

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
8 November 2007 (08.11.2007)

PCT

(10) International Publication Number
WO 2007/127685 A1

(51) International Patent Classification:
H01B 7/36 (2006.01)

(21) International Application Number:
PCT/US2007/067170

(22) International Filing Date: 23 April 2007 (23.04.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/379,927 24 April 2006 (24.04.2006) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

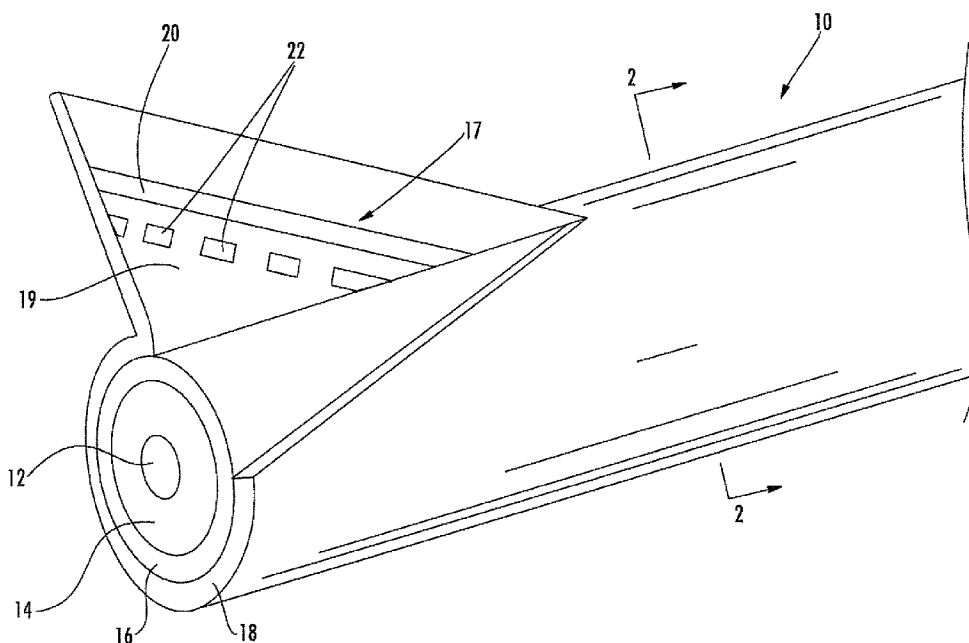
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

Published:

— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: CABLE HAVING INTERNAL IDENTIFYING INDICIA AND ASSOCIATED METHODS



(57) Abstract: A cable for ensuring the authenticity thereof and discouraging the unauthorized counterfeiting of the cable may include a cable core and an opaque outer jacket surrounding the cable core. The jacket may include identifying indicia visible on an inner surface of the opaque outer jacket when opened, but visually obscured from viewing from outside the opaque outer jacket when unopened. The indicia may be integrally molded plastic stripes, for example.

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CABLE HAVING INTERNAL IDENTIFYING INDICIA AND ASSOCIATED METHODS

Field of the Invention

[0001] The present invention relates to the field of cables, and, more particularly, to cables having identifying indicia and associated methods.

Background of the Invention

[0002] A manufacturer of electrical or optical cable may rely on consumer association with the manufacturer's name to secure future sales. The consumer may similarly rely on association with a particular manufacturer's cable to meet a desired level of performance. If a particular manufacturer's cable is counterfeited and sold, it not only results in lost sales, but such may tarnish the manufacturer's name and future sales.

[0003] Several techniques have been used to assist consumers in verifying a particular manufacturer as the source of a cable, such as including the manufacturer's name on the cable reel or on the outside of the outer cable jacket, for example. Unfortunately, one drawback of such verification techniques is their visible placement may result in easy counterfeiting.

[0004] In addition to techniques for verifying a cable manufacturer, several techniques have been disclosed for visually distinguishing cables from one another and identifying particular cable component ends for their respective connection at an appropriate termination point. For example, U.S. Published Patent Application No. 2002/0164133 to Rattazzi et al. discloses a method for color coding optical fibers, and buffer tubes containing a plurality of optical fibers. The color coding approach assigns a particular color code to the outer coating and inner coating of a buffer tube outer jacket; the outside coating, middle cross section, and inside coating of the buffer tube; and the coatings of the fibers through the buffer tube. By assigning multiple color codes to each cable component, a greater number of cables can be distinguished from one another.

