



(11) **EP 1 312 574 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
21.05.2003 Bulletin 2003/21

(51) Int Cl.7: **B66B 7/06**

(21) Application number: **00954956.9**

(86) International application number:
PCT/JP00/05671

(22) Date of filing: **24.08.2000**

(87) International publication number:
WO 02/016249 (28.02.2002 Gazette 2002/09)

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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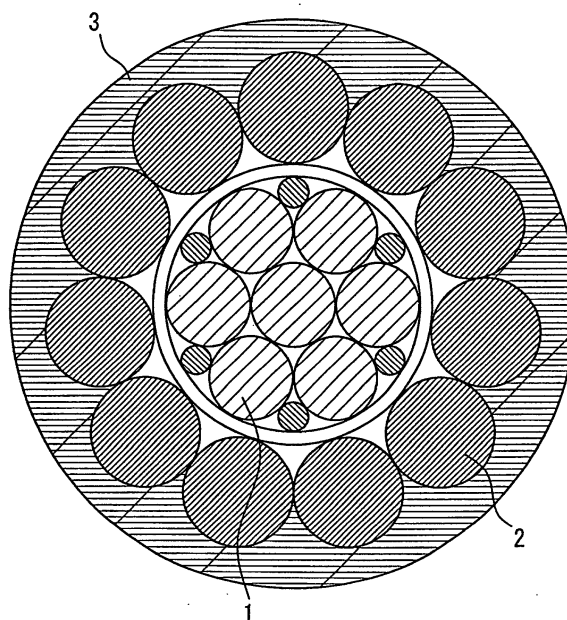
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(54) **SYNTHETIC FIBER ROPE FOR ELEVATORS**

(57) An outer sheath layer 3 made of flexible synthetic resin is formed so as to cover the outer circumferences of a plurality of synthetic-resin-made strands 2 constituting an outer circumference portion of a synthetic fiber rope. Segments of predetermined lengths in the outer sheath layer 3 are formed so as to be adjacent to each other and differ in color from each other. On the basis of a relationship between the colored segments and a sheave around which the main cable is wound, the position of a car in a shaft is assigned to one of the colored segments in the outer sheath layer 3 beforehand. This realizes a function equal to that of indices marked on the synthetic fiber rope.

As a result, even after an elevator system has been used for a long period of time, indices can be identified readily, thereby preventing difficulty in identifying indices, which would otherwise be caused by wear due to aging. Hence, there can be appropriately addressed an operation for rescuing passengers in an accidentally-stopped elevator car, thereby speeding the rescue operation.

Fig.1



Description

Technical Field

[0001] The present invention relates to a synthetic fiber rope which is coiled around a sheave to suspend a vertically-movable member and which is actuated by means of rotation of a sheave to vertically move the vertically-movable member.

Background Art

[0002] A wire rope; that is, a steel rope, has hitherto been used as a main cable for suspending an elevator car. In the event that an elevator car accidentally stops for reasons of a power failure or the like, a rescue operation is performed for rescuing passengers confined in the car after determination of a location in a shaft where the car has accidentally stopped.

[0003] In preparation for such a rescue operation for rescuing passengers, indices corresponding to car positions in the shaft are marked on the main cable in advance. The position of an accidentally-stopped car is specified by way of an index assigned to the main cable when accidental stoppage of an elevator system has arisen. For instance, a car is located in a position between the fifth and sixth floors, and then passengers are rescued.

[0004] In order to enable such an operation for rescuing passengers, after installation of an elevator system the foregoing indices are marked, with appropriate paint, on the main cable consisting of a wire rope. When the elevator system has been used for a long period of time, stains from a rope oil or peeling of paint stemming from wear of the main cable renders identification of the indices difficult. This hinders an operation for rescuing passengers in the event of accidental stoppage of an elevator car.

[0005] Consequently, the present invention aims at obtaining a synthetic fiber rope for use with an elevator, in which indices attached to a main cable can be readily identified even after the main cable has been installed.

Disclosure of the Invention

[0006] In the present invention, an outer sheath layer is formed from flexible synthetic resin so as to cover a plurality of strands constituting an outer circumference of a main cable formed from a synthetic fiber rope for use with an elevator, and adjacent segments of predetermined lengths are formed in the outer sheath layer so as to differ in color from each other.

