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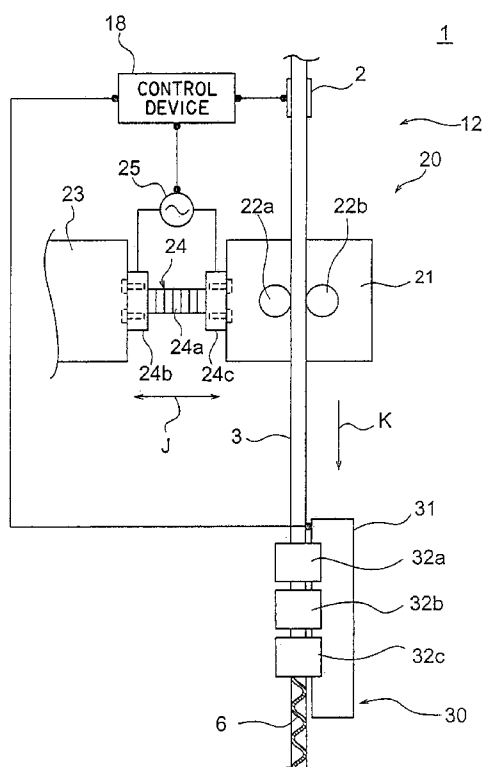
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[Continued on next page]

(54) Title: ELECTRICAL CABLE, APPARATUS AND METHOD OF COLORING AND MANUFACTURING SAME

FIG. 2



(57) Abstract: An object of the present invention is to provide a more recognizable mark on an outer surface of an electrical cable. An apparatus (1) for manufacturing an electrical cable (3) includes a coloring unit (12) to form a sinusoidal mark on an outer surface of the electrical cable (3) with ejection of a coloring material. The coloring unit (12) includes coloring nozzles (32a-32c) for continuously ejecting coloring materials onto the outer surface of the electrical cable moving in a longitudinal direction thereof; and a vibration device (20) disposed upstream of the coloring nozzles (32a-32c) for vibrating the electrical cable (3) in a direction orthogonal to the direction of movement of the electrical cable (3) and a direction of ejection of the coloring material.



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DESCRIPTION**ELECTRICAL CABLE, APPARATUS AND METHOD OF COLORING AND
MANUFACTURING SAME**

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Technical Field

The present invention relates to an electrical cable including a core wire and an insulation sheath cladding the core wire, an outer surface of the sheath being marked with a mark
10 for identification of the electrical cable. The present invention also relates to a method and an apparatus for coloring and manufacturing the electrical cable.

Related Art

15 A motor vehicle is mounted with a variety of electronic devices. A wire harness is arranged in the motor vehicle to supply electrical power from a power supply or control signal from a computer to the electronic devices. The wire harness includes a plurality of electrical wires and a connector
20 attached to end portions of the electrical wires.

The electrical cable includes a core wire and a sheath made of an insulation synthetic resin cladding the core wire. The connector includes a terminal and a connector housing to receive the terminal. The terminal is connected to the core wire of an
25 end portion of the electrical cable. The connector housing is made of an insulation synthetic resin and has a box shape. The

wire harness connected with the connector housing supplies electrical power or signal to the electronic devices.

The wire harness is assembled in the following manner. The electrical cable is cut into a prescribed length and the sheath
5 of the end portion thereof is removed. The terminal is then attached to the end portion and inserted into the connector housing.

The wire harness is identified about size of the core wire, material of the sheath (for example, heat resistance), and
10 purpose of use. The purpose of use is classified about a motor vehicle system such as control signal of air-bag, ABS (Antilock Brake System), or vehicle speed, and power transmission.

For identification of the electrical cable of the wire harness, the sheath is formed around the core wire by extruding
15 the synthetic resin colored with a desired coloring material (JP-H05-111947-A, JP-H06-119833-A, JP-H09-92056-A). When the color of the outer surface of the electrical cable is changed, it is necessary to stop operation of a extrusion cladding unit, resulting in additional time and cost which reduce productivity
20 of the electrical cable.