[0005] Another example of a color coding approach for visually distinguishing cables is disclosed in U.S. Patent No. 6,727,433 to Tsai including a cable having one or more conductors around which one or more color windings are uniformly wound and secured to the conductors by heating. A transparent plastic covering formed on the winding by extrusion molding permits viewing of the color windings from outside the cable.

[0006] Further, another similar example of a color coding approach for identification of cables is disclosed in U.S. Published Patent Application No. 2005/0252676 to McMillan including a cable containing a core within a jacket, and with the core including twisted pairs of insulated conductors. The insulated coverings of the twisted pairs of conductors include a coloring scheme with the respective conductors in the twisted pair having a substantially solid dark and lighter shade of the same color on their respective insulations.

[0007] Although these color coding systems provide a system for distinguishing cables and/or components thereof, they do not attempt to ensure the authenticity of a cable or discourage the unauthorized counterfeiting of cables. Accordingly, there is a need to develop a cable structure and methods to facilitate the authentication of a cable.

Summary of the Invention

[0008] In view of the foregoing background, it is therefore an object of the present invention to provide a cable and associated methods for ensuring the authenticity thereof and discouraging the unauthorized counterfeiting of the cable.

[0009] This and other objects, features, and advantages of the present invention are provided by a cable comprising a cable core and an opaque outer jacket surrounding the cable core, with identifying indicia visible on an inner surface of the opaque outer jacket when opened, but visually obscured from viewing from outside the opaque outer jacket when unopened. The identifying indicia on the inner surface of the opaque outer jacket may comprise color-coded indicia, for example.

[0010] The opaque outer jacket may comprise a plastic, and the identifying indicia may comprise at least one integrally molded plastic portion with the

opaque outer jacket and having a different color than a color of the opaque outer jacket. The at least one integrally molded plastic portion may comprise different colored stripes, for example. Some of the different colored stripes may be continuous or discontinuous. Some of the different colored stripes may be arranged in a side-by-side or circumferentially spaced apart relation.

[0011] The cable core may include optical components and/or electrical components. For example, the cable may be a coaxial drop cable wherein the cable core may comprise an inner conductor, a dielectric layer surrounding the inner conductor, and an outer conductor surrounding the dielectric layer.

[0012] A method aspect of the present invention is for making such a cable. The method may comprise forming a cable core, forming an opaque outer jacket surrounding the cable core, and forming identifying indicia visible on an inner surface of the opaque outer jacket when opened, but visually obscured from viewing from outside the opaque outer jacket when unopened. The method may further comprise making a record of the identifying indicia used in the cable separately available for access by a cable user to determine cable authenticity.

Brief Description of the Drawings

[0013] FIG. 1 is a perspective view of an end of a coaxial cable according to the present invention.

[0014] FIG. 2 is a cross-sectional view taken along line 2-2 of FIG. 1.

[0015] FIG. 3 is a transverse partial cross-sectional view of an optical cable according to the present invention.

[0016] FIG. 4 is a transverse partial cross-sectional view of a twisted pair cable according to the present invention.

[0017] FIG. 5 is a schematic diagram of an apparatus for making the cable according to the present invention.

[0018] FIG. 6 is a flow chart of a method of making a cable according to the present invention.

Detailed Description of the Preferred Embodiments

[0019] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the

invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

[0020] Referring to FIGS. 1-2, a cable **10** in accordance with the present invention is now described. The cable **10** illustratively takes the form of a coaxial cable **10** where the cable core **11** includes an inner conductor **12**, a dielectric layer **14** surrounding the inner conductor, and an outer conductor **16** surrounding the dielectric layer. An opaque outer jacket **18** surrounds the cable core **11** of the coaxial cable **10**.