[0007] On the basis of a relationship between the colored segments and a sheave around which the main cable is wound, the position of a car in a shaft is assigned to one of the colored segments in the outer sheath layer beforehand.

[0008] This realizes a function equal to that of the in-

dices marked on the synthetic fiber rope.

[0009] Since the outer sheath layer is made of synthetic resin, the layer can be readily colored during a manufacturing process. Even after an elevator system has been used for a long period of time, there can be prevented difficulty in identifying indices, which would otherwise be caused by wear of the outer sheath layer.

[0010] Consequently, there can be appropriately addressed an operation for rescuing passengers in an accidentally-stopped elevator car, thereby speeding the rescue operation.

[0011] According to the present invention, the outer sheath layer is made in a color different from that of the strands, thereby facilitating and enabling appropriate determination of the wear state of the outer sheath layer. Because of this, the efficiency of maintenance and inspection of the main cable of the elevator system can be improved.

[0012] Moreover, according to the present invention, a layer of paint differing in color from the outer sheath layer may preferably be formed on the surfaces of the strands.

[0013] Further, the present invention may also be embodied as a synthetic fiber rope for use with an elevator, comprising: rope cores; a plurality of strands provided along an outer circumference of the rope cores, each strand being made by means of twisting a plurality of flexible synthetic fibers; and an outer sheath layer which is made of flexible synthetic resin, and which is formed along an outer circumference of the strands, wherein a coating layer differing in color from the outer sheath layer is formed on the surfaces of the strands.

[0014] Further, according to the present invention, the layer of paint may be embodied as a layer of fluorescent paint.

Brief Descriptions of Drawings

[0015]

Fig. 1 is a transverse cross-sectional view of a preferable synthetic fiber rope for use with an elevator according to the present invention; and

Fig. 2 is a perspective view of the synthetic fiber rope shown in FIG. 1.

Best Modes for Implementing the Invention

[0016] In order to describe an embodiment of the present invention in detail, the present invention will be described by reference to the accompanying drawings. As shown in Figs. 1 and 2, reference numeral 1 designates rope cores provided in the center of a transverse cross section of a synthetic fiber rope. Each of the rope cores is made from a plurality of strands, each strand being made by braiding a plurality of synthetic fibers.

[0017] Reference numeral 2 designates a plurality of strands provided along an outer circumference of the

rope cores 1, and each of the strands 2 is made by braiding a plurality of flexible synthetic fibers.

[0018] Reference numeral 3 designates an outer sheath layer which is made of flexible synthetic resin so as to cover the outer circumference of the strands 2. Reference numeral 4 designates a first segment in the outer sheath layer 3 formed to a predetermined length; 5 designates a second segment formed adjacent to the first segment 4 and painted in a different color from that of the first segment 4; 6 designates a third segment formed adjacent to the second segment 5 and painted in a different color from that of the second segment 5; and 7 designates a fourth segment formed adjacent to the third segment 6 and painted in a different color from that of the third segment 6.

[0019] Segments of predetermined lengths which differ in colors from these of other adjacent segments are formed even in other longitudinal locations in the outer sheath layer 3.

[0020] The outer sheath layer 3 is formed in a color different from that of the strands 2.

[0021] In relation to the synthetic fiber rope for use with an elevator having the foregoing construction, the strands 2 are made of synthetic fibers, and the outer sheath layer 3 is made of flexible synthetic resin. During a manufacturing process, the strands 2 and the outer sheath layer 3 can be readily painted in appropriate colors. On the basis of a relationship between the colored segments and a sheave (not shown) around which the main cable is wound, the position of a car (not shown) in a shaft (not shown) is assigned to one of the colored segments in the outer sheath layer beforehand. This realizes a function equal to that of the indices marked on the synthetic fiber rope.

[0022] This structure prevents occurrence of difficulty in identifying indices, which would otherwise be caused by stains when an elevator has been used for a long period of time or a like reason. Consequently, there can be appropriately addressed an operation for rescuing passengers in an accidentally-stopped elevator car, thereby speeding the rescue operation.

