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- (54) Title: TRACEABLE AND THEFT DETERRENT RECLAIMABLE PRODUCT

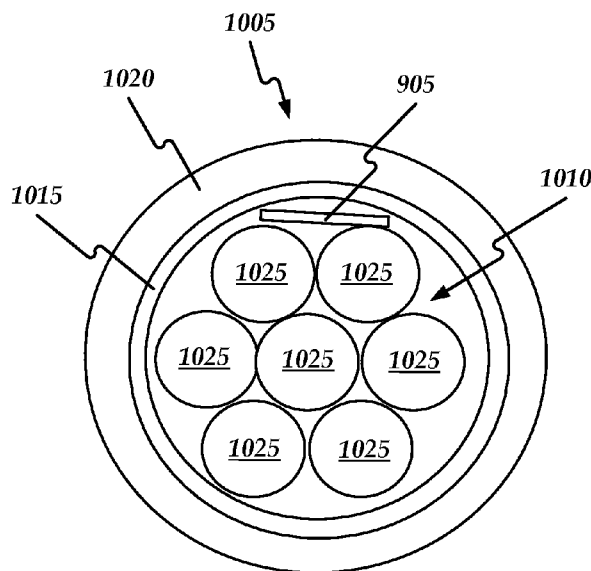


FIG. 10

(57) Abstract: A theft deterrent product may be provided. The theft deterrent product may comprise a jacket and a core under the jacket. In addition, the theft deterrent product may include an identification tape under the jacket. The identification tape may comprise a plurality of indicia located periodically and longitudinally on the identification tape. The plurality of indicia may respectively correspond to a plurality of unique codes.



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TITLE**TRACEABLE AND THEFT DETERRENT RECLAIMABLE PRODUCT**RELATED APPLICATIONS

[001] Under provisions of 35 U.S.C. § 119(e), Applicants claim the

5 benefit of U.S. Provisional Application No. 61/681,722, filed August 10, 2012, which is incorporated herein by reference. In addition, this Application is a continuation-in-part (CIP) of U.S. Application No. 13/658,852, filed October 24, 2012, which is incorporated herein by reference. U.S. Application No. 13/658,852 is a continuation-in-part (CIP) of U.S. Application

10 No. 13/281,489, filed October 26, 2011, which is incorporated herein by reference. U.S. Application No. 13/281,489 is a continuation-in-part (CIP) of U.S. Application No. 12/792,150, filed June 2, 2010, which is incorporated herein by reference. U.S. Application No. 12/792,150 is a continuation-in-part (CIP) of U.S. Application No. 12/433,440, filed April 30, 2009, which is

15 incorporated herein by reference. U.S. Application No. 12/433,440 is a continuation-in-part (CIP) of U.S. Application No. 12/269,110, filed November 12, 2008, which issued on July 31, 2012 as U.S. Patent No. 8,234,304, which is incorporated herein by reference. Furthermore, under provisions of 35 U.S.C. § 119(e), U.S. Application No. 12/269,110 (now US

20 Pat. No. 8,234,304) claimed the benefit of U.S. Provisional Application No. 60/987,566, filed November 13, 2007, which is incorporated herein by reference.

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5 reproduce the material only in connection with reproduction of the granted patent and for no other purpose.

BACKGROUND

[003] Due to certain metals' economic value, these metals may be targeted for theft. While copper may not be considered a precious metal, it
10 does have a high economic value. The same can be said for aluminum, though it may be valued less than copper. Electrical wire and cable may comprise metals such as aluminum and copper. Consequently, electrical wire and cable may be targeted for theft. For example, a thief may enter a warehouse storing electrical wire and cable and may steal the stored
15 electrical wire and cable. As another example, a thief may enter an electrical substation operated by an electric utility in order to steal any electrical wire and cable used in the electrical substation. In the electrical substation example, the thief may target, for example, bare copper ground wires running throughout the electrical substation. Once stolen, the
20 electrical wire and cable may be taken to a recycling center and sold as scrap metal. The recycling center's operator may have no way to distinguish between stolen electrical wire and cable and legitimate scrap electrical wire and cable in the conventional commercial course.

SUMMARY

[004] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter. Nor is this Summary intended to be used to limit the claimed subject matter's scope.

[005] A theft deterrent product may be provided. The theft deterrent product may comprise a jacket and a core under the jacket. In addition, the theft deterrent product may include an identification tape under the jacket.

10 The identification tape may comprise a plurality of indicia located periodically and longitudinally on the identification tape. The plurality of indicia may respectively correspond to a plurality of unique codes.

[006] Both the foregoing general description and the following detailed description provide examples and are explanatory only.

15 Accordingly, the foregoing general description and the following detailed description should not be considered to be restrictive. Further, features or variations may be provided in addition to those set forth herein. For example, embodiments may be directed to various feature combinations and sub-combinations described in the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[007] The accompanying drawings, which are incorporated in and constitute a part of this disclosure, illustrate various embodiments of the present invention. In the drawings:

[008] FIG. 1A is a diagram illustrating a bare solid conductor;

- [009] FIG. 1B is a diagram illustrating a stranded conductor;
- [010] FIG. 1C is a diagram illustrating a multi-layered conductor;
- [011] FIG. 2 is a block diagram of theft deterrent system;
- [012] FIG. 3 is a flow chart of a method for providing a theft deterrent
- 5 cable;
- [013] FIG. 4 is a block diagram of a product processor;
- [014] FIG. 5 is a diagram illustrating a cable having an indicator;
- [015] FIG. 6 is a diagram illustrating a product having an indicator;
- [016] FIG. 7A is a diagram illustrating a product having an indicator;
- 10 [017] FIG. 7B is a diagram illustrating a product having an indicator;
- [018] FIG. 8 is a diagram illustrating a product having an indicator;
- [019] FIG. 9 shows an identification tape; and
- [020] FIG. 10 shows a cable.

DETAILED DESCRIPTION

- 15 [021] The following detailed description refers to the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the following description to refer to the same or similar elements. While embodiments of the invention may be described, modifications, adaptations, and other implementations are possible. For
- 20 example, substitutions, additions, or modifications may be made to the elements illustrated in the drawings, and the methods described herein may be modified by substituting, reordering, or adding stages to the disclosed methods. Accordingly, the following detailed description does not limit the invention.

[022] Consistent with embodiments of the invention, a theft deterrent process may be provided. The process may provide traceability for any products (e.g., electrical wire, electrical cable, cathodes, etc.) that may be stolen and then recycled. The products may be metal-based and
5 may have a high scrap monetary value. Products such as copper or aluminum cable can be bare or covered. Embodiments of the invention may provide, for example, a process for placing a number of highly tamper resistant traceable indicia on a product's surface. The indicia may include codes that may be continuously indexed and may be uniquely specific to the
10 product having the indicia. At the product's sale and shipment point, the codes may be assigned to a specific order and/or end user. A computer based user interface and data storage system may allow for traceability at any point after sale by, for example, a scrap dealer, a customer, a law enforcement agency, or any other third party.

15 [023] Embodiments of the invention may include a laser based marking system that may be able to mark at high line speeds onto, for example, a metal surface. Indicia including unique codes may be etched by the laser based marking system on the metal surface in periodic increments that may be spaced by several feet or longer. The code may also be printed
20 without any spacing. Since the code may change with the product's length, when the product is later cut to a specific length, the code may help provide a length indication for the product to a specific order, end user, or designated third party. A computer system may store the unique traceable code for any desired length of time and may interface with another computer
25 interface system. The computer system can be updated as the product's

legitimate ownership changes hands. This interface can be used by a designated third party (e.g., scrap dealer, reclaimer, recycler, law enforcement, etc.) at any time to determine the product's ownership chain.

[024] An ink based system (e.g., ink jet printers) may be used to
5 print onto a covering or an indenting metal wheel may be used. A problem with ink on metal surfaces centers around adhesion. It may not be practical to clean drawing oils or other contaminants from cables completely prior to marking to improve adhesion. Also, many ink types do not stand up well to high temperatures or UV exposure over long time periods. Furthermore,
10 when metals oxidize, ink may not provide an effective visual identification level. An indenting metal wheel may not be suitable due to manufacturing line speed considerations because the wheel may need a slow line speed. Also, interstices in many stranded conductors may not provide enough contact area for an effective indent marking by the wheel. Moreover, it may
15 be difficult to index a marking wheel (due to mechanical limitations) to provide a unique indexable and traceable code.

[025] Embodiments of the invention may provide a process to print (e.g., on a metal surface) with a laser source, chemical etching method, high temperature/high adhesion ink, high speed indexing printing wheel, or other
20 processes for providing a highly tamper resistant traceable code. For example, a laser based printing system may be used to provide high speed, legibility, tamper resistance, and traceability. The laser system can have many different laser source types such as YAG and CO2. Furthermore, many different methods for focusing the intense laser energy on, for
25 example, a metal surface may be used. Embodiments of the invention may

also provide several ways to move a laser energy beam fast enough to print effectively at high line speeds. The print imparted by the laser beam may provide a highly tamper resistant marking. The laser beam may burn away metal (or other material) to a desired depth to provide a very long lasting
5 marking when exposed to environment conditions. Or the marking process may only alter a surface appearance without physically removing any metal or other material. Notwithstanding, this type marking may be legible when metal oxidizes and may not be compromised if the metal is exposed to high temperatures.

10 [026] FIG. 1A is a diagram illustrating a bare solid conductor 105. Embodiments of the invention may provide solid conductor 105 with a plurality of indicia (e.g., a first indicia 110, a second indicia 115, and a third indicia 120) periodically and longitudinally on bare solid conductor 105. Bare solid conductor 105 may comprise, but is not limited to, copper or
15 aluminum.

[027] FIG. 1B is a diagram illustrating a stranded conductor 125. Embodiments of the invention may provide stranded conductor 125 with a plurality of indicia (e.g., a fourth indicia 130 and a fifth indicia 135) periodically and longitudinally on stranded conductor 125. As shown in FIG.
20 1B, with stranded conductor 125, fourth indicia 130 and fifth indicia 135 may each be placed to respectively fit on a first individual strand 136 and a second individual strand 137 of stranded conductor 125. In this way, interstices 138 between stranded conductor 125's individual strands may be avoided by embodiments of the invention when fourth indicia 130 and a fifth
25 indicia 135 are applied to stranded conductor 125. Notwithstanding, the

indicia may or may not follow individual strand helix. Embodiments of the inventions may include placing the indicia along an axis parallel to the conductor axis as shown in FIG. 1A and 1C. Indicia portions may fall into the interstices, but may still be visually or otherwise legible.