As another way to change the color of the outer surface, other coloring material is added to the coloring material in operation. This method causes a mixed coloring portion between
25 the first color portion and the next color portion of the electrical cable, resulting in low yield of the material of the electrical cable.

WO2003/019580 discloses that an electrical cable is clad with a synthetic resin with a plain color and that an outer surface of the electrical cable is colored with a desired color. Low productivity of the electrical cable and low yield of the material thereof are avoided. Patent document 5 discloses that an outer surface of a plain-colored electrical cable is colored with ejection of an amount of a coloring material by means of a coloring apparatus. FIG. 4 shows a perspective view of an electrical cable 103 colored with the coloring apparatus of JP-2005-019081-A. The outer surface 105a of a sheath 105 is marked with a straight mark 106 to identify the electrical cable 103. The sheath 105 has a plain color P and is marked with the mark 106 having a color R different from the plain color P.

The mark 106 is straight along a longitudinal direction of the electrical cable 103 and is thus invisible from view of some directions. A worker is concerned about inserting a terminal connected with the electrical cable 103 into a wrong terminal receiving chamber.

The worker thus confirms the mark 106 when he inserts the terminal into the connector housing, resulting in lower efficiency of assembly. It is thus difficult to identify the mark 106 such as a stripe pattern formed on the outer surface 105a of the electrical cable 103.

Disclosure of the Invention

The present invention is to provide an electrical cable

having a more recognizable mark on an outer surface thereof, and an apparatus and a method of coloring and manufacturing the electrical cable.

According to a first aspect of the present invention, a
5 coloring unit for coloring an electrical cable, includes: a coloring nozzle for continuously ejecting a coloring material onto an outer surface of the electrical cable moving in a longitudinal direction thereof; and a vibration device disposed upstream of the coloring nozzle for vibrating the electrical
10 cable in a direction orthogonal to the direction of movement of the electrical cable and a direction of ejection of the coloring material.

According to a second aspect of the present invention, an apparatus for manufacturing an electrical cable, includes: a
15 extrusion cladding unit for forming a sheath around a core wire with a synthetic resin of a plain color; a moving device for moving the electrical cable in a longitudinal direction thereof; a coloring nozzle for continuously ejecting a coloring material onto an outer surface of the electrical cable moving
20 in the longitudinal direction thereof; and a vibration device disposed upstream of the coloring nozzle for vibrating the electrical cable in a direction orthogonal to the direction of movement of the electrical cable and a direction of ejection of the coloring material.

25 According to a third aspect of the present invention, a method of coloring an electrical cable includes the steps of:

moving the electrical cable in a longitudinal direction thereof
and vibrating the electrical cable in a direction orthogonal
to the direction of movement of the electrical cable and a
direction of ejection of a coloring material; and continuously
5 ejecting the coloring material onto an outer surface of the
electrical cable.

According to a fourth aspect of the present invention, a
method of manufacturing an electrical cable includes the steps
of: extruding a synthetic resin of a plain color to form a sheath
10 around a core wire of the electrical cable; moving the
electrical cable in a longitudinal direction thereof and
vibrating the electrical cable in a direction orthogonal to the
direction of movement of the electrical cable and a direction
of ejection of a coloring material; and continuously ejecting
15 the coloring material onto an outer surface of the electrical
cable.

According to a fifth aspect of the present invention, an
electrical cable includes: a conductive core wire; and a sheath
made of an insulation synthetic resin and cladding the core wire,
20 wherein an outer surface of the sheath includes a sinusoidal
mark formed in a longitudinal direction of the electrical cable,
the sinusoidal mark being formed with ejection of a coloring
material onto the outer surface of the sheath for identification
of the electrical cable.

Brief Description of the Drawings

FIG. 1 is a schematic configuration showing an apparatus for manufacturing an electrical cable of an embodiment of the present invention;

5 FIG. 2 is a schematic configuration showing a coloring unit of the apparatus of FIG. 1;

FIG. 3 is a perspective view of the electrical cable manufactured with the apparatus of FIG. 1; and

10 FIG. 4 is a perspective view of a conventional electrical cable.

Best Mode for Carrying out the Invention

FIG. 1 shows an embodiment of an apparatus 1 for manufacturing an electrical cable 3 shown in FIG. 3, the
15 apparatus 1 including a coloring unit 12 shown in FIG. 2.

