrate layer 206, thus providing contrast between symbol perforations 202 and the

## 13

unperforated portions of tape body **201**. Optionally, symbol perforations **202** may extend through upper substrate layer **206** and partially or wholly through base substrate layer **103**, for example, to expose pavement **112**. It is not necessary, however, that symbol perforations **202** extend all the way through tape body **201**, particularly where it is made of a clear material. Nor is it necessary that symbol perforations **202** have the same size at the front and back of tape body **201**.

FIG. **16** depicts the application of a composite tape structure like that of FIG. **6** but constructed using a perforated pavement tape as discussed in connection with FIGS. **13-15**. The composite tape structure is being bonded to pavement **112**, which itself has been pre-bonded to reflective glass beads **109**. More particularly, the structure is being lowered for bonding to the layer of reflective glass beads **109** and subsequent removal of protective tape **110** and protective tape adhesive **110A**. A motorist viewing the perforated pavement tape of FIG. **16** at night under automobile headlights (or a pedestrian with a flashlight) would observe a field of darkness surrounding symbol perforations **202**, which would appear brightly lit by the underlying reflective glass beads **109**, the opposite of the effect created by the pavement tape of FIGS. **5A-B**. As shown in FIG. **16**, symbol perforations **202** extend completely through substrate layer **206** and through base substrate layer **103**. However, symbol perforations **202** may also extend only through upper substrate layer **206**, where base substrate layer **103** is a translucent or transparent material that allows the transmission of light to and from underlying glass beads **109**. Such an application may beneficially protect glass beads **109** from traffic or weather damage.

FIG. **17** depicts a top view of a mask tape **213** comprising a mask tape body **212** and a single star-shaped mask perforation **211**. The mask perforation need not be a symbol. FIG. **18** depicts a top view of a perforated pavement tape **200** comprising a tape body **201** and a single circular symbol perforation **202A**. FIG. **19** depicts the result obtained when mask tape **213** is positioned over perforated pavement tape **200**. It is to be understood and appreciated that mask tape **213** may function as upper substrate layer **206**, and perforated pavement tape **201** may serve as a base substrate layer **103** (as in FIG. **16**). Alternately, mask tape **213** may be a separate tape utilized with a perforated pavement tape **201** which includes upper and base substrate layers **206**, **103**, along with their respective faces and adhesive layers.

The only part of tape body **201** that is visible through mask perforation **211** is the portion of tape body **201** surrounding and bearing the circular symbol perforation **202A**. If mask tape body **212** is black, and if tape body **201** is embedded on its top surface with reflective glass beads backed with black pavement, the visual result at night to a motorist using headlights or a pedestrian with a flashlight will be a shining star with a black center. Alternately, as described herein above, glass beads **109** may be disposed on the surface of pavement **112**, beneath a base substrate layer **103** (not shown) of perforated pavement tape **200**. Circular symbol perforation **202A** may extend through tape body **201** and base substrate **103**, or through tape body **201** where base substrate **103** is made of a light-transmissive material, to convey the effect of a shining center.

Composite images of this type may take many forms. They may be built from two layers of tape or from many layers. The component tapes may be a spectrum of colors and textures, including transparent components. Transparent components may provide actual visual depth and provide a viewer with a three-dimensional image. Holographic or other components may simulate visual depth and provide a viewer with an illusion of a three-dimensional image. Upper perforations

## 14

need not surround lower perforations in their entirety, but rather surround only portions of lower perforations. Designer choices govern these selections.

FIG. **20** depicts a side view of the creation of a two-color composite perforated pavement tape using the mask tape **213** of FIG. **17** and the perforated pavement tape **200** of FIG. **18**. Here, tape body **201** is colored red and is bonded to pavement **112**, which is black. Circular symbol perforation **202** has boundaries **203** and **204**.

Mask tape **213** has a green mask tape body **212**. The top surface **212A** of the body is bonded to a protective tape **110** by a protective tape adhesive **110A**. Its bottom surface **212B** is coated with an adhesive of the same type used to bond perforated pavement tape **200** to pavement **112** (e.g., as used in first adhesive layer **104A**) although this is not a requirement. Mask tape **213** is perforated by mask perforation **211** with boundaries **214** and **215**, which exceed boundaries **203** and **204** of perforated pavement tape **200** at all points, as depicted in FIG. **19**.

When mask tape **213** is bonded to perforated pavement tape **200** so that mask perforation **211** is aligned directly above symbol perforation **202**, as illustrated in FIG. **19**, a viewer will observe the green surface of mask tape body **212** interrupted by the star-shaped mask perforation **211**. Behind mask perforation **211**, the viewer will observe the smaller, circular symbol perforation **202** of perforated pavement tape **200**. That symbol will be as black as the pavement beneath it and surrounded by the red of tape body **201** up to the boundaries imposed by mask perforation **211** of mask tape body **212**. The visual result will be a red star with a black center in a green backdrop.