5 [028] FIG. 1C is a diagram illustrating a multi-layered conductor 140. Embodiments of the invention may provide multi-layered conductor 140 with a plurality of indicia (e.g., a sixth indicia 145 and a seventh indicia 150) periodically and longitudinally on multi-layered conductor 140. As shown in FIG. 1C, multi-layered conductor 140 may include an interior layer 155, a
10 conductor 160, and a jacket 165. Conductor 160 may comprise, but is not limited to, copper or aluminum. Conductor 160 may be configured in any way including, but not limited to, stranded or solid. Moreover, multi-layered conductor 140 may not be limited to conductor 160 and may include more than one conductor. Furthermore, multi-layered conductor 140 may include
15 any number of layers. Any layer of multi-layered conductor 140 may be conductive, semi-conductive, or insulative. Consistent with embodiments of the invention, sixth indicia 145 and seventh indicia 150 may be placed on an exterior of any layer of multi-layered conductor 140. While FIG. 1C shows sixth indicia 145 and seventh indicia being placed on jacket 165, sixth indicia
20 145 and seventh indicia may be placed on the exterior of any one or more layers of multi-layered conductor 140. Moreover, sixth indicia 145 and seventh indicia may be placed on conductor 160 or on any one or more conductors of multi-layered conductor 140.

 [029] FIG. 2 is a block diagram of theft deterrent system 200. As
25 shown in FIG. 2, system 200 may include a product processor 205, a first

enterprise processor 210, a network 215, and a reclaimer processor 220.

Other processors (not shown) may be connected to network 215. System 200's product processor 205 may be described in more detail below with respect to FIG. 4.

5 [030] Embodiments consistent with the invention may comprise a system for providing a theft deterrent cable. The system may comprise a memory storage for maintaining a database and a processing unit coupled to the memory storage. The processing unit may be operative to create a plurality of unique codes and to place a plurality of indicia periodically and
10 longitudinally on the cable. The plurality of indicia may respectively correspond to the plurality of unique codes. The processing unit may be further operative to assign, in a database, the plurality of unique codes to an organizational entity. The organizational entity may comprise a first enterprise. In addition, the processing unit may be further operative to
15 receive an indication that the cable is to be transferred from the first enterprise to a second enterprise. Moreover, the processing unit may be operative to assign in the database, in response to the received indication, the plurality of unique codes from the organizational entity comprising the first enterprise to the organizational entity comprising a second enterprise.

20 [031] Consistent with embodiments of the present invention, the aforementioned memories, processing units, and other components may be implemented in a system, such as theft deterrent system 200 of FIG. 2. Any suitable combination of hardware, software, and/or firmware may be used to implement the memories, processing units, or other components. By way of
25 example, the memories, processing units, or other components may be

implemented with product processor 205, first enterprise processor 210, or reclaimer processor 220 in combination with system 200. The aforementioned system and processors are exemplary and other systems and processors may comprise the aforementioned memories, processing
5 units, or other components, consistent with embodiments of the present invention.

[032] FIG. 3 is a flow chart setting forth the general stages involved in a method 300 consistent with embodiments of the invention for providing a theft deterrent cable. Method 300 may be implemented using product
10 processor 205 as described in more detail below with respect to FIG. 4. Ways to implement the stages of method 300 will be described in greater detail below. While embodiments of the invention may be described with an example product comprising a cable, the invention is not so limited. As described, the product may comprise any product. For example, the product
15 may comprise an electrical wire, an electrical cable, a cathode, a solid metal wire clad with another metal (e.g., a copper clad steel wire, a steel clad copper wire, a tin clad copper wire, a copper clad tin wire, etc.), a stranded metal wire clad with another metal, a stranded wire in which strands comprise solid metal wire clad with another metal, a pipe, a conduit, a water
20 line, tubing, or tubing used for refrigerant in, for example, an air conditioner, a heat pump, refrigerator, or freezer. The aforementioned are examples and the product may comprise any product that may be metal-based, that may have a high scrap monetary value, and that may be likely to be stolen and then recycled. The product may be, for example, copper or aluminum
25 and may be bare or covered.

[033] Method 300 may begin at starting block 305 and proceed to stage 310 where product processor 205 may create a plurality of unique codes. For example, the plurality of unique codes may comprise any unique sequential number (e.g., alphanumeric) series. In addition each of the
5 plurality of unique codes may also indicate a date and/or time the cable was manufactured, a manufacturing line on which the cable manufactured, a license under which certain rights are granted, a particular specification under which the cable is manufactured, a linear distance and a plant where the cable was manufactured.

10 [034] After the plurality of unique codes are created, a plurality of indicia may be placed periodically and longitudinally on the cable a predetermined distance apart. The plurality of indicia may respectively correspond to the plurality of unique codes. Each one of the plurality of indicia may include a sequential number portion corresponding to a
15 sequential number that may be incremented by an amount equal to the predetermined distance. For example, if each of the plurality of indicia are placed one foot apart, the sequential number portion may be incremented by one. If each of the plurality of indicia are placed the two feet apart, the sequential number portion may be incremented by two. Notwithstanding,
20 the sequential number portion may indicate a linear distance from a reference point. The sequential number may be set or reset to zero (or any other value) at a given time (e.g., Jan. 1 of a given year), when a certain order is completed, or when a certain license is granted.

[035] The plurality of indicia may be placed using any unit of
25 measurement (e.g., the Metric System) and is not limited to the English

Measurement System or even specifically to footage markers within the English Measurement System. Furthermore, each of the plurality of indicia may be placed longitudinally on the cable at random distances apart from each other. Regardless of whether they are random or at a predetermined
5 distance, the indicia may reflect an accurate linear distance for the placement of the indicia in the cable.

[036] Consistent with embodiments of the invention, no space may exist between the indicia. In other words, the plurality of indicia may be continuous with no space between individual ones of the plurality of indicia.
10 As described above with respect to FIG. 1A, FIG. 1B, and FIG. 1C, the plurality of indicia may be placed on an exterior of a cable, may be placed on an exterior of any layer of the cable, or may be placed on an exterior of any conductor of the cable. Moreover, the plurality of indicia may be placed while the cable is moving on a production line during manufacture of the
15 cable using, for example, a laser. Notwithstanding, the plurality of indicia placed on the cable may be visually perceivable by a person. Moreover, as described above with respect to FIG. 1B, the plurality of indicia may be placed on an exterior of the conductor when the conductor is stranded. In this case each one of the plurality of indicia may be placed to fit on strands of
20 the stranded conductor. The aforementioned laser may comprise, but is not limited to, a Yag laser system manufactured by KBA-Metronic Corporation of Veitshoechheim, Germany.

[037] Consistent with embodiments of the invention, a number of factors may be balanced in order to place the plurality of indicia on the
25 cable. For example, the number of characters in an individual indicia and

the time spent writing each character on the cable verses the line speed at which the cable is being manufactured may be balanced. For example, for a faster line speed: i) there may not be enough time to write enough characters to write a whole individual indicia; ii) there may not be enough
5 time to write an individual indicia's characters deeply enough with a laser; or iii) there may not be enough time to properly write an individual indicia's characters with any writing or etching process. Consequently, in order to write individual indicia, the aforementioned line speed may need to be slowed. Slowing the line speed, however, may be undesirable.

10 [038] Consistent with embodiments of the invention, in order to write individual indicia without slowing the line speed, a number of other ways to write the individual indicia may be used. For example, each individual indicia within the plurality of indicia may be broken into two or more pieces and the individual pieces may be alternately placed periodically and
15 longitudinally on the cable at predetermined distances apart. For example, a first indicia in the plurality of indicia may be broken into a first piece and a second piece, a second indicia in the plurality of indicia may be broken into a first piece and a second piece, and a third indicia in the plurality of indicia may be broken into a first piece and a second piece. Then the indicia
20 pieces may be placed sequentially on the cable at predetermined distances apart as follows: the first piece of the first indicia, the second piece of the first indicia, the first piece of the second indicia, the second piece of the second indicia, the first piece of the third indicia, the second piece of the third indicia, etc. By breaking each of the plurality of indicia into at least two
25 pieces, less characters may be written at given locations periodically and

longitudinally on the cable at the predetermined distances apart. With fewer characters to write at the given locations, more time may be spent writing each individual character at a given location. Consequently, the writing quality may be increased. Writing quality may be a function of the depth at which a laser-written character is written or the amount of ink used to write an ink-written character, for example.

[039] Furthermore, as stated above, each individual indicia may comprise a unique code and a sequential number portion. With respect to the broken pieces example above, the first pieces may comprise the unique codes and the second pieces may comprise a sequential number portion (e.g., a footage marker). Consequently, an alternating arrangement may be provided. In other words, footage markers and unique codes may be alternated periodically and longitudinally on the cable a predetermined distance apart.

[040] In addition, the periodic distance at which individual indicia and/or indicia pieces are placed on the cable may be calculated based on a desired writing quality and the number of characters to be written for each individual indicia and/or indicia piece at a given location. For example, for a given line speed and a given number of characters to be written, the periodic distance between individual indicia and/or indicia pieces may need to be X . However, if the same writing quality and character number is to be maintained at a higher line speed, the distance may need to be increased to $X+n$. Similarly, if the line speed can be decreased, the distance may be decreased to $X-n$ with a given quality level being maintained.

[041] Consistent with embodiments of the invention, each one of the plurality of indicia may be configured not to interfere with proper termination of the cable. For example, the indicia may be themselves conductive and may not include paints, varnishes, and other coverings that may need to be removed before termination. Notwithstanding, the indicia may be conductive or nonconductive and may be configured to be removed from the conductor when the cable including the conductor is terminated. For example, the indicia may be configured to be removed by a technician by brushing the indicia away with a wire brush.

10 [042] Furthermore, the indicia may be "tamper proof." For example, the indicia may be placed on a conductor, conductors, or on any layer of the cable in such a way that it may be difficult to be removed by a potential thief. For example, laser etching may be difficult to be removed by a potential thief. Furthermore, the volume of indicia placed on the cable may make it impractical for a potential thief to remove all indicia from the cable.

15 [043] Moreover, the indicia may not only comprise a sequential number (e.g., that visually presents itself as sequential), but also a code that may not be a set of numbers at all (e.g., has no visual appearance as a sequence). The indicia may be a series of letters, dots, characters, markings of any type (or any combination thereof) that may be generated by an encryption algorithm. A so encrypted indicia could be decrypted when need be.

[044] Consistent with embodiments of the invention, a indictor or plurality of indicators may be placed on the product. For example, an indicator may be included with the indicia, may be placed on the product

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(e.g., the cable) in addition to the indicia, or may be placed on the product with no relation to the indicia. The indicator may be placed, for example, using any of the aforementioned processes for placing the indicia (e.g., a laser source, chemical etching process, high temperature/high adhesion ink, high speed indexing printing wheel, etc.). The indicator may comprise a highly visible logo or other insignia type that may be visible at a distance from the product. The indicator may identify the product as having a theft deterrent feature. The indicator may comprise, but is not limited to, text, symbols, a colored stripe, a special color jacket, or color print. In this way, seeing the indicator may communicate to a potential thief that the product can be traced thus providing a deterrent to thief. ***Notwithstanding, the indicator may be placed on any layer or layers of the cable or on any conductor or conductors of the cable.