The electrical cable 3 is assembled in a wire harness arranged in a vehicle such as a motor vehicle. The electrical cable 3 includes a conductive core wire 4 and an insulation sheath 5 as shown in FIG. 3. The core wire 4 is formed with either
20 a plurality of wires or a single wire. The sheath 5 is made of a synthetic resin such as Polyvinylchloride (PVC) and covers the core wire 4. An outer surface of the sheath 5 is then an outer surface 5a of the electrical cable 3.

The sheath 5 is colored with a plain color P which is either
25 a color of a coloring material added into the synthetic resin or a color of the resin itself. The plain color P of the resin

itself is referred to as free color and can be white.

The outer surface 5a of the electrical cable 3 is marked with a mark 6 to identify the electrical cable 3, the mark 6 being colored with a color R denoted by parallel diagonal lines in FIG. 3. The color R is different from the plain color P. The mark 6 is formed in a sinusoidal shape and entirely extends in a longitudinal direction of the electrical cable 3. A plan view of the mark 6 appears as a sine curve.

The electrical cables 3 are assembled in the wire harness to supply electrical power or electrical signal to electronic devices through the connector. The worker identifies a size of the core wire 4, a material of the sheath 5, and purpose of use by means of the color of the mark 6 when he assembles the wire harness. The purpose of use is classified about a motor vehicle system such as control signal of air-bag, ABS (Antilock Brake System), or vehicle speed, and power transmission.

The sinusoidal mark 6 extends in a circumferential direction of the electrical cable 3 longer than the stripe mark 106 of FIG. 4 and is thus more recognizable with multidirectional views. The sinusoidal mark 6 improves working efficiency of assembly of the wire harness.

Referring to FIG. 1, the apparatus 1 for manufacturing the electrical cable 3 includes a supply unit 10, a extrusion cladding unit 11, the coloring unit 12, a take-up unit 13, and a plurality of pulleys 14 (moving device). The pulleys 14 pull the core wire 4 or the electrical cable 3 through the supply

unit 10, the extrusion cladding unit 11, the coloring unit 12, and the take-up unit 13, in turn in a direction K denoted by an arrow in FIG. 1.

The supply unit 10 supplies the core wire 4 to the extrusion
5 cladding unit 11. The extrusion cladding unit 11 then applies a hot melt synthetic resin of the plain color P around the core wire 4 to form the sheath 5.

The sheath 5 can be either formed with the plain-colored
10 synthetic resin or the synthetic resin containing the coloring material.

The coloring unit 12 is disposed downstream of and
immediately after the extrusion cladding unit 11. The coloring
unit 12 colors the outer surface 5a of the sheath 5 of the plain
color P with a desired color while the sheath 5 is at an elevated
15 temperature.

The outer surface 5a of the sheath 5 is colored with a
coloring liquid or a coating material. The coloring liquid
contains a solvent and a dye dissolved or dispersed in the
solvent, and the coating material contains a fluid dispersion
20 and a pigment dispersed in the fluid. When the coloring liquid
utilized, the dye soaks in the sheath 5, and when the coating
material used, the pigment adheres on the outer surface 5a of
the sheath 5.

It is preferable that the solvent and the fluid dispersion
25 have affinity with the synthetic resin of the sheath 5 to assure
soaking of the dye and adherence of the pigment.

The take-up unit 13 cuts the electrical cable 5 colored with the coloring unit 12 by a desired length and winds the electrical cable 5 into a drum for shipment.

Referring to FIG. 2, the coloring unit 12 includes a nozzle unit 30, a vibration device 20, an encoder 2, and a control device 18.