[0021] Identifying indicia **17** is visible on an inner surface **19** of the opaque outer jacket **18** when the opaque outer jacket is opened (FIG. 1). However, the identifying indicia **17** are visually obscured from viewing from outside the opaque outer jacket **18** when the opaque outer jacket is unopened as will be appreciated by those skilled in the art. The opaque outer jacket **18** may be opened by cutting or slicing the opaque outer jacket in a longitudinal direction along the cable **10**, for example, and peeling back the opaque outer jacket, thus revealing the inner surface **19** and exposing the identifying indicia **17**.

[0022] The identifying indicia **17** on the inner surface of the opaque outer jacket **18** may include color-coded identifying indicia. Such color-coded identifying indicia **17** may include one or more color(s) and/or color shade(s) of a particular color and associated with an alpha-numeric code. The alpha-numeric code may relate to a manufacturer cable model and lot number, for example. The identifying indicia color code and the associated alpha-numeric code may be made available to the cable user to determine cable authenticity. The color codes and associated alpha-numeric codes may undergo periodic modification so as to further discourage the counterfeiting of cables.

[0023] The opaque outer jacket **18** may include a plastic material and the identifying indicia **17** may include a plurality of integrally molded plastic portions with the opaque outer jacket, each having a different color than a color of the

opaque outer jacket. The integrally molded plastic portions may be molded onto the inner surface **19** of the opaque outer jacket **18** by extrusion, as discussed below, or any method appreciated by one of skill in the art. The plurality of integrally molded plastic portions may include different colored stripes, such as the continuous strip **20** and the discontinuous stripe **22** as in illustrated cable **10**.

[0024] The identifying indicia **17** may be other than the illustrated integrally molded plastic stripes **20**, **22**. For example, the indicia may be a visible ink, or indicia with an emission spectrum in the infrared or ultraviolet regions and visible with optical aids, or any other identifying indicia known to one of skill in the art.

[0025] The cable may also take the form of an optical cable **50**, as illustrated in FIG. 3, comprising a core **51** including a central strength member **52** with adjacent buffer tubes **54** for containing a plurality of fibers **56**. The opaque outer jacket **58** surrounds the core **51** of the optical cable **50**. The identifying indicia is in the form of an integrally molded single plastic stripe **60** molded into the inner surface of the opaque outer jacket **58**.

[0026] The cable may further take the form of an electrical communications cable **70**, as illustrated in FIG. 4, comprising a core **72** including a plurality of twisted conductor pairs **74**. The opaque outer jacket **78** surrounds the core **72** of the twisted pair cable **70**. The electrical communications cable **70** includes a plurality of integrally molded plastic portions in the form of side-by-side stripes **80** molded into the inner surface of the opaque outer jacket **78**.

[0027] The present invention is not limited to those cable structures discussed above and encompasses all cable structures having a core with one or more electrical or optical component(s) and an opaque outer jacket surrounding the core.

[0028] Referring now additionally to FIGS. 5-6, a method and apparatus for making a cable is now described. Beginning at Block **100** (FIG. 6), a method for making a cable with an apparatus **90** (FIG. 5) illustratively includes supplying cable core **11** from one or more reel(s) **70** and advancing the core along a path of travel **74** to an extruder **72** (Block **102**). The extruder **72** illustratively extrudes an opaque outer jacket to surround the cable core **11** with identifying indicia in

the form of one or more plastic stripes visible on an inner surface of the opaque outer jacket when opened, but visually obscured from viewing from outside the opaque outer jacket when unopened (Block 104).

[0029] The cable 10, including the cable core, opaque outer jacket and indicia, is passed through a water flow cooler 76 for cooling the outer jacket 18 (Block 106), and wound onto a take-up cable reel 78 (Block 108). The cable 10 is made available to the customer (Block 110), along with a record of the indicia (Block 112) permitting the user to verify cable authenticity, for example.

[0030] The record of the indicia may include a viewable copy of the identifying indicia, or a color-code designation of the indicia with accompanying decoding information. The record may be provided to a cable user via a secure database, such as an internet-based database, for example, maintained by the cable manufacturer and accessible by registered cable users. The record may also be in the form of a hardcopy record of the identifying indicia, provided simultaneously to the cable user with the cable 10 or at a time after cable delivery. An updated record 80 may be provided to the cable user upon a periodic modification to the record so to further discourage counterfeiting of the cable 10.