[045] FIG. 5 is a diagram illustrating a cable 505 consistent with embodiments of the invention. As shown in FIG. 5, cable 505 may comprise, but is not limited to, a stranded electrical conductor having a center strand 510 and any number of outer strands 515 or layers stranded around center strand 510. While FIG. 5 shows center strand 510 at the center of cable 505, embodiments of the invention are not so limited. For example, center strand 510 may be placed within a layer of strands (not shown) interior to outer strands 515.

[046] As stated above, indicia may be placed anywhere on any layer or surface on a product (e.g., a cable) consistent with embodiments of the invention. The indicia may be placed in such a way that the indicia are not visible from the exterior of the cable. For example, an indicia 520 may be

placed on center strand 510, under outer strands 515. As shown in FIG. 5, portions of outer strands 515 may need to be removed from center strand 510 in order to expose indicia 520 that would otherwise be covered by one or more of outer strands 515.

5 [047] Indicia 520 may comprise one of a plurality of indicia placed periodically and longitudinally on center strand 510, under outer strands 515. Because indicia 520 may not be on an exterior surface of cable 505, indicia 520 may only be visible after some or all of outer strands 515 are removed. Accordingly, cable 505 may include an indicator comprising, for
10 example, a highly visible logo, other insignia type, or any other type of indicator that may be visible at a distance from cable 505. The indicator may identify cable 505 as having a theft deterrent feature. In this way, seeing the indicator may communicate to a potential thief that cable 505 can be traced, thus providing a deterrent to thief. Similarly, the indicator may
15 identify cable 505 as having a theft deterrent feature to, for example, a scrap dealer, a customer, a law enforcement agency, or any other third party. It may be communicated or other wise published to the general public, scrap dealers, customers, law enforcement agencies, or to anyone that the indicator means that a product bearing the indicator means that the product
20 has a theft deterrent feature.

 [048] As shown in FIG. 5 the indicator, for example, may comprise one or more of outer strands 515 being different (e.g., visibly different) from the rest of outer strands 515. For example, one or more outer strands 515 (e.g., a strand 515a) may comprise a tin-coated copper strand while the
25 remainder of outer strands 515 may comprise copper. In this way, strand

515a may be shinier than the rest of outer strands 515 and thus visibly different from the rest of outer strands 515. Also, strand 515a coated with tin may oxidize at a much slower rate than copper, thus it may create a visual contrast that may last through the life of cable 505. Consequently, cable 505 may include an indicator that may be visible at a distance from cable 505 when one or more of outer strands 515 is different (e.g., visibly different) from the rest of outer strands 515.

[049] FIG. 6 is a diagram illustrating a product 605. As stated above, product 605 may comprise, but is not limited to, an electrical conductor. As shown in FIG. 6, a plurality of indicia (e.g., a first indicia 610 and a second indicia 615, etc.) may be placed periodically and longitudinally on product 605.

[050] Product 605 may comprise an outer layer 620 and an inner portion 625. Outer layer 620 and inner portion 625 may comprise visibly different materials. For example, outer layer 620 may be made of a material shinier than a material comprising inner portion 625. Specifically, outer layer 620 may be made of tin and inner portion 625 may be made of copper. Notwithstanding, outer layer 620 and inner portion 625 may comprise any materials including metal materials (e.g., tin, copper, aluminum, steel, etc.). Outer layer 620 and inner portion 625 may comprise the same or different materials. Moreover, inner portion 625 may be solid. In another embodiment, inner portion 625 may not be solid, but may include a longitudinally cylindrical hole (not shown) running from one end of product 605 to the other creating a pipe or conduit.

[051] In placing the plurality of indicia (e.g., first indicia 610 and second indicia 615, etc.) periodically and longitudinally on product 605, a laser based marking system may be used. Specifically, the plurality of indicia may be etched through outer layer 620 and into inner portion 625.

5 Consequently, a visual contrast may be created in the symbols comprising the plurality of indicia. For example, this visual contrast may be due to the outer surface of outer layer 620 being shinier than the symbols comprising the plurality of indicia, which may be etched into inner portion 625 comprising a material duller than the outer surface of outer layer 620. In

10 other words, because the bottoms of the symbols comprising the plurality of indicia may be cut into the duller inner portion 625, the symbols comprising the plurality of indicia may appear duller or flatter than the outer surface of outer layer 620.

[052] Furthermore, having a shiny outer layer 620 may comprise an

15 indicator that may be visible at a distance from product 605. This indicator may identify product 605 as having a theft deterrent feature. In this way, seeing the indicator may communicate to a potential thief that product 605 can be traced, thus providing a deterrent to thief.

[053] FIG. 7A is a diagram illustrating a product 705. As shown in

20 FIG. 7A, a plurality of indicia (e.g., a first indicia 710 and a second indicia 715, etc.) may be placed on product 705. Product 705 may comprise an outer layer 720 and an inner cavity 725. Inner cavity 725 may comprise a longitudinally cylindrical hole running from one end of product 705 to the other creating, for example, a tube, a pipe, or a conduit. As stated above,

25 product 705 may comprise, but is not limited to, a pipe, a conduit, a water

line, tubing, or tubing used for refrigerant in, for example, an air conditioner, a heat pump, refrigerator, or freezer.

[054] In placing the plurality of indicia (e.g., first indicia 710 and second indicia 715, etc.) on product 705, the plurality of indicia may be parallel to a longitudinal axis 730 of product 705 as shown in FIG. 7A (e.g., longitudinally). As shown in FIG. 7B, the plurality of indicia (e.g., first indicia 710 and second indicia 715, etc.) may be placed on product 705 perpendicular to longitudinal axis 730 of product 705. Furthermore, the plurality of indicia (e.g., first indicia 710 and second indicia 715, etc.) may be rotated at an angle relative to longitudinal axis 730 and do not have to be perpendicular or parallel to longitudinal axis 730. Moreover, individual characters comprising first indicia 710 and a second indicia 715 may be rotated at an angle relative to longitudinal axis 730 and do not have to be perpendicular or parallel to longitudinal axis 730. Regarding spacing between the plurality of indicia, consistent with embodiments of the invention, the plurality of indicia may be spaced evenly apart (e.g., periodically), at random distances apart, or may have no spacing between them.

[055] Consistent with embodiments of the invention, center strand 510 or outer strands 515 (as shown in FIG. 5) may comprise, but not limited to, a structure similar to product 705 of FIG. 7. In other words, center strand 510 or outer strands 515 may comprise an outer layer and an inner portion. As with product 705, center strand 510's or outer strands 515's outer layer and inner portion may comprise visibly different materials. For example, the outer layer may be made of a material shinier than a material comprising the

inner portion. Specifically, the outer layer may be made of tin and the inner portion may be made of copper. Furthermore, indicia (e.g., indicia 520) may be etched through the outer layer of center strand 510 or outer strands 515 and into the inner portion of center strand 510 or outer strands 515.

- 5 Consequently, a visual contrast may be created in the symbols comprising the indicia (e.g., indicia 520).

[056] FIG. 8 is a diagram illustrating a product 805. Product 805 may comprise, but is not limited to, an electrical conductor. As shown in FIG. 8, a plurality of indicia (e.g., a first indicia 810 and a second indicia 815,
10 etc.) may be placed periodically and longitudinally on product 805.

[057] Product 805 may comprise an outer layer 820, an inner portion 825, and a center portion 830. The cost of the material comprising center portion 830 may be cheaper than the cost of the material comprising inner portion 825. Consequently, the material cost of the embodiment shown in
15 FIG. 8 may be cheaper than the embodiment shown in FIG. 6. While FIG. 8 shows product 805 as having three elements (e.g., outer layer 820, inner portion 825, and center portion 830) product 805 may comprise any number of elements.

[058] Outer layer 820 and inner portion 825 may comprise visibly
20 different materials. For example, outer layer 820 may be made of a material shinier than a material comprising inner portion 825. Specifically, outer layer 820 may be made of tin, inner portion 825 may be made of copper or steel, and center portion 830 may be made of copper or steel. Notwithstanding, outer layer 820, inner portion 825, and center portion 830 may be made of
25 any material including any metal material (e.g., tin, copper, aluminum, steel,

etc.). Any two or more of outer layer 820, inner portion 825, and center portion 830 may be made of the same or different materials.

[059] In placing the plurality of indicia (e.g., first indicia 810 and second indicia 815, etc.) periodically and longitudinally on product 805, a laser based marking system may be used. Specifically, the plurality of indicia may be etched through outer layer 820 and into inner portion 825. Consequently, a visual contrast may be created in the symbols comprising the plurality of indicia. For example, this visual contrast may be due to the outer surface of outer layer 820 being shinier than the symbols comprising the plurality of indicia, which may be etched into inner portion 825 comprising a material duller than the outer surface of outer layer 820. In other words, because the bottoms of the symbols comprising the plurality of indicia may be cut into the duller inner portion 825, the symbols comprising the plurality of indicia may appear duller or flatter than the outer surface of outer layer 820.

[060] Furthermore, having a shiny outer layer 820 may comprise an indicator that may be visible at a distance from product 805. This indicator may identify product 805 as having a theft deterrent feature. In this way, seeing the indicator may communicate to a potential thief that product 805 can be traced, thus providing a deterrent to thief.

[061] Turning back to FIG. 5, consistent with embodiments of the invention, product 605 and/or product 805 may be used in cable 505 as any one or more of center strand 510 and/or outer strands 515 (including strand 515a.) In other words, center strand 510 may comprise product 605 or product 805. Outer strands 515 may comprise product 605 with or without

indicia (e.g., first indicia 610 and/or second indicia 615) or product 805 with or without indicia (e.g., first indicia 810 or second indicia 815). Furthermore, strand 515a may comprise product 605 with or without indicia (e.g., first indicia 610 and/or second indicia 615) or product 805 with or without indicia
5 (e.g., first indicia 810 or second indicia 815).

[062] FIG. 9 shows an identification tape 905. A plurality of indicia (e.g., a first indicia 910 and a second indicia 915, etc.) may be placed periodically and longitudinally on identification tape 905 that may, in turn, be included in a product such as a cable, for example. While FIG. 9 shows
10 identification tape 905 as being flat, embodiments of the invention are not so limited. For example, identification tape 905 may comprise a rope and may comprise any shape. In other words, identification tape 905 may comprise any form of medium capable of carrying the plurality of indicia.

[063] As stated above, consistent with embodiments of the
15 invention, the plurality of indicia may be placed (e.g., printed) on identification tape 905 with a laser source, chemical etching method, high temperature/high adhesion ink, ink jet printer, high speed indexing printing wheel, embossed, or other processes for providing a highly tamper resistant traceable code. Identification tape 905 may be flexible, conductive, or non-
20 conductive. Identification tape 905 may comprise metal (e.g., copper), metal foil (e.g., copper foil), Mylar, PVC, EPR, polyethylene, cotton, polyester, or nylon tape, or any polymer material.

