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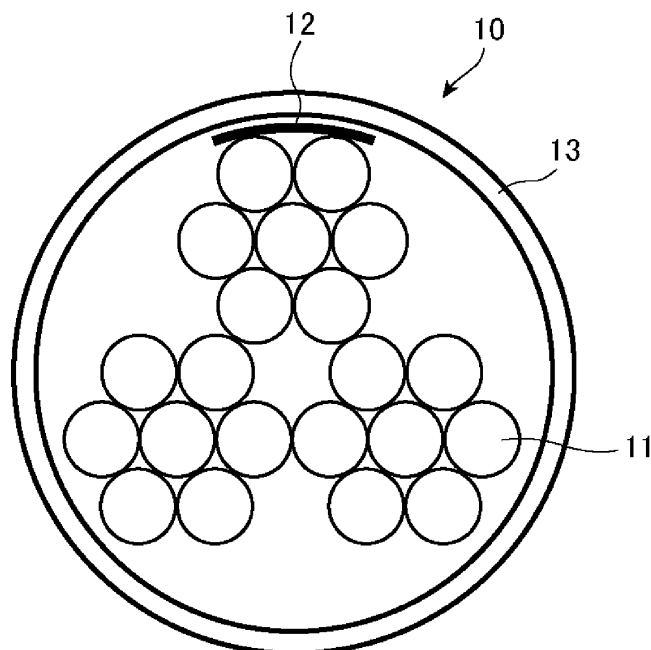
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(54) **WIRE ROPE WITH REFLECTIVE TAPE, WIRE ROPE WITH FLUORESCENT TAPE, AND CABLE-TYPE TRAFFIC BARRIER**

(57) Provided is a wire rope with a reflective tape (or a fluorescent tape), in which a reflective tape 12 (or a fluorescent tape) is wound around an outer periphery of a wire rope 11, and further having on its outer periphery

a protective layer 13 formed of a translucent member, thereby improving visibility of the wire rope at nighttime, etc., and a cable-type traffic barrier using the wire rope with the reflective tape (or the fluorescent tape).

[Fig. 2]



Description

[Technical Field]

[0001] This invention relates to a wire rope with a reflective tape, a wire rope with a fluorescent tape, and a cable-type traffic barrier having the same.

[Background Art]

[0002] Traffic barriers such as guardrails are used as facilities to enhance road safety. A traffic barrier is a facility in the form of a fence installed along a roadway in order to prevent a travelling vehicle from deviating to an oncoming lane, a sidewalk, etc., and is basically a facility in which a beam or a rope is supported by posts along the roadway.

[0003] One of the traffic barriers is a cable-type traffic barrier with a wire rope stretched between posts. One of the requirements for the cable-type traffic barrier is to improve visibility of the wire rope at nighttime, etc.

[0004] In this regard, a prior art related to a wire rope used for a cable-type traffic barrier is disclosed in Patent Document 1.

[Prior Art Publication]

[Patent Documents]

[0005] [Patent Document 1] Japan Patent No. 6368449

[Summary of the Invention]

[Problem to be Solved by the Invention]

[0006] Patent Document 1 discloses a wire rope in which a resin wire is spirally wound along a recess between strands, and describes that a luminous material is included in the resin wire. According to the above, visibility of the wire rope at nighttime, etc. can be considered as improved to a certain extent.

[0007] However, since light emission by light accumulation is not so strong and weakens with the lapse of time, there is a limit in terms of improving visibility of the wire rope. Further, in some cases, for example, a road in a mountainous area, etc. hardly receives light depending on the season or the condition of the installation environment, and from this aspect, there is a limit in improving the visibility of the wire rope.

[0008] In addition, in the case where the resin wire is wound along the concave portion between the strands as disclosed in Patent Document 1, there is a risk that the resin wire may be cut due to friction, etc. during construction or contact with vehicles, and if the resin wire is cut even at one location, the resin wire may be loosened from such a point and may fall off.