[0031] Many modifications and other embodiments of the invention will come to the mind of one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is understood that the invention is not to be limited to the specific embodiments disclosed, and that other modifications and embodiments are intended to be included within the scope of the appended claims.

THAT WHICH IS CLAIMED IS:

1. A cable comprising:
a cable core; and
an opaque outer jacket surrounding said cable core;
identifying indicia visible on an inner surface of said opaque outer jacket when opened, but visually obscured from viewing from outside said opaque outer jacket when unopened.
2. The cable according to Claim 1 wherein said identifying indicia comprises color-coded indicia.
3. The cable according to Claim 1 wherein said opaque outer jacket comprises a plastic; and wherein said identifying indicia comprises at least one integrally molded plastic portion with said opaque outer jacket and having a different color than a color of said opaque outer jacket.
4. The cable according to Claim 3 wherein said at least one integrally molded plastic portion comprises a plurality of different colored stripes.
5. The cable according to Claim 4 wherein at least some of said different colored stripes are continuous.
6. The cable according to Claim 4 wherein at least some of said different colored stripes are discontinuous.
7. The cable according to Claim 4 wherein at least some of said different colored stripes are in side-by-side relation.
8. The cable according to Claim 4 wherein at least some of said different colored stripes are in circumferentially spaced apart relation.
9. The cable according to Claim 1 wherein said cable core comprises at least one optical component.
10. The cable according to Claim 1 wherein said cable core comprises at least one electrical component.

11. The cable according to Claim 1 wherein said cable core comprises an inner conductor, a dielectric layer surrounding said inner conductor, and an outer conductor surrounding said dielectric layer.

12. A cable comprising:
a cable core; and
an opaque outer jacket surrounding said cable core;
at least one color-coded stripe visible on an inner surface of said opaque outer jacket when opened, but visually obscured from viewing from outside said opaque outer jacket when unopened.

13. The cable according to Claim 12 wherein said opaque outer jacket comprises a plastic; and wherein said at least one color-coded stripe comprises a plurality of integrally molded plastic stripes with said opaque outer jacket, each having a different color than a color of said opaque outer jacket.

14. The cable according to Claim 13 wherein at least some of said colored-coded stripes are continuous.

15. The cable according to Claim 13 wherein at least some of said different colored stripes are in side-by-side relation.

16. The cable according to Claim 12 wherein said cable core comprises at least one of an optical component and an electrical component.

17. A method for making a cable comprising:
forming a cable core;
forming an opaque outer jacket surrounding the cable core; and
forming identifying indicia visible on an inner surface of the opaque outer jacket when opened, but visually obscured from viewing from outside the opaque outer jacket when unopened.

18. The method according to Claim 17 wherein the identifying indicia comprises color-coded indicia.

19. The method according to Claim 17 wherein forming the opaque outer jacket comprises molding same; and wherein forming the identifying indicia comprises integrally molding at least one plastic portion with

the opaque outer jacket and having a different color than a color of the opaque outer jacket.

20. The method according to Claim 19 wherein molding the opaque outer jacket and at least one plastic portion comprises extruding the opaque outer jacket and the at least one plastic portion surrounding the cable core as the cable core is advanced along a path of travel.

21. The method according to Claim 19 wherein the at least one plastic portion comprises a plurality of different colored stripes.