[064] Identification tape 905 may be included in a product such as a cable 1005 as shown in FIG. 10. Cable 1005 may comprise a core 1010, a
25 shield 1015, and a jacket 1020. Cable 1005 may further comprise a binder

(not shown) that may be helically wrapped around core 1010. Core 1010 may comprise a plurality of conductors 1025 that may be insulated and may be solid or stranded. Cable 1005 may comprise, but is not limited to, a control cable for agricultural irrigation equipment or electrical substation equipment. Plurality of conductors 1025 may be used to provide control signals or for providing energy.

[065] Cable 1005 may include materials that may need to be removed before other portions of cable 1005 can be recycled. For example, cable 1005 may include metals (e.g., copper, aluminum, etc.) that may be valuable enough to cost justify recycling. Moreover, cable 1005 may include other materials (e.g., insulation) that may need to be removed before the metals can be in condition for recycling. In some situations, a mechanical granulation process, flames or chemicals may be used to remove the other materials (e.g., insulation). Consequently, identification tape 905 may be constructed in such a way that identification tape 905 and the plurality of indicia on identification tape 905 may not be destroyed, for example, when the product (e.g., cable 1005) that includes identification tape 905, has its insulation removed, for example, by a mechanical granulation process, flames, or chemicals. In other words, identification tape 905 may be made of a material that is resistant to mechanical damage, flames (heat), or chemicals that may be used to remove insulation from cables (e.g., cable 1005.) Moreover, the plurality of indicia may be placed on identification tape 905 in such a way that the plurality of indicia are still readable after the mechanical granulation process, flames (heat), or chemicals are used to remove insulation from cable 1005. Identification tape 905, for example,

may be made of metal or any other mechanical damage, flame, or chemical resistant material. The temperature of heat used to remove insulation from cables (e.g., cable 1005) may be between 1,000°F and 1,900°F and may comprise approximately 1,500°F.

5 [066] Ones of the plurality of conductors 1025 may be so small that if the plurality of indicia were placed on the ones of the plurality of conductors 1025, the plurality of indicia may be too small to be seen or read by the human eye without magnification. However, the plurality of indicia (e.g., first indicia 910 and second indicia 915, etc.) placed periodically and
10 longitudinally on tape 905 may be large enough to be seen and read by the human eye without magnification.

 [067] Consistent with embodiments of the invention, identification tape 905 may be substantially parallel to a longitudinal axis of cable 1005 and may be placed between core 1010 and shield 1015 or between shield
15 1015 and jacket 1020. Consistent with another embodiment of the invention, identification tape 905 may be fed into a wall of jacket 1020 (e.g., somewhere between the outside and inside). Moreover, identification tape 905 may also be placed between layers of a two or more layer jacket 1020. Also, identification tape 905 may be applied to an outside surface of jacket
20 1020 such that it bonds to the outside surface of jacket 1020.

 [068] Identification tape 905 may comprise an anchoring feature configured to resist a force applied to identification tape 905 in a direction of a longitudinal axis of cable 1005. Consequently, if cable 1005 is cut at a cross section exposing identification tape 905, the anchoring feature may
25 resist an effort to pull identification tape 905 out of cable 1005. The

anchoring feature may cause identification tape 905 to attach to other elements of cable 1005. The anchoring feature may comprise, for example, an adhesive or cleats disposed on identification tape 905.

[069] Identification tape 905 may be used as a binder for core 1010
5 and may be helically wrapped around core 1010. Furthermore, identification tape 905 may be put in the place of one of the plurality of conductors 1025 in core 1010. For example, when core 1010 is constructed, the plurality of conductors 1025 may be pulled from reels and twisted in an S-Z configuration. During the twisting of core 1010, identification tape 905 may
10 be pulled into core 1010 as or in the place of one of the plurality of conductors 1025 and twisted into core 1010 in an S-Z configuration or could be helically applied to the core 1010.

[070] Furthermore, an indicator may be placed on cable 1005 that may be visible at a distance from cable 1005. For example, the indicator
15 may be placed on jacket 1020. This indicator may identify cable 1005 as having a theft deterrent feature. In this way, seeing the indicator may communicate to a potential thief that cable 1005 can be traced, thus providing a deterrent to thief. For example, the indicator may comprise a bright jacket color for jacket 1020 or a printed logo or text on jacket 1020.
20 The printed text may comprise "Traceable".

[071] Once product processor 205 creates the plurality of unique codes and places the plurality of indicia periodically and longitudinally on the cable in stage 310, method 300 may continue to stage 320 where product processor 205 may assign, in a database (e.g., a database 440 as
25 described below with respect to FIG. 4), the plurality of unique codes to an

organizational entity. The organizational entity may comprise a first enterprise. For example, the first enterprise may comprise, but is not limited to, an enterprise that is to distribute the cable, an enterprise that is purchasing the cable an enterprise for which the cable is being
5 manufactured, or an enterprise that is to install the cable.

[072] After product processor 205 assigns the plurality of unique codes to the organizational entity in stage 320, method 300 may proceed to stage 330 where product processor 205 may receive an indication that the cable is to be transferred from the first enterprise to a second enterprise.
10 For example, using first enterprise processor 210, the first enterprise may communicate with product processor 205 over network 215. Through this communication, the first enterprise may indicate that the ownership of a particular amount of cable is being transferred to the second enterprise. In this communication, the first enterprise may specify a series of the plurality
15 of unique codes corresponding to the cable whose ownership is being transferred from the first enterprise to a second enterprise.

[073] From stage 330, where product processor 205 receives the indication that the cable is to be transferred from the first enterprise to the second enterprise, method 300 may advance to stage 340 where product
20 processor 205 may assign in database 440, in response to the received indication, the plurality of unique codes from the organizational entity comprising the first enterprise to the organizational entity comprising the second enterprise. For example, the second enterprise may comprise an enterprise purchasing the cable, an enterprise that is to distribute the cable,
25 an enterprise for which the cable is being manufactured, and an enterprise

that is to install the cable. For example, the first enterprise may be a cable distributor and the second enterprise may be an entity purchasing the cable from the cable distributor. In addition, the first enterprise may be an entity for which the cable is being manufactured and the second enterprise may be an entity that the first enterprise has contracted with to install the cable. Moreover, the first enterprise may be an entity for which the cable is being manufactured and the second enterprise may be an entity purchasing the cable from the first entity.

[074] Once product processor 205 assigns the plurality of unique codes from the first enterprise to the second enterprise in stage 340, method 300 may continue to stage 350 where product processor 205 may receive an input. For example, the input may be received from a reclaimer operating reclaimer processor 220. The reclaimer may comprise, but is not limited to, an enterprise that recycles materials (e.g., copper or aluminum). In this example, the second entity may bring cable to the reclaimer. The reclaimer may record codes from indicia from the cable brought for recycling. For each piece of cable, the reclaimer may record a code closest to a first end of the cable and a code closest to a second end of the cable. Notwithstanding, the reclaimer may record any one or more codes shown in indicia from the cable brought for recycling. Next, using reclaimer processor 220, the reclaimer may communicate these recorded code numbers to product processor 205 through the input.

[075] After product processor 205 receives the input in stage 350, method 300 may proceed to stage 360 where product processor 205 may determine if the input corresponds to any one of the plurality of unique

codes. For example, from the received input, product processor 205 may extract the recorded codes submitted by the reclaimer in the input. Then the recorded codes from the input may be compared against codes that have been previously saved in database 440 and assigned to certain

5 organizational entities. Consequently, product processor 205 may determine that respective matches exist between one or more of the recorded codes from the input and one or more unique codes previously saved in database 440.

[076] From stage 360, where product processor 205 determines if

10 the input corresponds to any one of the plurality of unique codes, method 300 may advance to stage 370 where product processor 205 may determine the organizational entity to which the plurality of unique codes are assigned.

For example, product processor 205 may determine that the recorded codes from the input match codes previously assigned to the second

15 enterprise. Consequently, product processor 205 may transmit an output to reclaimer processor 220 indicating that the determined organizational entity is the second enterprise. Moreover, product processor 205 may determine that the recorded codes from the input do not match codes previously assigned to the second enterprise. Consequently, product processor 205

20 may transmit the output to reclaimer processor 220 indicating that the determined organizational entity is not the second enterprise. From the output, the reclaimer is better able to determine if the cable brought for recycling should be purchased from the entity bringing the cable. Once product processor 205 determines the organizational entity to which the

plurality of unique codes are assigned in stage 370, method 300 may then end at stage 380.

[077] FIG. 4 shows product processor 205 of FIG. 2 in more detail. As shown in FIG. 4, product processor 205 may include a processing unit
5 425 and a memory 430. Memory 430 may include theft deterrent software module 435 and database 440. First enterprise processor 210 and reclaimer processor 220 may comprise similar structures. While executing on processing unit 425, deterrent software module 435 may perform processes for providing a theft deterrent cable, including, for example, one
10 or more method 300 stages described above with respect to FIG. 3. Furthermore, one or more method 300 stages may be performed by first enterprise processor 210 or reclaimer processor 220.

[078] Product processor 205, first enterprise processor 210, and reclaimer processor 220 ("the processors") included in system 200 may be
15 implemented using a personal computer, network computer, mainframe, or other similar microcomputer-based workstation. The processors may though comprise any type of computer operating environment, such as hand-held devices, multiprocessor systems, microprocessor-based or programmable sender electronic devices, minicomputers, mainframe
20 computers, and the like. The processors may also be practiced in distributed computing environments where tasks are performed by remote processing devices. Furthermore, the processors may comprise a mobile terminal, such as a smart phone, a cellular telephone, a cellular telephone utilizing wireless application protocol (WAP), personal digital assistant
25 (PDA), intelligent pager, portable computer, a hand held computer, a

conventional telephone, or a facsimile machine. The aforementioned systems and devices are exemplary and the processors may comprise other systems or devices.

[079] Network 215 may comprise, for example, a local area network (LAN) or a wide area network (WAN). When a LAN is used as network 215, a network interface located at any of the processors may be used to interconnect any of the processors. When network 215 is implemented in a WAN networking environment, such as the Internet, the processors may typically include an internal or external modem (not shown) or other means for establishing communications over the WAN. Further, in utilizing network 215, data sent over network 215 may be encrypted to insure data security by using known encryption/decryption techniques.

[080] In addition to utilizing a wire line communications system as network 215, a wireless communications system, or a combination of wire line and wireless may be utilized as network 215 in order to, for example, exchange web pages via the Internet, exchange e-mails via the Internet, or for utilizing other communications channels. Wireless can be defined as radio transmission via the airwaves. However, it may be appreciated that various other communication techniques can be used to provide wireless transmission, including infrared line of sight, cellular, microwave, satellite, packet radio, and spread spectrum radio. The processors in the wireless environment can be any mobile terminal, such as the mobile terminals described above. Wireless data may include, but is not limited to, paging, text messaging, e-mail, Internet access and other specialized data applications specifically excluding or including voice transmission. For

example, the processors may communicate across a wireless interface such as, for example, a cellular interface (e.g., general packet radio system (GPRS), enhanced data rates for global evolution (EDGE), global system for mobile communications (GSM)), a wireless local area network interface (e.g., WLAN, IEEE 802, WiFi, WiMax), a bluetooth interface, another RF communication interface, and/or an optical interface.