It is to be understood and appreciated that alternate configurations of perforated pavement tape **200** and mask tape **213** may also be implemented. For example, base substrate layer **103** (e.g., FIG. **6**) may be a perforated pavement tape and upper substrate layer **106** may be a mask tape.

FIG. **21** depicts the composite tape of FIG. **16**, with a layer of reflective glass beads **109** and without protective tape and protective tape adhesive **110**, **110A**. In the embodiment of FIG. **21**, the layer of reflective glass beads **109** is covered with a protective coating **216**. A protective coating is often useful for protecting the perforated pavement tapes and composite structures discussed above, whether or not they are covered with reflective glass beads.

FIG. **22** depicts a perforated pavement tape **200** comprising a tape body **201** and a symbol perforation **217**. The symbol perforation **217** is circular and its upper edge **218** has been chamfered. FIG. **23** depicts a side-view section of the perforated pavement tape of FIG. **22**. Chamfering may in some circumstances serve to preserve the life of perforated pavement tape **200** by avoiding sudden or catastrophic failure of symbol perforation edges. This is a design choice, however, not a requirement.

FIG. **24** depicts a pavement tape **2500** that includes a tape body **2501** and a text message **2502**. FIG. **25** depicts a perspective view of pavement tape **2500** with tape body **2501**. Pavement tape **2500** includes tape body **2501** with a base substrate layer **2503** having a rear face **2504** and a front face **2505**. As disclosed above, base substrate layer **2503** may be formed with a film such as a PVC film. Under extreme weather (e.g., too hot or too cold), however, the film can crack. To improve durability and flexibility, the film is treated with a cold crack additive **2509**. Cold crack additive **2509** is illustratively shown in FIG. **25** as dots, for purposes of illustration. Cold crack additive **2509** includes an impact resistance agent and a weather resistance agent. Such agents may

15

be polyvinyl chloride resin, di-isonyl phthalate, dioctyl adipate, a stability agent, and/or variations thereof.

Text message **2502** may be printed upon front face **2505** of base substrate layer **2503**. Text message **2502** may be digitally printed upon front face **2505**. For outdoor applications, a long-lasting outdoor ink may be used for printing text message **2502** upon front face **2505**. Text message **2502** prompts the consumers to interact directly with the advertiser such as to retrieve a message or a discount, for example.

First adhesive layer **2504A**, applied to the rear face **2504**, may be a pressure sensitive adhesive. The pressure sensitive adhesive may be a weather- and solvent-resistant acrylic adhesive having similar specifications to those described above. In one embodiment, first adhesive layer **2504A** may be a rubber adhesive that serves as both tape body **2501** and adhesive layer **2504A** at the same time.

An upper substrate layer **2506**, including a second adhesive layer **2507**, protects front face **2505** of base substrate layer **2503**. Upper substrate layer **2506** is, for example, a pressure sensitive, weather-resistant acrylic adhesive covered with an 18 mm, 235 g/m<sup>2</sup> vinyl PVC film. The acrylic adhesive layer **2507** may thus have similar specifications as to those adhesive layers described above. A smooth, transparent PVC film having a matte finish may provide be added to for easy viewing of text message **2502**, while reducing glare from sunlight, streetlights, or headlights, for example. Protective layer **2508**, partially covering the upper substrate layer **2506**, may be a suitable protective material, such as a siliconized paper layer, and adhesive layer **2507** may be a suitably strong, weather resistant adhesive.

Upper substrate layer **2506** joins with base substrate layer **2503** at front face **2505**. For example, upper substrate layer **2506** may be joined with base substrate layer **2503** by placing upper substrate layer **2506** atop base substrate layer **2503** such that second adhesive layer **2507** contacts and adheres to front face **2505**. The joined substrate layers **2503**, **2506** may also be fixed together, for example, by laminating (e.g., cold laminating) upper substrate layer **2506** to base substrate layer **2503**.

The various tape and pavement configurations described in the detailed description set forth are not intended to limit the scope of this application. Changes may be made in the information bearing pavement tape described herein without departing from the scope thereof. The matter contained in the above description or shown in the accompanying drawings should be interpreted as illustrative, and not in a limiting sense. The following claims are intended to cover all generic and specific features described herein, as well as all statements of the scope of the present system and methods, which, as a matter of language, might be said to fall therebetween.