[0009] In view of the above, the object of this invention

is to provide a wire rope improved in visibility of the wire rope at nighttime, etc.

[Means for Solving the Problem]

(Configuration 1)

[0010] A wire rope with a reflective tape, in which the reflective tape is wound around an outer periphery of the wire rope, further having an outer periphery thereof covered with a protection layer formed from a translucent material.

(Configuration 2)

[0011] A wire rope with a fluorescent tape, in which the fluorescent tape is wound around an outer periphery of the wire rope, further having an outer periphery thereof covered with a protection layer formed from a translucent material.

(Configuration 3)

[0012] A cable-type traffic barrier including at least one of the wire rope with the reflective tape of Configuration 1 or the wire rope with the fluorescent tape of Configuration 2.

[Effect of the Invention]

[0013] According to the wire rope with a reflective tape, the wire rope with a fluorescent tape, and the cable-type traffic barrier provided therewith, visibility of the wire rope at nighttime, etc. can be improved due to the reflective tape (or the fluorescent tape) emitting light stronger than a luminous material when the light hits a headlight, etc.

[Brief Description of the Drawings]

[0014]

[Fig. 1] Fig. 1 shows a wire rope with reflective tape (protection layer not shown) of an embodiment according to this invention.

[Fig. 2] Fig. 2 is a cross-sectional view of a wire rope with reflective tape of the embodiment.

[Fig. 3] Fig. 3 shows a cable-type traffic barrier.

[Fig. 4] Fig. 4 shows another example of a wire rope with reflective tape (protection layer not shown).

[Embodiment for Carrying Out the Invention]

[0015] The embodiment of this invention is described concretely below together with the drawings. Incidentally, the embodiment given below is one of the embodiments upon embodying this invention and is not intended to limit the invention within such a scope.

[0016] Fig. 1 is a schematic view showing a wire rope

with reflective tape of an embodiment according to this invention, and Fig. 2 shows a cross-section of the wire rope with reflective tape. For convenience of illustration, in Fig. 1, a transparent resin tube (protection layer formed of translucent member) provided on an outermost layer is omitted.

[0017] As shown in Figs. 1 and 2, a wire rope with reflective tape 10 of this embodiment has a wire rope 11 (3×7 wire rope in this embodiment) having a reflective tape 12 wound spirally around an outer periphery of the wire rope 11, with an outer periphery thereof further covered with a transparent resin tube (protection layer formed of translucent member) 13.

[0018] While a 3×7 wire rope 11 is used as an example in this embodiment, a wire rope of any configuration can be used.

[0019] The reflective tape 12 may be any reflective tape, such as a bead type or a prism type; however, it is preferable to have enough flexibility to be wound around the wire rope.

[0020] The reflective tape 12 is spirally wound around the outer periphery of the wire rope 11. The reflective tape 12 may be adhered to the wire rope 11 by having an adhesive layer or using an adhesive, etc., or may be simply wound without being adhered, etc. to the wire rope 11.

[0021] In this embodiment, an example is given where the reflective tape 12 is wound spirally in the same direction as the twisting direction of the wire rope 11; however, the twisting direction of the wire rope 11 and the spiral direction of the reflective tape 12 can be opposite.

[0022] The transparent resin tube 13 protects the wire rope 11 and the reflective tape 12, and is a tube made of a transparent resin in this embodiment. The wire rope 11 having the reflective tape 12 wound is inserted into the transparent resin tube 13 to form the wire rope with reflective tape 10.

[0023] As the transparent resin tube 13, a transparent heat-shrinkable tube may be used, and after the wire rope 11 having the reflective tape 12 wound thereto is inserted, heat may be applied for adherence.

[0024] Fig. 3 is a diagram schematically showing a cable-type traffic barrier. A cable-type traffic barrier 100 is provided with terminal posts 103 installed at both ends thereof, intermediate posts 102, and wire ropes supported by each post along a roadway.