[081] System 200 may also transmit data by methods and processes other than, or in combination with, network 215. These methods and processes may include, but are not limited to, transferring data via, diskette, flash memory sticks, CD ROM, facsimile, conventional mail, an interactive voice response system (IVR), or via voice over a publicly switched telephone network.

[082] Generally, consistent with embodiments of the invention, program modules may include routines, programs, components, data structures, and other types of structures that may perform particular tasks or that may implement particular abstract data types. Moreover, embodiments of the invention may be practiced with other computer system configurations, including hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, minicomputers, mainframe computers, and the like. Embodiments of the invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

[083] Furthermore, embodiments of the invention may be practiced in an electrical circuit comprising discrete electronic elements, packaged or integrated electronic chips containing logic gates, a circuit utilizing a microprocessor, or on a single chip containing electronic elements or microprocessors. Embodiments of the invention may also be practiced using other technologies capable of performing logical operations such as, for example, AND, OR, and NOT, including but not limited to mechanical, optical, fluidic, and quantum technologies. In addition, embodiments of the invention may be practiced within a general purpose computer or in any other circuits or systems.

[084] Embodiments of the invention, for example, may be implemented as a computer process (method), a computing system, or as an article of manufacture, such as a computer program product or computer readable media. The computer program product may be a computer storage media readable by a computer system and encoding a computer program of instructions for executing a computer process. The computer program product may also be a propagated signal on a carrier readable by a computing system and encoding a computer program of instructions for executing a computer process. Accordingly, the present invention may be embodied in hardware and/or in software (including firmware, resident software, micro-code, etc.). In other words, embodiments of the present invention may take the form of a computer program product on a computer-usable or computer-readable storage medium having computer-usable or computer-readable program code embodied in the medium for use by or in connection with an instruction execution system. A computer-usable or

computer-readable medium may be any medium that can contain, store, communicate, propagate, or transport the program for use by or in connection with the instruction execution system, apparatus, or device.

[085] The computer-usable or computer-readable medium may be, for example but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, device, or propagation medium. More specific computer-readable medium examples (a non-exhaustive list), the computer-readable medium may include the following: an electrical connection having one or more wires, a portable computer diskette, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), an optical fiber, and a portable compact disc read-only memory (CD-ROM). Note that the computer-usable or computer-readable medium could even be paper or another suitable medium upon which the program is printed, as the program can be electronically captured, via, for instance, optical scanning of the paper or other medium, then compiled, interpreted, or otherwise processed in a suitable manner, if necessary, and then stored in a computer memory.

[086] Embodiments of the present invention, for example, are described above with reference to block diagrams and/or operational illustrations of methods, systems, and computer program products according to embodiments of the invention. The functions/acts noted in the blocks may occur out of the order as shown in any flowchart. For example, two blocks shown in succession may in fact be executed substantially

concurrently or the blocks may sometimes be executed in the reverse order, depending upon the functionality/acts involved.

[087] While certain embodiments of the invention have been described, other embodiments may exist. Furthermore, although

5 embodiments of the present invention have been described as being associated with data stored in memory and other storage mediums, data can also be stored on or read from other types of computer-readable media, such as secondary storage devices, like hard disks, floppy disks, or a CD-ROM, a carrier wave from the Internet, or other forms of RAM or ROM.

10 Further, the disclosed methods' stages may be modified in any manner, including by reordering stages and/or inserting or deleting stages, without departing from the invention.

[088] While the specification includes examples, the invention's scope is indicated by the following claims. Furthermore, while the

15 specification has been described in language specific to structural features and/or methodological acts, the claims are not limited to the features or acts described above. Rather, the specific features and acts described above are disclosed as example for embodiments of the invention.

WHAT IS CLAIMED IS:

1. A product comprising:
a jacket;
a core under the jacket; and
5 an identification tape under the jacket, the identification tape comprising a plurality of indicia located periodically and longitudinally on the identification tape, the plurality of indicia respectively corresponding to a plurality of unique codes.
- 10 2. The product of claim 1, wherein the product comprises an electrical cable.
3. The product of claim 1, wherein the product comprises a control cable for agricultural irrigation equipment.
- 15 4. The product of claim 1, wherein the product comprises a control cable for electrical substation equipment.
5. The product of claim 1, wherein each of the plurality of unique
20 codes has a corresponding unique portion that is unique to a corresponding portion of the product adjacent to the corresponding unique portion.
6. The product of claim 1, wherein the product further comprises an indicator on the exterior of the product.

7. The product of claim 6, wherein the indicator indicates that the product has a theft deterrent feature.

5 8. The product of claim 7, wherein the indicator comprises the jacket being a bright color.

9. The product of claim 7, wherein the indicator comprises at least one symbol.

10

10. The product of claim 1, wherein the identification tape is substantially parallel to a longitudinal axis of the product.

11. The product of claim 1, further comprising a shield disposed
15 between the jacket and the core.

12. The product of claim 11, wherein the identification tape is disposed between the jacket and the shield.

20 13. The product of claim 11, wherein the identification tape is disposed between the core and the shield.

14. The product of claim 1, wherein the identification tape comprises a binder around the core.

25

15. The product of claim 14, wherein the identification tape is helically wrapped around the core.

16. The product of claim 1, wherein the identification tape
5 comprises an anchoring feature configured to resist a force applied to the identification tape in a direction of a longitudinal axis of the product.

17. The product of claim 16, wherein anchoring feature comprises an adhesive.

10

18. The product of claim 16, wherein the anchoring feature comprises cleats disposed on the identification tape.

19. A cable, comprising:
15 an identification tape; and
at least one indicia placed on the identification tape, the at least one indicia corresponding to a unique code having a unique portion that is unique to a portion of the cable adjacent to the corresponding unique portion, wherein the at least one indicia is not visible from an exterior of the
20 cable.

20. The cable of claim 19, further comprising an indicator on the exterior of the cable.

21. The cable of claim 20, wherein the indicator indicates that the cable has a theft deterrent feature.

22. The cable of claim 21, wherein the indicator comprises the jacket being brightly colored.

23. The cable of claim 21, wherein the indicator comprises at least one symbol.

24. The cable of claim 20, wherein the cable comprises a control cable for agricultural irrigation equipment.

25. The cable of claim 19, wherein the identification tape is substantially parallel to a longitudinal axis of the cable.

15

26. A cable comprising:

a jacket having an indicator that indicates that the cable has a theft deterrent feature;

a core under the jacket;

20 an identification tape under the jacket; and

at least one indicia placed on the identification tape, the at least one indicia corresponding to a unique code having a unique portion that is unique to a portion of the cable adjacent to the corresponding unique portion, wherein the at least one indicia is not visible from an exterior of the

25 cable.

27. The cable of claim 26, wherein the identification tape is substantially parallel to a longitudinal axis of the cable.

5 28. The cable of claim 26, wherein the identification tape comprises a binder around the core.