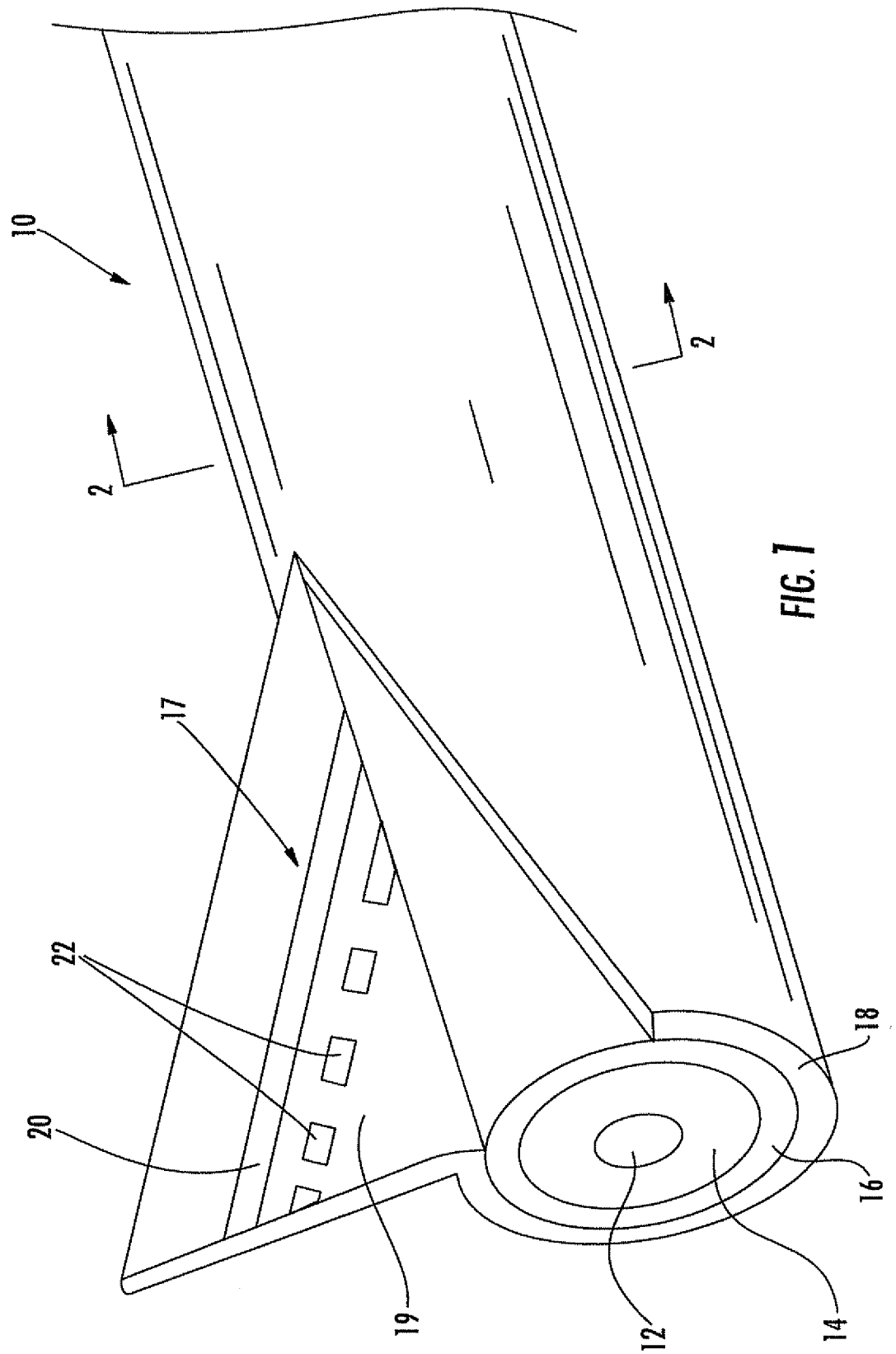
22. The method according to Claim 21 wherein at least some of the different colored stripes are continuous.

23. The method according to Claim 21 wherein at least some of the different colored stripes are in side-by-side relation.

24. The method according to Claim 17 wherein the cable core comprises at least one of an optical component and an electrical component.

25. The method according to Claim 17 further comprising making a record of the identifying indicia used in the cable separately available for access by a cable user to determine cable authenticity.