[0025] Visibility of the wire rope of the cable-type traffic barrier at nighttime, etc. is improved by using the wire rope with reflective tape 10 as the wire rope. Namely, according to the wire rope with reflective tape 10 of this embodiment, since the light of a headlight of a vehicle, etc. is reflected by the reflective tape 12, the wire rope has high luminance and excellent visibility as compared to those with a resin wire including the luminous material as disclosed in Patent Document 1.

[0026] Further, in winding the resin wire around the wire rope as in Patent Document 1, the resin wire forms a projection in the cross-sectional shape as shown in Fig.

2, etc. of Patent Document 1. Such a projection is likely to be damaged during construction or vehicle contact, and the resin wire is easily broken. If the thickness of the resin wire is reduced, it is possible to reduce formation of the projection of the resin wire in the cross-sectional shape. However, the reduced thickness of the resin wire causes a problem where the effect of improving visibility is reduced.

[0027] On the other hand, since the wire rope with reflective tape 10 of this embodiment uses the reflective tape 12, the above-described problem can be reduced.

[0028] The resin wire of Patent Document 1 is likely to be broken as mentioned above, and if the resin wire is cut even at one location, the resin wire may be loosened from such a point and may fall off.

[0029] On the other hand, since the wire rope with reflective tape 10 of this embodiment is covered with the transparent resin tube 13 as a protection layer, damage or breakage of the reflective tape 12 is reduced, and even if a local breakage occurs, the reflective tape 12 does not loosen and fall off therefrom.

[0030] As described above, according to the wire rope with reflective tape 10 of this embodiment, visibility of the wire rope at nighttime, etc. is improved by winding the reflective tape 12. Further, due to being covered with the transparent resin tube 13, the reflective tape 12 is prevented from being damaged or falling off.

[0031] In this embodiment, the wire rope with reflective tape 10 is used for a cable-type traffic barrier as an example. However, the present invention is not limited thereto, and the wire rope with reflective tape 10 can be used for various applications.

[0032] When the wire rope with reflective tape 10 is used for the cable-type traffic barrier, the wire rope with reflective tape 10 may be used for all the wire ropes, or the wire rope with reflective tape 10 may only be partially used.

[0033] For example, when only one wire rope with reflective tape 10 is used, the use of the wire rope with reflective tape 10 for the topmost wire rope is considered to have a great effect of improving visibility.

[0034] In this embodiment, an example is given where the reflective tape is wound; however, a fluorescent tape may be wound. Further, both of the reflective tape and the fluorescent tape may be wound, and a light-accumulating tape may further be wound.

[0035] A retroreflective tape may be used as the reflective tape.

[0036] In this embodiment, the transparent resin tube 13 is used as the protection layer. However, it is sufficient as long as light can be transmitted and capable of coating the wire rope as a protection layer. For example, the wire rope may be coated with resin, etc. (any coating method can be used).

[0037] Any winding manner can be used for winding the reflective tape around the wire rope.

[0038] Fig. 4 shows another example of the wire rope with reflective tape (protection layer not shown).

[0039] For example, the number of the reflective tapes to be wound around the wire rope is arbitrary, and Fig. 4(a) shows as an example a wire rope with reflective tape 10' wound with two reflective tapes 12'.

[0040] The area of the reflecting surface can be easily adjusted by adjusting the width of the reflective tape, the number of the tapes to be wound, or the pitch of winding. For example, the surface of the wire rope may be covered almost entirely with the reflective tape by applying narrower pitches.

[0041] In this embodiment, the reflective tape is spirally wound as an example. However, this invention is not limited thereto, and for example, as shown in Fig. 4(b), the wire rope with reflective tape 10" may be wound with a reflective tape 12" in a ring-like manner.