I claim:

1. A method of conveying information from a section of pavement, comprising:

applying at least one message conveying the information to a front face of a base substrate layer comprising a cold crack agent, wherein a rear face of the base substrate layer is bonded to a front face of a pressure-sensitive adhesive layer, and wherein a releasable liner is bonded to a rear face of the pressure-sensitive adhesive layer;

affixing an upper substrate layer to at least a portion of the front face of the base substrate layer, wherein the upper substrate layer comprises a protective tape on a front face of the upper substrate layer;

removing the liner to expose the rear face of the pressure-sensitive adhesive layer;

bonding the rear face of the pressure-sensitive adhesive layer to a surface of the section of pavement; and

16

removing the protective tape after bonding the rear face of the pressure-sensitive adhesive layer to the surface of the section of pavement,

wherein the cold crack agent comprises polyvinyl chloride resin,

wherein a thickness of the base substrate layer has a range of about 0.003 inches to 0.004 inches;

wherein a thickness of the pressure-sensitive adhesive layer has a range of about 0.002 inches to 0.005 inches; and

wherein the upper substrate layer is a clear film having a thickness of about 0.001 inches to 0.007 inches.

2. The method of claim 1, wherein the surface of the section of pavement is a portion of a parking lot comprising asphalt.

3. The method of claim 1, wherein the step of applying the at least one message comprises digitally printing at least a portion of the at least one message on the front face of the base substrate layer.

4. The method of claim 1, wherein the upper substrate layer is a clear polyvinyl chloride film, and

wherein the step of affixing the upper substrate layer to at least the portion of the front face of the base substrate layer comprises adhering the clear polyvinyl chloride film to the front face of the base substrate layer.

5. The method of claim 1, wherein the step of affixing the upper substrate to at least the portion of the front face of the base substrate layer comprises laminating the upper substrate layer to the front face of the base substrate layer.

6. The method of claim 1, wherein the step of bonding the rear face of the pressure-sensitive adhesive layer to the surface of the section of pavement comprises:

applying pressure to the front face of the upper substrate layer.

7. The method of claim 1, wherein the surface of the section of pavement comprises a pavement adhesive tape affixed thereto, and

wherein the step of bonding the rear face of the pressure-sensitive adhesive layer to the surface of the section of pavement comprises bonding the rear face of the pressure-sensitive adhesive layer to the pavement adhesive tape.

8. The method of claim 1, wherein the message comprises at least one symbol perforation extending through the upper substrate layer, the base substrate layer and the pressure-sensitive adhesive layer.

9. The method of claim 1, wherein the upper substrate layer is a mask layer having at least one mask perforation, wherein the base substrate layer comprises at least one perforation, and

wherein the step of affixing the upper substrate layer to at least the portion of the front face of the base substrate layer comprises positioning a portion of the at least one mask perforation over a portion of the at least one perforation of the base substrate layer, and

wherein the portion of the at least one mask perforation and the portion of the at least one perforation of the base substrate layer form a symbol perforation extending through the upper substrate layer, the base substrate layer and the pressure-sensitive adhesive layer.

10. A method of conveying information from a section of pavement, comprising:

applying at least one message conveying the information to a front face of a base substrate layer comprising a cold crack agent, wherein a rear face of the base substrate layer is bonded to a front face of a pressure-sensitive adhesive layer, and wherein a releasable liner is bonded to a rear face of the pressure-sensitive adhesive layer;

17

affixing an upper substrate layer to at least a portion of the front face of the base substrate layer, wherein the upper substrate layer comprises a protective tape on a front face of the upper substrate layer;  
 removing the liner to expose the rear face of the pressure-sensitive adhesive layer;  
 attaching a railing to an edge of the base substrate layer and an edge of the upper substrate layer;  
 bonding the rear face of the pressure-sensitive adhesive layer to a surface of the section of pavement; and  
 removing the protective tape after bonding the rear face of the pressure-sensitive adhesive layer to the surface of the section of pavement,  
 wherein the railing is attached to the edge of the base substrate layer and the edge of the upper substrate layer prior to bonding the rear face of the pressure-sensitive adhesive layer to the surface of the section of pavement;  
 wherein the cold crack agent comprises polyvinyl chloride resin;  
 wherein a thickness of the base substrate layer has a range of about 0.003 inches to 0.004 inches;  
 wherein a thickness of the pressure-sensitive adhesive layer has a range of about 0.002 inches to 0.005 inches;  
 and

18

wherein the upper substrate layer is a clear film having a thickness of about 0.001 inches to 0.007 inches.

**11.** A method of conveying information comprising:

forming a symbol in a base substrate layer, wherein the base substrate layer is a film comprising polyvinyl chloride and having a thickness of about 3 to 4 mils, and wherein a rear face of the base substrate layer includes a coating of a pressure-sensitive adhesive comprising rubber and acrylic and having a thickness of about 2 to 5 mils;

laminating an upper substrate layer to a front face of the base substrate layer to form a pavement tape, wherein the upper substrate layer comprises a protective tape on a front face of the upper substrate layer, and wherein the upper substrate layer is a clear polyvinyl chloride film covering at least a portion of the symbol and having a thickness of about 1 to 7 mils;

adhering the pavement tape to a section of pavement; and removing the protective tape after adhering the pavement tape to the section of pavement.

**12.** The method of claim **11**, wherein the pavement tape comprises at least one symbol perforation extending there-through.

\* \* \* \* \*