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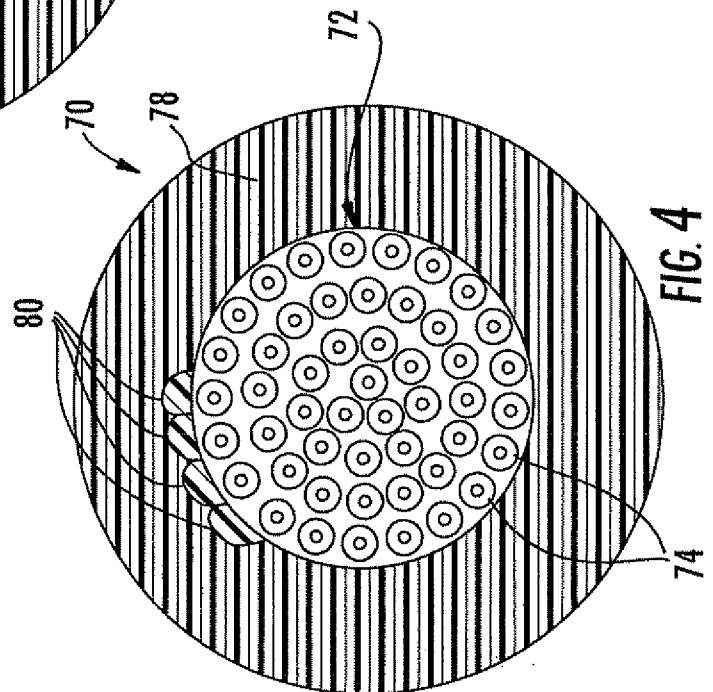
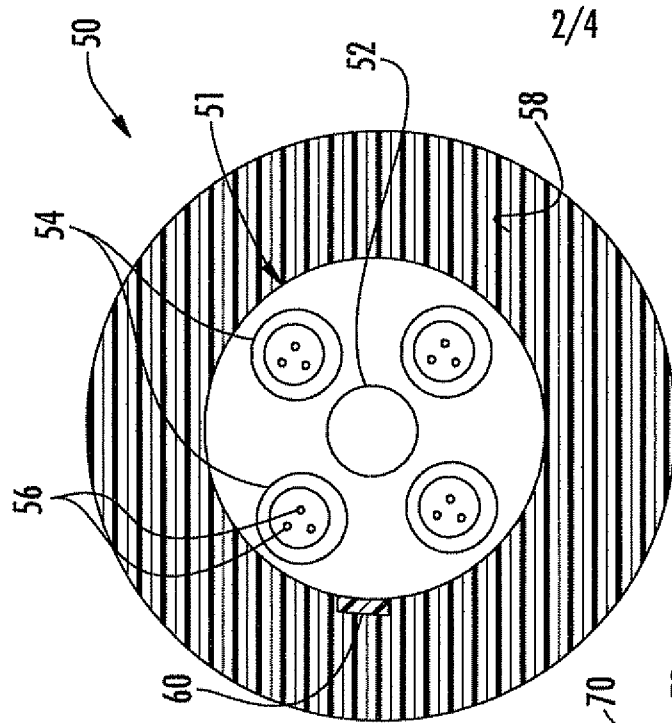
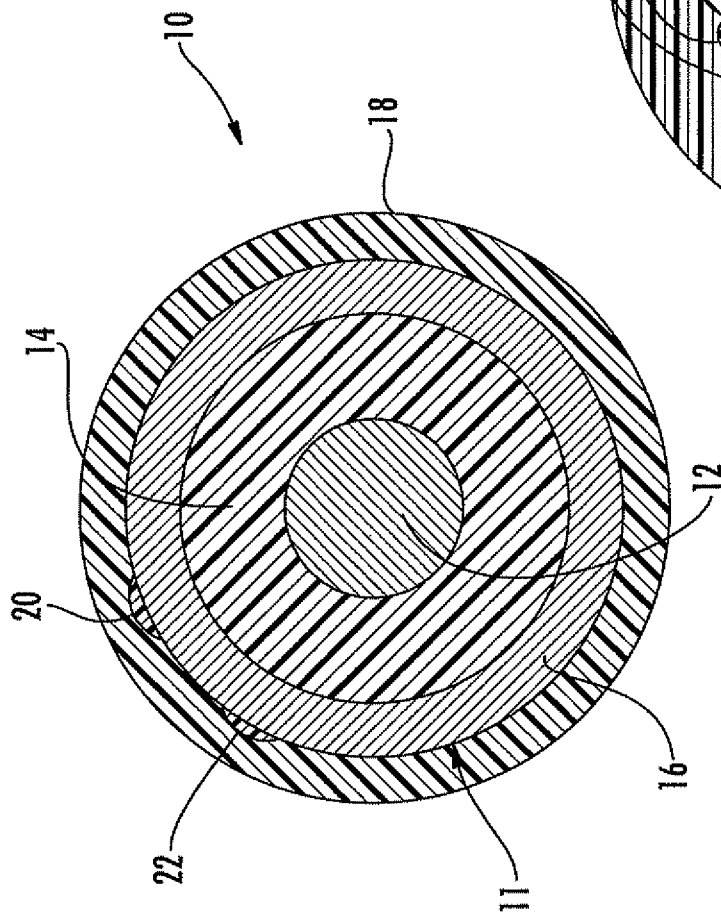