29. The cable of claim 26, wherein the identification tape is helically wrapped around the core.

10

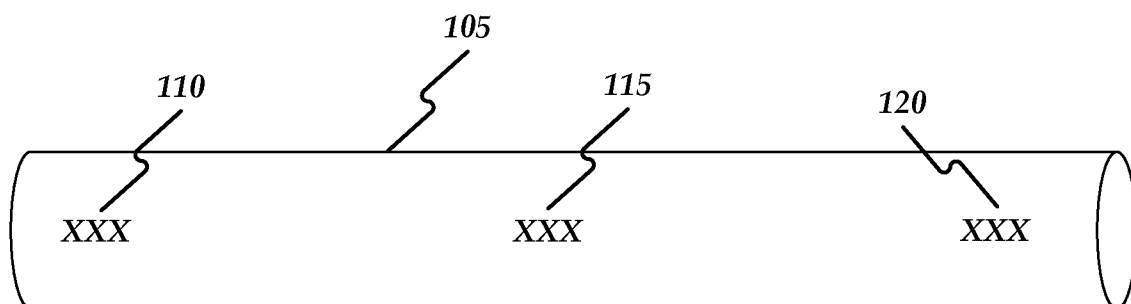


FIG. 1A

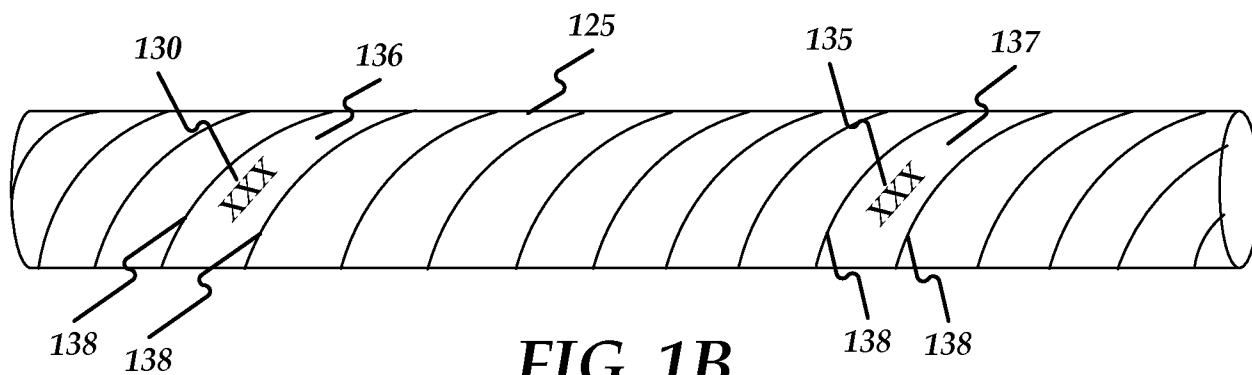


FIG. 1B

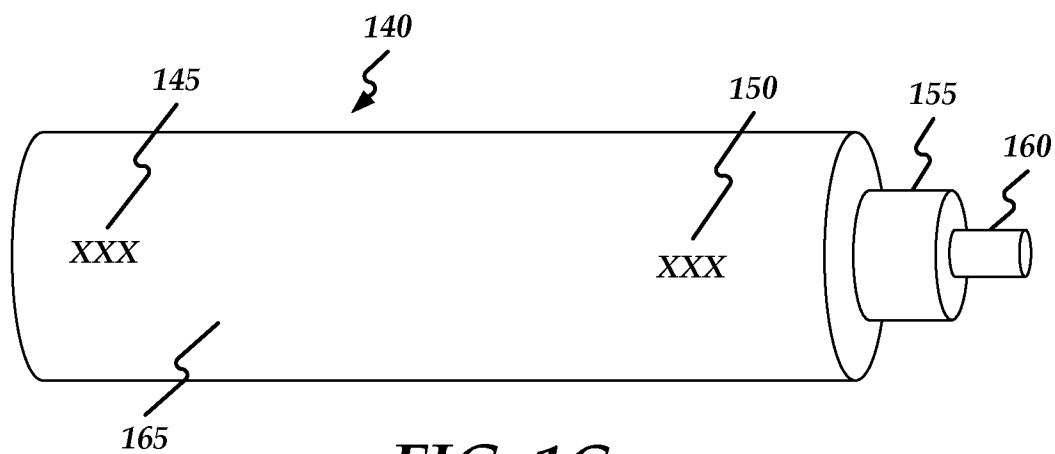
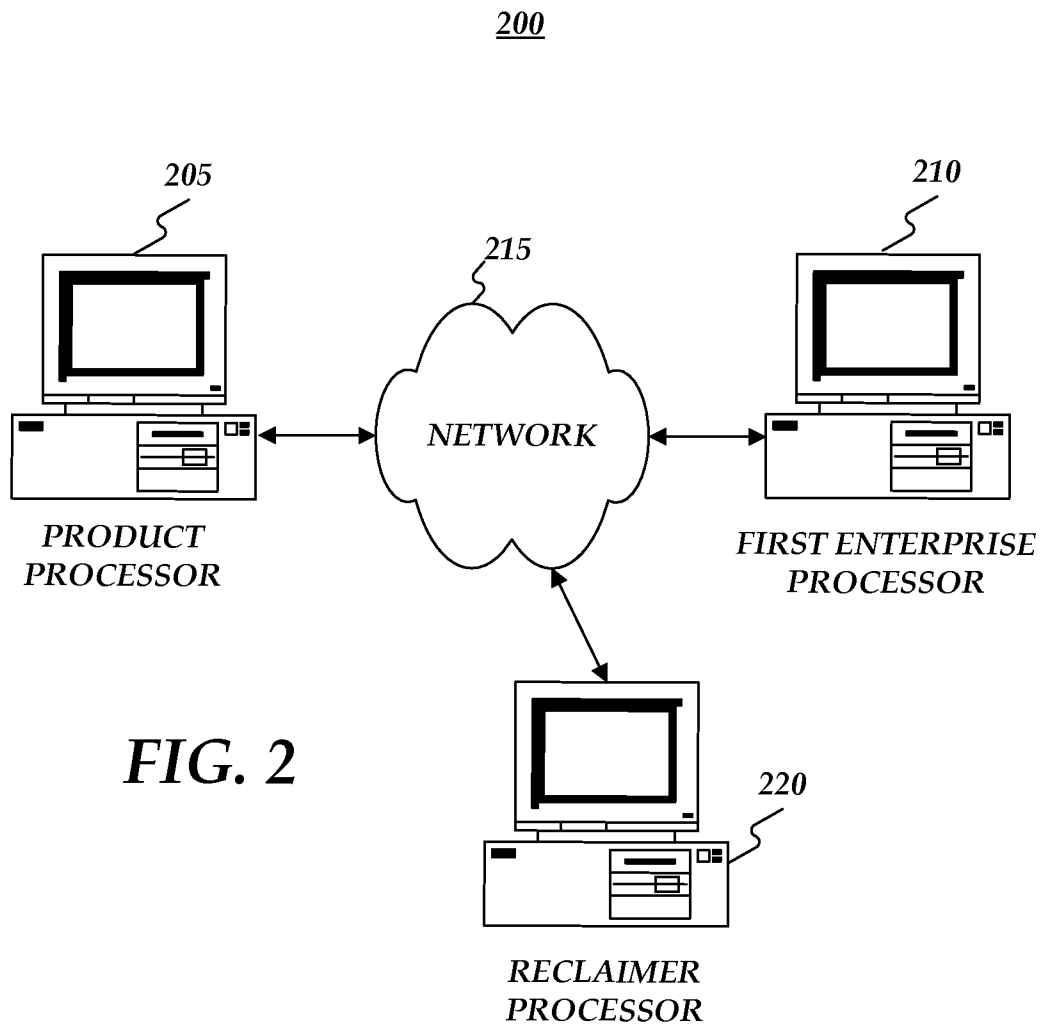


FIG. 1C

2/10



3/10

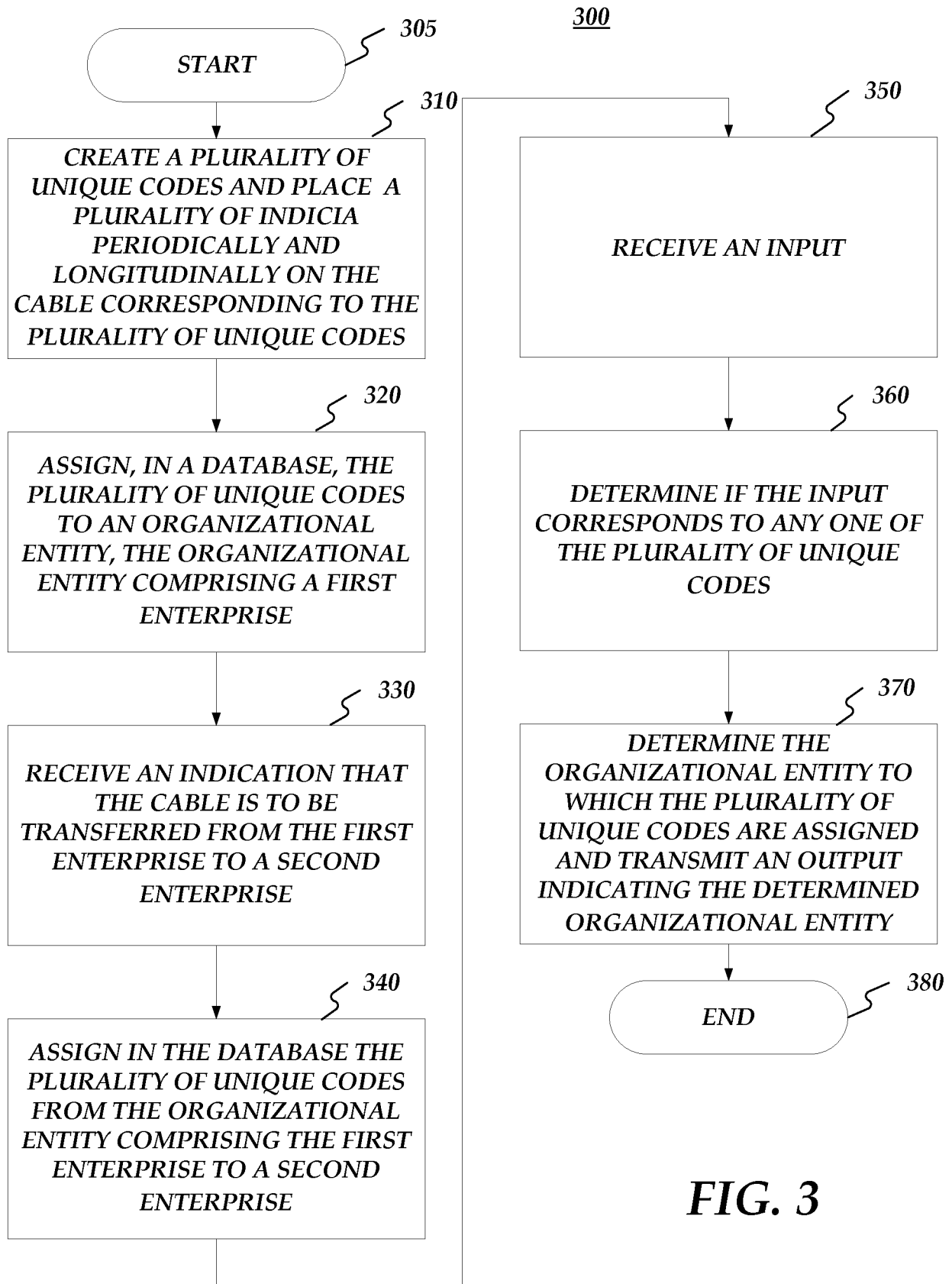
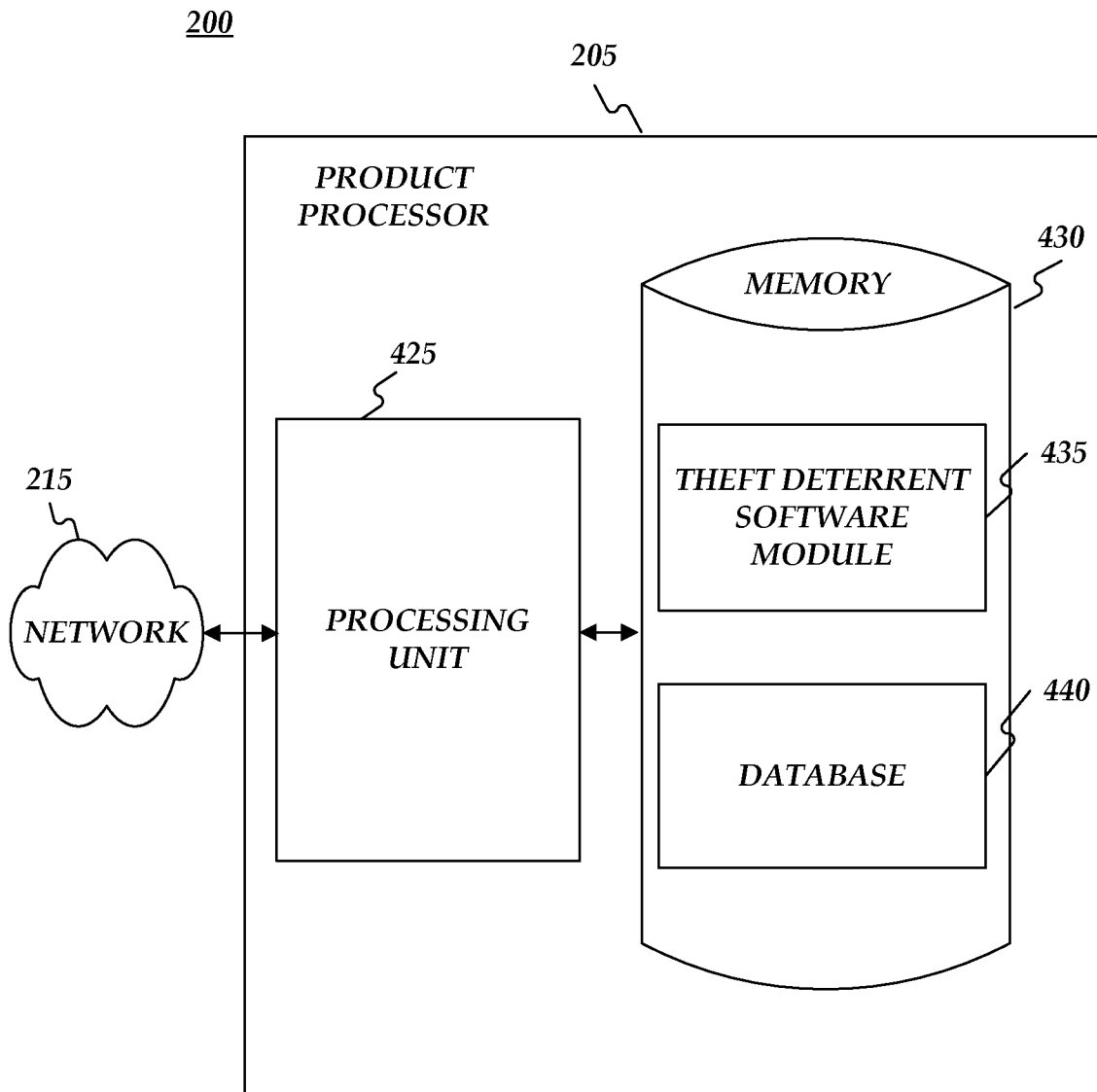