[Description of Reference Numerals]

[0042]

10 wire rope with reflective tape

11 wire rope

12 reflective tape

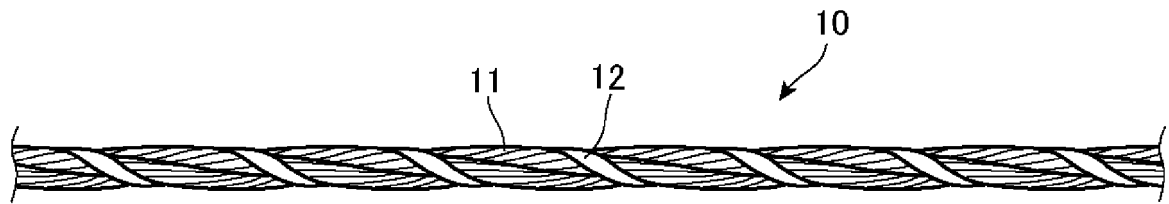
13 transparent resin tube (protection layer formed by translucent material)

100 cable-type traffic barrier

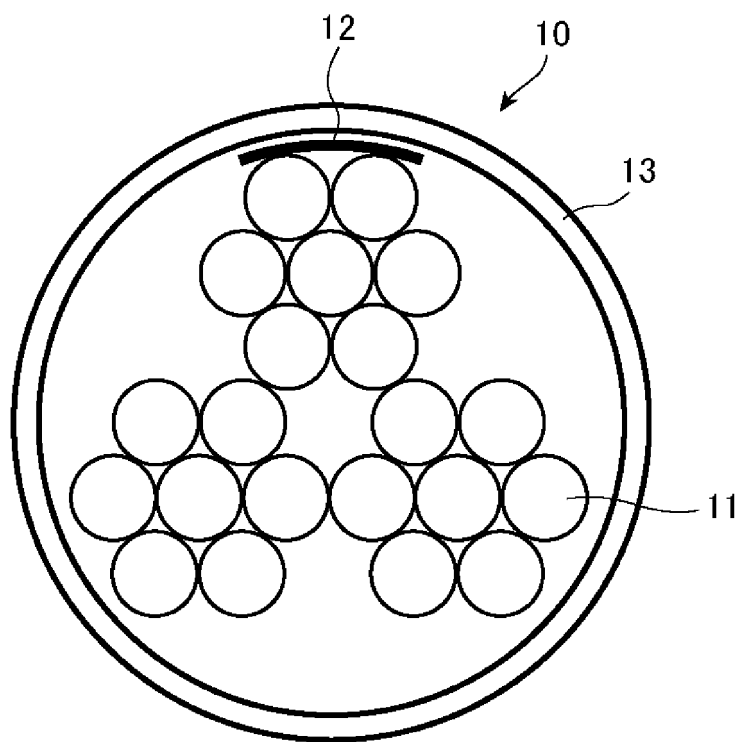
Claims

1. A wire rope with a reflective tape, wherein the reflective tape is wound around an outer periphery of the wire rope, further having an outer periphery thereof covered with a protection layer formed from a translucent material.
2. A wire rope with a fluorescent tape, wherein the fluorescent tape is wound around an outer periphery of the wire rope, further having an outer periphery thereof covered with a protection layer formed from a translucent material.
3. A cable-type traffic barrier comprising at least one of the wire rope with the reflective tape of claim 1 or the wire rope with the fluorescent tape of claim 2.

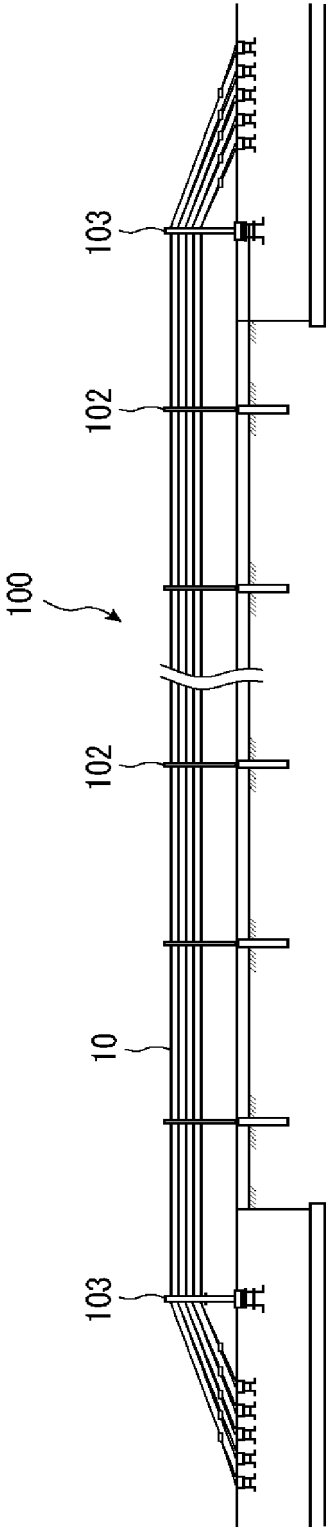
[Fig. 1]