The nozzle unit 30 includes a unit main body 31 fixed on a floor of a factory and a plurality of coloring nozzles 32a-32c supported with the unit main body 31. The coloring nozzles 32a-32c are disposed above the electrical cable 3 horizontally stretched and are arranged in the direction K of movement of the electrical cable 3. FIGS. 1 and 2 show the three coloring nozzles 32a-32c arranged in the direction K. The coloring nozzles 32a-32c are referred to as a first, a second, and a third coloring nozzle respectively in the downstream direction.

The first coloring nozzle 32a is supplied with the color R, the second coloring nozzle 32b is supplied with a color except the colors R and P, and the third coloring nozzle 32c is supplied with a color except the colors utilized. The coloring nozzles 32a-32c downwardly eject prescribed amounts of the coloring materials onto and make the marks 6 on an uppermost portion of the outer surface 5a of the electrical cable 3. The coloring nozzles 32a-32c are selected in accordance with the specification of the electrical cable 3 and can be operated simultaneously.

The coloring nozzles 32a-32c are capable of independently

changing the color without stopping of operation of the apparatus 1. Productivity of the electrical cable 3 is thus maintained. The independent operation of the coloring nozzles 32a-32c can eliminate the mixture portion of the colors, resulting in reduction of yield loss of the material of the electrical cable 3.

The vibration device 20 is disposed upstream of the nozzle unit 30. The vibration device 20 includes a base body 23 fixed on the floor of the factory, a platform 21 to position the electrical cable 3 moved from the extrusion cladding unit 11 in place thereon, a pair of guide portions 22a and 22b having a cylindrical shape and upstanding from the platform 21 to guide the electrical cable 3 therebetween, an ultrasonic transducer 24, and an electrical power supply 25. The platform 21 is connected with the base body 23 via the ultrasonic transducer 24. The spacing between the guide portions 22a and 22b is adjusted to a distance substantially same as the diameter of the electrical cable 3.

The ultrasonic transducer 24 includes a plurality of piezoelectric elements 24a and a pair of electrodes 24b and 24c connected with both ends of the piezoelectric elements 24a. The piezoelectric elements 24a expand and contract in response to voltage applied. One electrode 24b is fixed to the base body 23 and another electrode 24c is fixed to the platform 21. The electrical power supply 25 supplies alternating current to the pair of the electrodes 24b and 24c.

The ultrasonic transducer 24 energized with the power supply 25 expands and contracts in a direction J denoted by an arrow in FIG. 2 by virtue of the piezoelectric elements 24a, the direction J being orthogonal to the longitudinal direction of the electrical cable 3 and the direction of ejection of the coloring material from the coloring nozzles 32a-32c. The ultrasonic transducer 24 vibrates the platform 21 in the direction J with an amplitude of 0.5-2mm in accordance with the diameter of the electrical cable 3.

The power supply 25 is turned on/off with control of the control device 18 and the ultrasonic transducer 24 is energized in a prescribed timing with the control device 18.

The encoder 2 is disposed upstream of the vibration device 20. The encoder 20 has a rotor with a cylindrical shape and rotatable about an axle. An outer surface of the rotor contacts the sheath 5 of the electrical cable 3. The rotor rotates as the electrical cable 3 moves in the direction K and the number of rotations is proportional to the distance of movement of the electrical cable 3.

The encoder 2 outputs a pulse signal responding to the distance of movement of the electrical cable 3 to the control device 18.

The control device 18 is a computer including RAM, ROM, and CPU to control the coloring unit 12. The control device 18 controls operation of one of the coloring nozzles 32a-32c to color the outer surface 5a of the sheath 5 based on a program

stored in ROM and the information received from the encoder 2.

The control device 18 controls the power supply 25 to energize the ultrasonic transducer 24 based on the information from the encoder 2 so that the ultrasonic transducer 24 vibrates the platform 21, or the electrical cable 3 in the direction J. The frequency (vibration velocity) of the platform 21 is adjusted with the control device 18 in response to the moving speed of the electrical cable 3 measured with the encoder 2. The reference frequency or the amplitude of the platform 21 is stored in advance in ROM in accordance with the diameter of the electrical cable 3 to be manufactured. The reference frequency denotes the frequency (vibration velocity) of the platform 21 for the prescribed velocity of the electrical cable 3. The apparatus 1 is capable of changing the reference frequency and the amplitude of the platform 21 in response to the electrical cable 3 to be manufactured.