FIG. 3

FIG. 4

FIG. 2

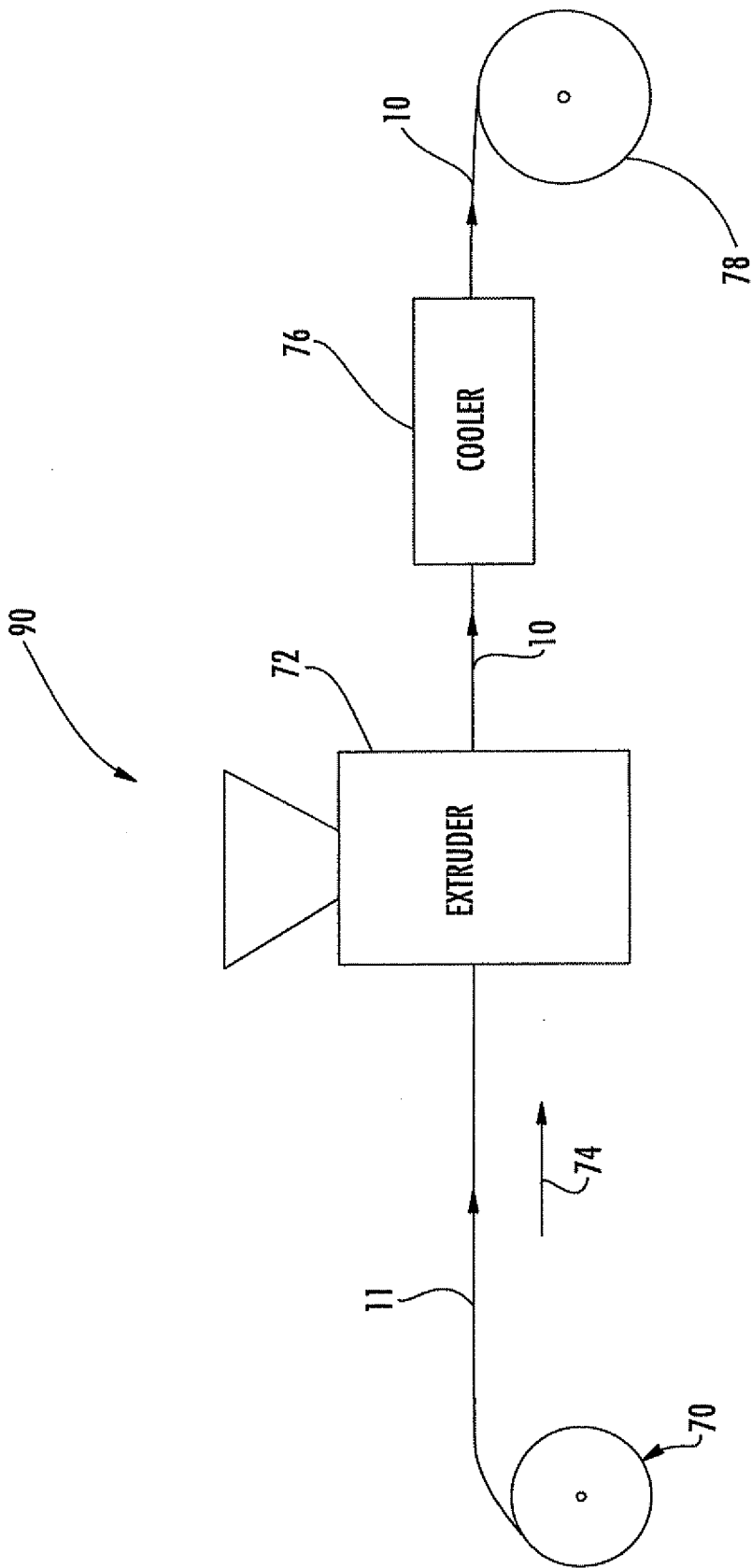


FIG. 5

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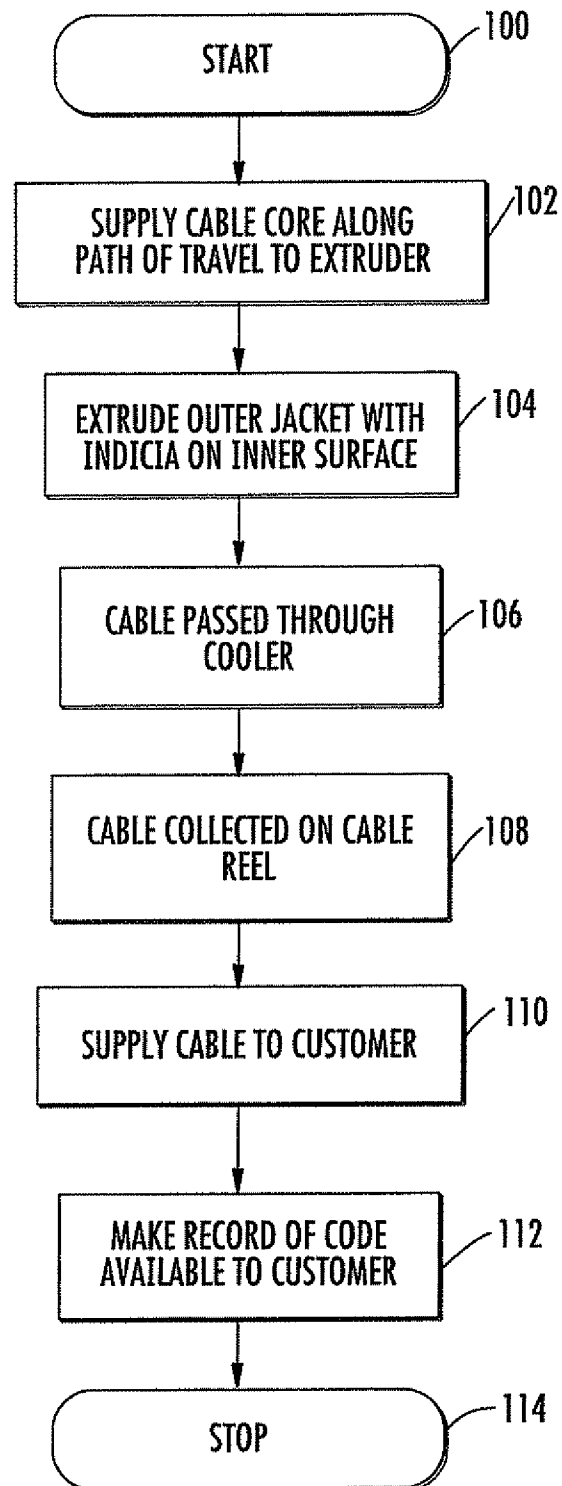


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/067170

A. CLASSIFICATION OF SUBJECT MATTER

INV. H01B7/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 387 626 A (LIVERPOOL ELECTRIC CABLE COMPA; THOMAS HENRY TWEEDLE) 9 February 1933 (1933-02-09)	1-3, 9-13, 16-20, 24, 25
Y	page 1, line 25 - line 38	4-8, 14, 15, 21-23
Y	GB 2 154 785 A (BICC PLC) 11 September 1985 (1985-09-11) page 1, line 17 - line 31; figure 1	4-8, 14, 15, 21-23

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
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- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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Date of the actual completion of the international search

8 October 2007

Date of mailing of the international search report

17/10/2007

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/067170

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 387626	A	09-02-1933	NONE
GB 2154785	A	11-09-1985	NONE