[Fig. 2]

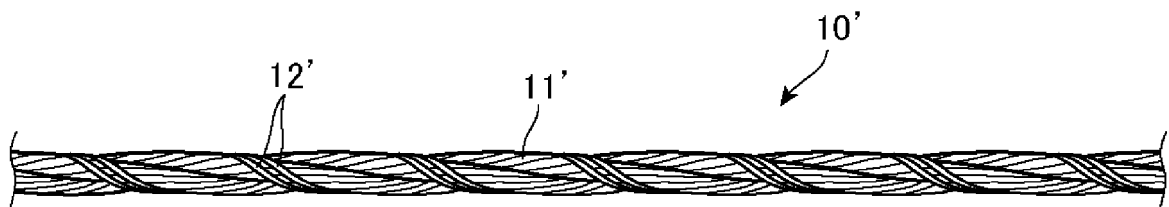


[Fig. 3]

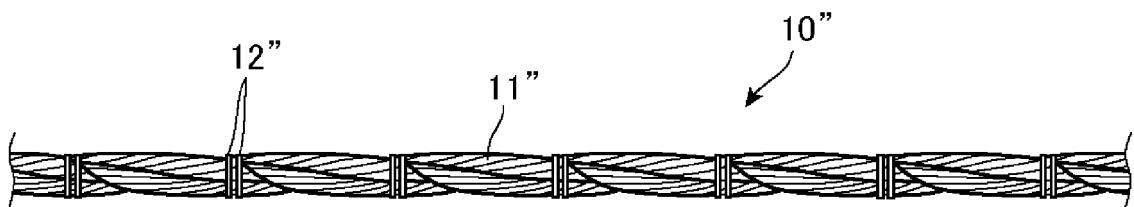


[Fig. 4]

(a)



(b)



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/039146

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. D07B1/16(2006.01) i, E01F15/06(2006.01) i

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)

Int.Cl. D07B1/00-9/00, E01F1/00, E01F13/00-15/14, G09F13/00-13/46

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

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2018

Registered utility model specifications of Japan 1996-2018

Published registered utility model applications of Japan 1994-2018

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 54-41049 Y2 (TOKYO ROPE MFG. CO., LTD.) 03 December 1979, column 1, lines 23-24, column 2, lines 16-31, column 3, line 10 to column 4, line 1, drawings & JP 54-60922 U	1-3

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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

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"&" document member of the same patent family

Date of the actual completion of the international search
07 December 2018 (07.12.2018)Date of mailing of the international search report
18 December 2018 (18.12.2018)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/039146

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 103355/1981 (Laid-open No. 10919/1983) (SHINAGAWA ELECTRIC WIRE CO., LTD.) 24 January 1983, page 2, line 8 to page 3, line 11, drawings (Family: none)	1, 2
A	KR 10-2013-0014092 A (GWANG MYUNG BIO INDUSTRY CO., LTD.) 07 February 2013, claims, drawings (Family: none)	1-3
A	US 2376813 A (ROBINS, C.) 22 May 1945, claims, figures & GB 556747 A & GB 557442 A	1-3
A	US 2382355 A (WARREN, JR., R. F.) 14 August 1945, claims, figures (Family: none)	1-3

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 6368449 B [0005]