When the electrical cable 3 is passed under the coloring nozzles 32a-32c consecutively ejecting the coloring material and subjected to vibration in the direction J, the sinusoidal mark 6 is formed in the longitudinal direction thereof as shown in FIG. 3. The frequency and amplitude of vibration of the platform 21 are adapted to change a pitch and the amplitude of the sinusoidal curve formed on the outer surface 5a of the electrical cable 3.

The electrical cable 3 is stretched and moved through the encoder 2 and the nozzle unit 30 in the direction K in FIG. 2.

The electrical cable 3 is manufactured utilizing the apparatus 1 in the following manner. The core wire 4 is supplied with the supply unit 10 and clad with the sheath 5 of the plain color P formed by the extrusion cladding unit 11. The electrical
5 cable 3 is moved with the pulleys 14 in the direction K. When the encoder 2 detects pass of the electrical cable 3 between the guide portions 22a and 22b, the control device 18 controls the power supply 25 to energize the ultrasonic transducer 24. The ultrasonic transducer 24 energized vibrates the platform
10 21 in the direction J and thus the electrical cable 3 passing the guide portions 22a and 22b.

When the encoder 2 detects the electrical cable 3 positioned below the coloring nozzles 32a-32c, the control device 18 controls the coloring nozzles 32a-32c to eject the
15 coloring materials. In this embodiment, the first coloring nozzle 32a is operated to eject the coloring material of the color R.

The vibration in the direction J and the movement in the direction K forms the sinusoidal mark 6 on the outer surface
20 5a of the electrical cable 3.

The pulleys 14 pull the electrical cable 3 to the take-up unit 13. The take-up unit 13 cuts the electrical cable 3 by the desired length and winds the cable to the drum.

When the encoder 2 measures a prescribed distance of
25 movement of the electrical cable 3, the control device 18 controls the coloring nozzles 32a-32c to stop ejection of the

coloring materials. When the pulleys 14 stop and the encoder 2 detects stoppage of movement of the electrical cable 3, the control device 18 controls the power supply 25 to stop energization of the ultrasonic transducer 24, or the platform 21. The ultrasonic transducer 24 can be stopped synchronously with stoppage of ejection of the coloring nozzles 32a-32c.

The apparatus 1 for manufacturing the electrical cable 3 includes the vibration device 20 upstream of the coloring nozzles 32a-32c so as to form the sinusoidal mark 6 on the outer surface 5a of the electrical cable 3. The sinusoidal mark 6 extends in the circumferential direction more than the conventional stripe mark 106 and thus becomes visible from multidirectional views. The more recognizable mark, sinusoidal mark 6 improves efficiency of assembly of the wire harness.

The coloring nozzles 32a-32c are disposed in the direction of movement of the electrical cable 3 so that the coloring nozzles 32a-32c can independently eject the respective colors without stopping the apparatus 1. Productivity of the electrical cable 3 is thus improved. The independent coloring nozzles 32a-32c avoid the mixing of the colors when the one color is changed to other colors.

The platform 21 is subjected to vibration of the ultrasonic transducer 24 but can be vibrated with an eccentric cam.

It is appreciated that the sinusoidal mark 6 can be formed at both end portions of the electrical cable 3 or can be intermittently formed in the longitudinal direction thereof.

The information of movement of the electrical cable 3 from the encoder 2 and the program stored in the control device 18 effects the variation of the sinusoidal mark 6.

An image sensor such as CCD camera and an identifying device to identify an arbitrary position of the electrical cable 3 from the image of the image sensor can be replaced with the encoder 2.

The electrical cable 3 manufactured with the apparatus 1 can be utilized for electronic devices such as a portable computer.

Acrylic paint, ink (dye or pigment), and UV ink are utilized for the coloring liquid and the coating material.