FIG. 3

**FIG. 4**

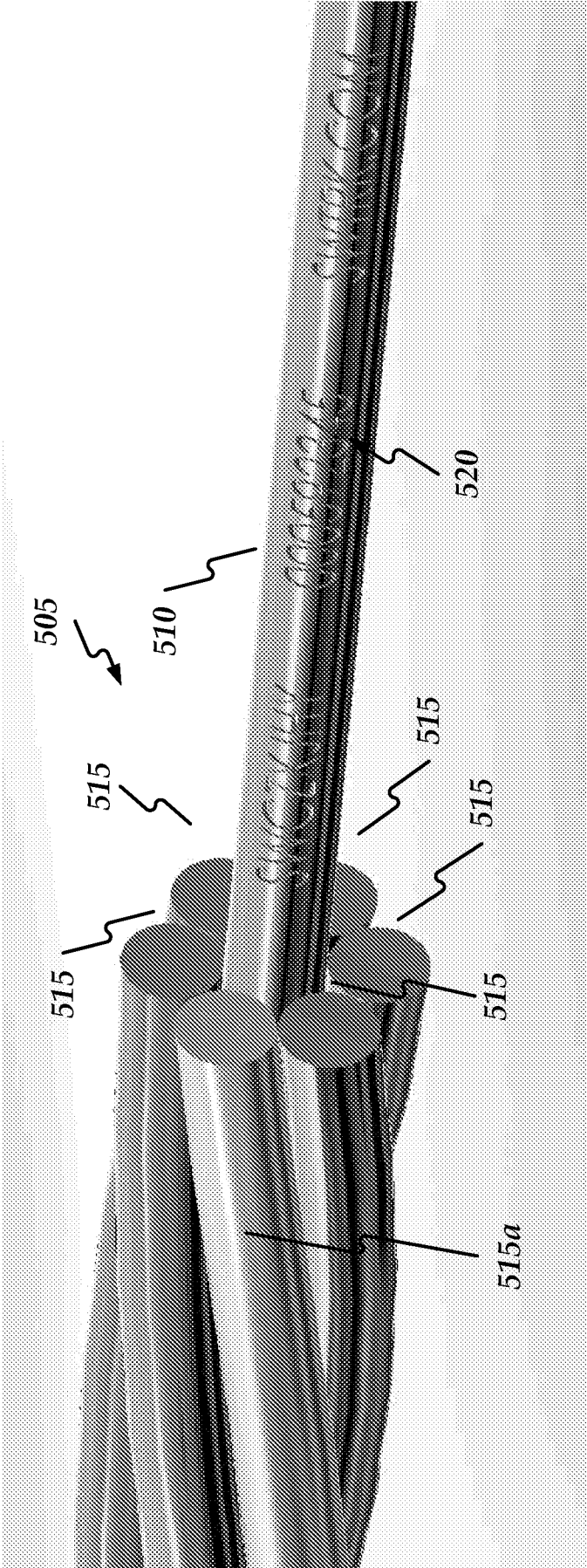


FIG. 5

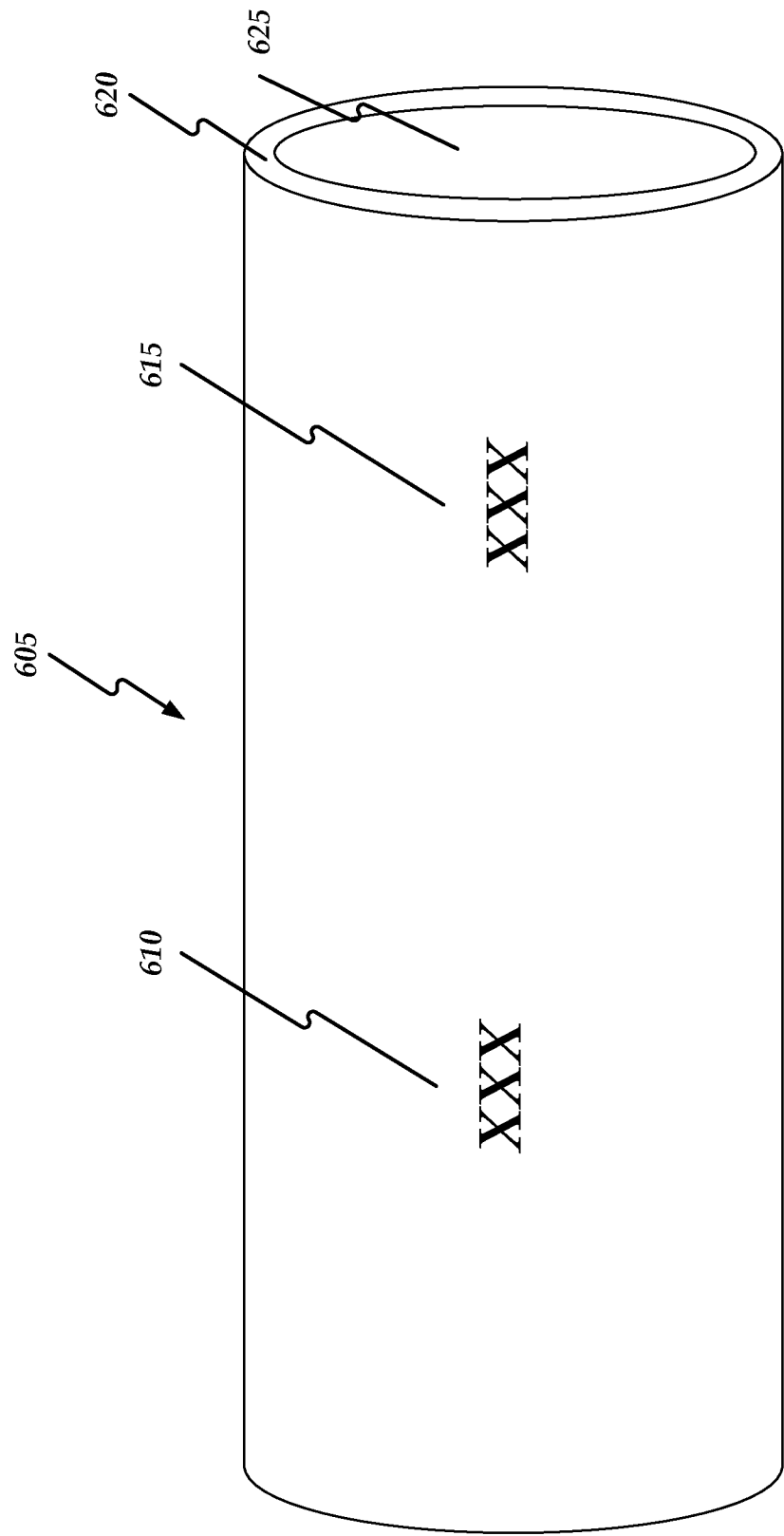


FIG. 6

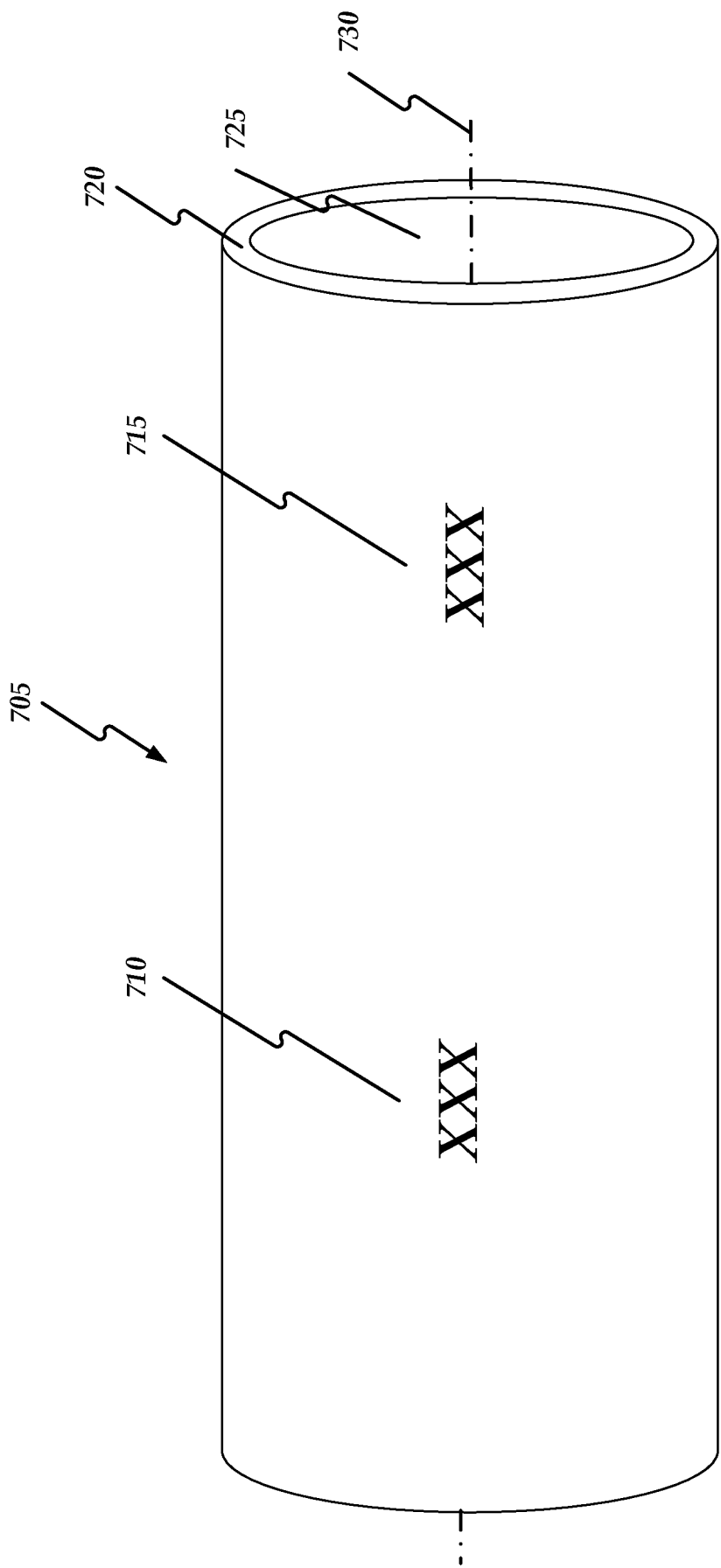


FIG. 7A

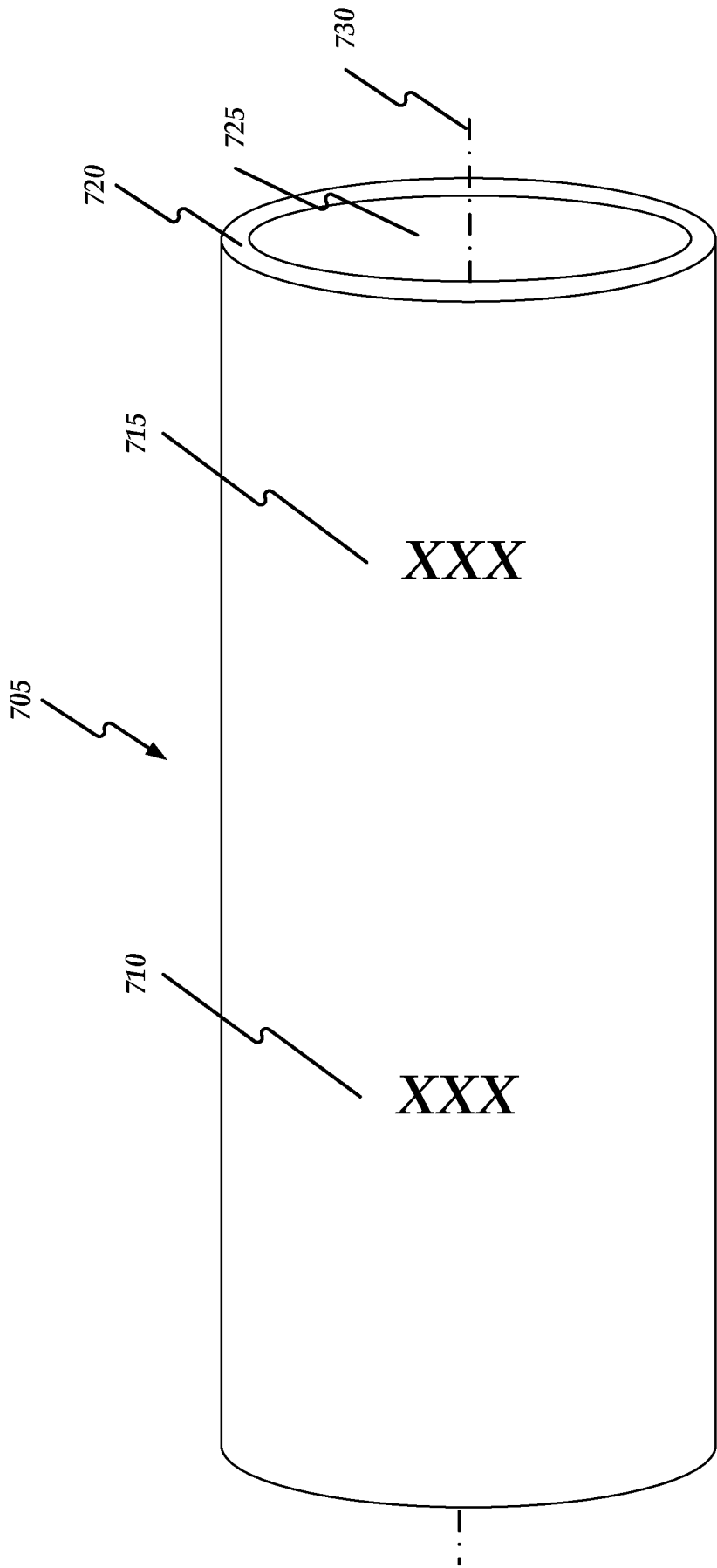


FIG. 7B

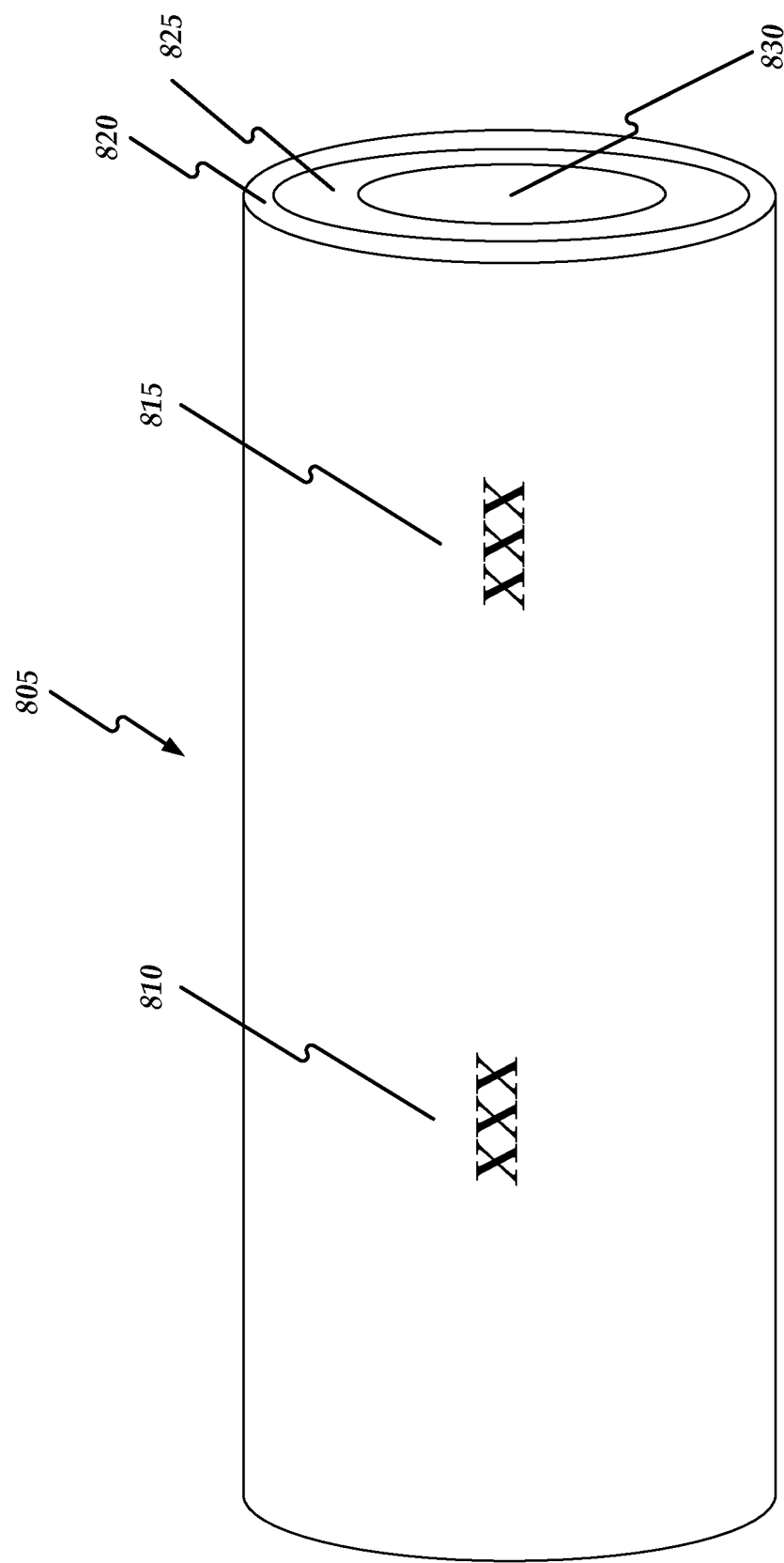
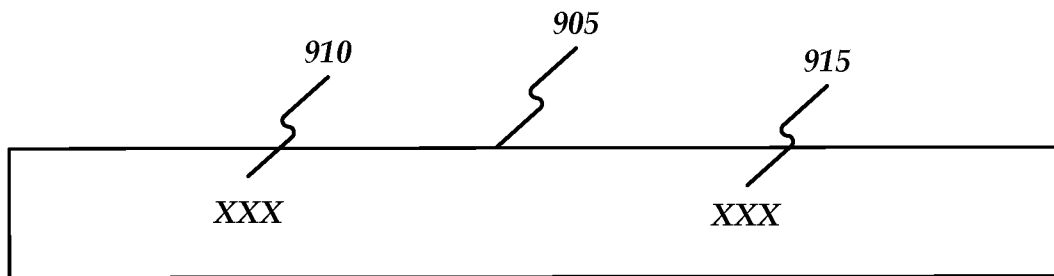
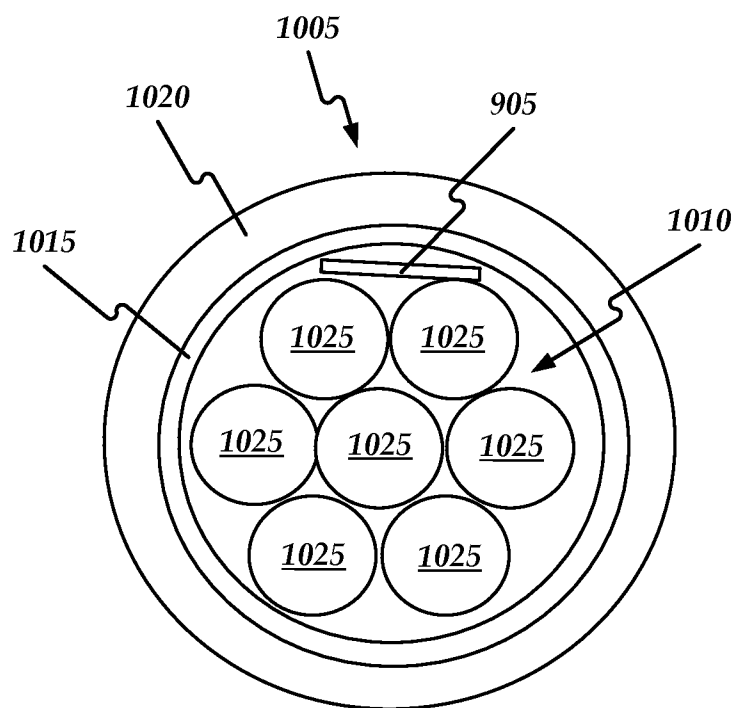


FIG. 8

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**FIG. 9****FIG. 10**

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/054257

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H01B7/36 G08B13/14
 ADD.

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO 2011/024144 A1 (CBI ELECTRIC AFRICAN CABLES A DIVISION OF ATC PTY LTD [ZA]; LEEBURN KI) 3 March 2011 (2011-03-03)	1-5, 10-13, 16-19,25
Y,P	Page 4, last paragraph; Page 5 (whole); Claims 5, 7, 8 and 9; Figures 1 and 2.	6-9,14, 15, 20-24, 26-29
Y	----- DE 20 2007 009370 U1 (BAIER HELWIG [DE]) 18 October 2007 (2007-10-18) paragraphs [0001] - [0004] paragraph [0008] paragraphs [0010], [0011] figure 2 ----- -/-	6-9, 20-24, 26-29



Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

2 October 2013

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/054257

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

International application No

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