The embodiments of the present invention are purely exemplary and not limited thereto. Any modification and alteration are within scope of the present invention.

Industrial Applicability

A coloring unit for coloring an electrical cable, includes: a coloring nozzle for continuously ejecting a coloring material onto an outer surface of the electrical cable moving in a longitudinal direction thereof; and a vibration device disposed upstream of the coloring nozzle for vibrating the electrical cable in a direction orthogonal to the direction of movement of the electrical cable and a direction of ejection of the coloring material. The coloring material is thus ejected onto the outer surface of the electrical cable to form a sinusoidal

mark extending in the longitudinal direction thereof and to provide a more recognizable mark.

An apparatus for manufacturing an electrical cable, includes: a extrusion cladding unit for forming a sheath around
5 a core wire with a synthetic resin of a plain color; a moving device for moving the electrical cable in a longitudinal direction thereof; a coloring nozzle for continuously ejecting a coloring material onto an outer surface of the electrical cable moving in the longitudinal direction thereof; and a
10 vibration device disposed upstream of the coloring nozzle for vibrating the electrical cable in a direction orthogonal to the direction of movement of the electrical cable and a direction of ejection of the coloring material. The coloring material is thus ejected onto the outer surface of the electrical cable to
15 form a sinusoidal mark extending in the longitudinal direction thereof and to manufacture the electrical cable having a more recognizable mark.

A method of coloring an electrical cable includes the steps of: moving the electrical cable in a longitudinal direction
20 thereof and vibrating the electrical cable in a direction orthogonal to the direction of movement of the electrical cable and a direction of ejection of a coloring material; and continuously ejecting the coloring material onto an outer surface of the electrical cable. The coloring material is thus
25 ejected onto the outer surface of the electrical cable to form a sinusoidal mark extending in the longitudinal direction

thereof and to provide a more recognizable mark.

A method of manufacturing an electrical cable includes the steps of: extruding a synthetic resin of a plain color to form a sheath around a core wire of the electrical cable; moving the electrical cable in a longitudinal direction thereof and vibrating the electrical cable in a direction orthogonal to the direction of movement of the electrical cable and a direction of ejection of a coloring material; and continuously ejecting the coloring material onto an outer surface of the electrical cable. The coloring material is thus ejected onto the outer surface of the electrical cable to form a sinusoidal mark extending in the longitudinal direction thereof and to manufacture the electrical cable having a more recognizable mark.

The outer surface of the electrical cable is marked with the sinusoidal mark extending in the longitudinal direction thereof. The sinusoidal mark extends in the circumferential direction of the electrical cable more than the conventional stripe mark so that the sinusoidal mark can be more recognizable from multidirectional views. Use of the electrical cable with the sinusoidal mark improves efficiency of assembly of the wire harness.

Claims

1. A coloring unit for coloring an electrical cable, comprising:

a coloring nozzle for continuously ejecting a coloring
5 material onto an outer surface of the electrical
cable moving in a longitudinal direction thereof; and
a vibration device disposed upstream of the coloring
nozzle for vibrating the electrical cable in a
direction orthogonal to the direction of movement of
10 the electrical cable and a direction of ejection of
the coloring material.

2. An apparatus for manufacturing an electrical cable, comprising:

a extrusion cladding unit for forming a sheath around a
15 core wire with a synthetic resin of a plain color;
a moving device for moving the electrical cable in a
longitudinal direction thereof;

a coloring nozzle for continuously ejecting a coloring
material onto an outer surface of the electrical
20 cable moving in the longitudinal direction thereof;
and

a vibration device disposed upstream of the coloring
nozzle for vibrating the electrical cable in a
direction orthogonal to the direction of movement of
25 the electrical cable and a direction of ejection of
the coloring material.

3. A method of coloring an electrical cable comprising the steps of:

moving the electrical cable in a longitudinal direction thereof and vibrating the electrical cable in a direction orthogonal to the direction of movement of the electrical cable and a direction of ejection of a coloring material; and continuously ejecting the coloring material onto an outer surface of the electrical cable.

4. A method of manufacturing an electrical cable comprising the steps of:

extruding a synthetic resin of a plain color to form a sheath around a core wire of the electrical cable; moving the electrical cable in a longitudinal direction thereof and vibrating the electrical cable in a direction orthogonal to the direction of movement of the electrical cable and a direction of ejection of a coloring material; and continuously ejecting the coloring material onto an outer surface of the electrical cable.

5. An electrical cable comprising:

a conductive core wire; and a sheath made of an insulation synthetic resin and cladding the core wire,

wherein an outer surface of the sheath includes a sinusoidal mark formed in a longitudinal direction

of the electrical cable, the sinusoidal mark being formed with ejection of a coloring material onto the outer surface of the sheath for identification of the electrical cable.

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FIG. 2

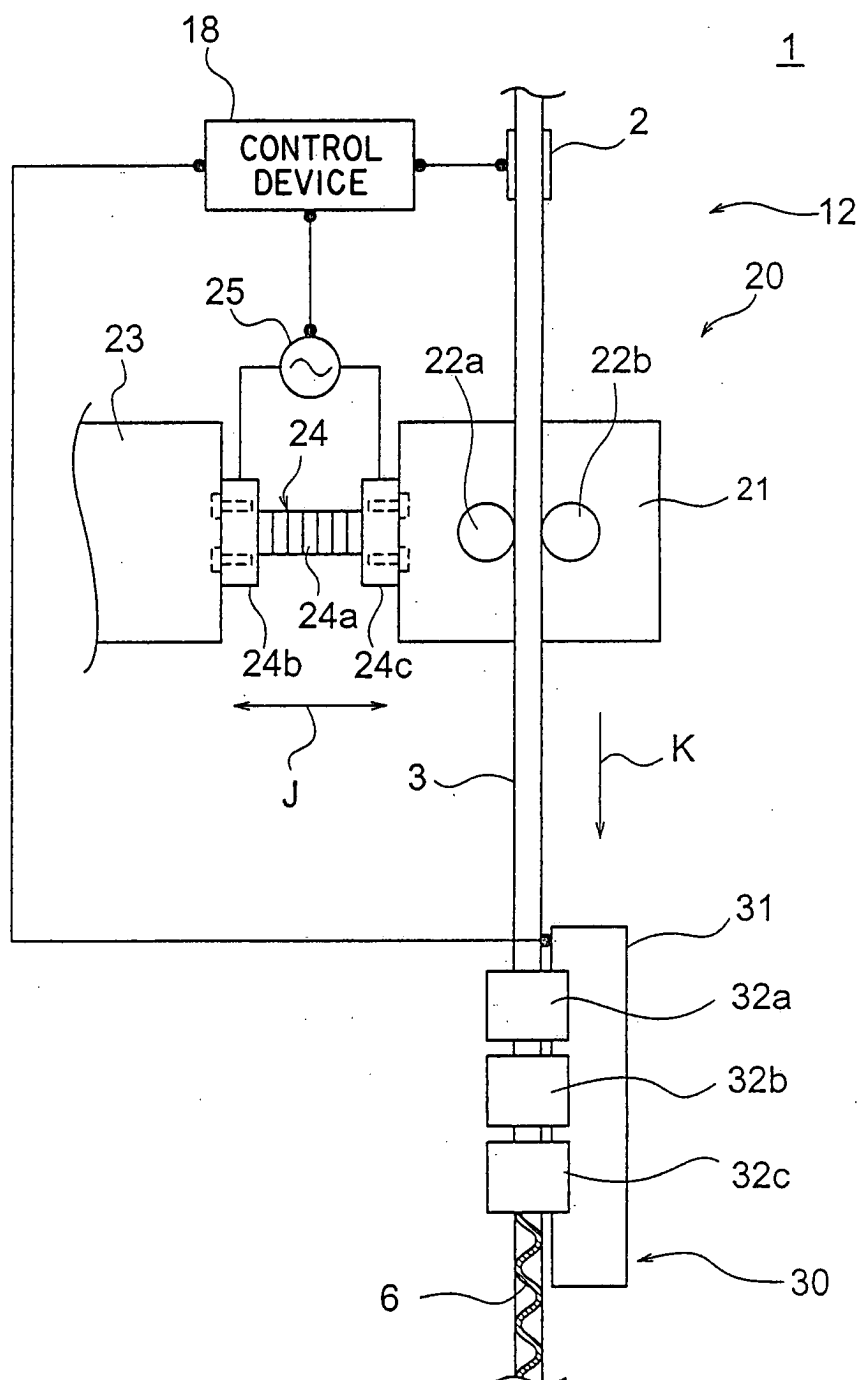


FIG. 3

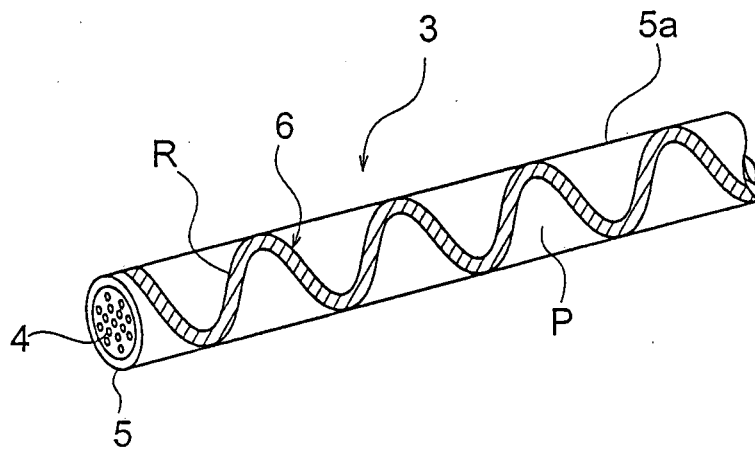
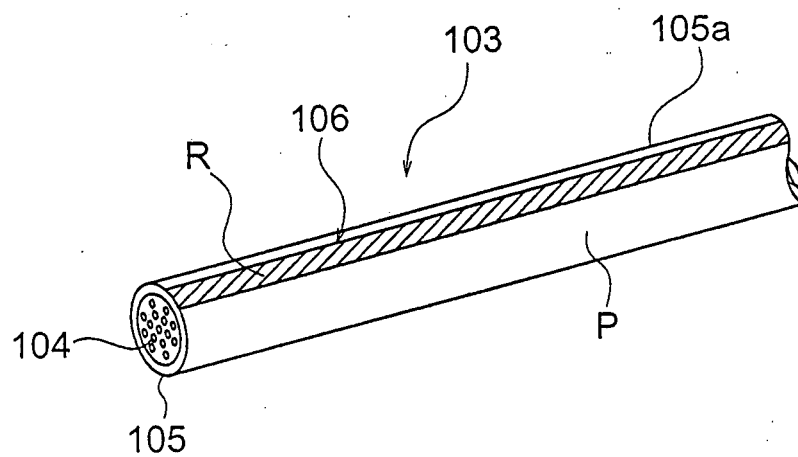


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No

PCT/JP2007/072230

A. CLASSIFICATION OF SUBJECT MATTER

INV. H01B13/34

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, 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	CH 354 493 A (SIEMENS AG [DE]) 31 May 1961 (1961-05-31)	1-4
X	page 1, line 42 - line 55; figures 1,2 -----	5
X	DE 14 15 791 A1 (KABEL METALLWERKE GHH) 21 November 1968 (1968-11-21) page 2, paragraph 2 - paragraph 3; figures 1,2 -----	1-4

☐

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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- *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.
- *G* document member of the same patent family

Date of the actual completion of the international search

28 January 2008

Date of mailing of the international search report

05/02/2008

Name and mailing address of the ISA/

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Fax: (+31-70) 340-3016

Authorized officer

Salm, Robert

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/JP2007/072230

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CH 354493	A	31-05-1961	NONE	
DE 1415791	A1	21-11-1968	CH 397016 A	15-08-1965
			GB 950571 A	26-02-1964