[0023] Further, the colored segments enable easy determination of the extent of elongation of a synthetic fiber rope due to aging. Thus, the efficiency of maintenance and inspection of the main cable of the elevator system can be improved.

[0024] Since the outer sheath layer 3 is formed in a color different from that of the strands 2, a wear state of the outer sheath 3 can be readily and appropriately determined. For this reason, the efficiency of maintenance and inspection of the main cable of the elevator system can be improved.

[0025] A coating layer is formed on the surface of each of the strands 2 by means of impregnation of paint. When the outer sheath layer 3 has become worn and has disappeared, the paint of the strands 2 is transferred to the sheave (not shown) around which the synthetic fiber rope is wound. Such a structure enables appropri-

ate determination of wear of the outer sheath layer 3 at the time of periodic inspection of an elevator system, by means of merely observing whether or not the paint of the strands 2 has been transferred to the sheave, without involvement of visual inspection of the entire synthetic fiber rope so as to determine whether or not the strands 2 become exposed in any location of the rope. Thus, maintenance and inspection of the elevator system can be improved. Further, the coating layer to be formed on the surface of the strands 2 is preferably a layer of fluorescent paint. If a layer of fluorescent paint is formed on the surfaces of strands, the paint is easily acknowledged by an inspection worker by means of a fluorescent characteristic. If the paint of the coating layer has been transferred onto a sheave, the paint can be readily detected. Moreover, the fluorescent paint that has been transferred onto the sheave is less prone to disappear. Even if a slight delay has arisen in the time of routine inspection, the paint can be detected readily.

Industrial Applicability

[0026] As has been described, a synthetic fiber rope for use with an elevator according to the present invention comprises a plurality of strands provided along an outer circumference of a main cable constituted of the synthetic fiber rope, and an outer sheath layer provided so as to cover each of the strands, wherein adjacent segments of predetermined lengths are formed in different colors in the outer sheath layer. On the basis of a relationship between the colored segments and a sheave around which the main cable is wound, the position of a car in a shaft is assigned to one of the colored segments in the outer sheath layer beforehand. This realizes a function equal to that of the indices marked on the synthetic fiber rope.

[0027] This structure prevents difficulty in identifying indices, which would otherwise be caused by stains when an elevator has been used for a long period of time or a like reason. Consequently, there can be appropriately addressed an operation for rescuing passengers in an accidentally-stopped elevator car, thereby speeding the rescue operation. The rope according to the invention is useful as a synthetic fiber rope for use with an elevator which is wound around a sheave and suspends a vertically-movable member and is suitable for actuation by means of rotation of the sheave, to thereby vertically move the vertically-movable.

[0028] In relation to the synthetic fiber rope for use with an elevator according to the present invention, the outer sheath layer is made in a color different from that of the strands, thereby facilitating and enabling appropriate determination of the wear state of the outer sheath layer. For this reason, the rope according to the invention is useful as a synthetic fiber rope for use with an elevator which is wound around a sheave and suspends a vertically-movable member and is suitable for actuation by means of rotation of the sheave, to thereby ver-

tically move the vertically-movable member.

Claims

1. A synthetic fiber rope for use with an elevator, comprising:
 - rope cores;
 - a plurality of strands provided along an outer circumference of the rope cores, each strand being made by means of twisting a plurality of flexible synthetic fibers; and
 - an outer sheath layer which is made of flexible synthetic resin, is formed along an outer circumference of the strands, and has adjacent segments of predetermined lengths in different colors.
2. The synthetic fiber rope according to claim 1, wherein the outer sheath layer is made in a color different from that of the strands.
3. The synthetic fiber rope according to claim 1, wherein a coating layer differing in color from the outer sheath layer is formed on the surfaces of the strands.
4. A synthetic fiber rope for use with an elevator, comprising:
 - rope cores;
 - a plurality of strands provided along an outer circumference of the rope cores, each strand being made by means of twisting a plurality of flexible synthetic fibers; and
 - an outer sheath layer which is made of flexible synthetic resin, and is formed along an outer circumference of the strands;
 - a coating layer which is differing in color from the outer sheath layer and is formed on the surfaces of the strands.
5. The synthetic fiber rope for use with an elevator according to claim 4, wherein the coating layer is a layer of fluorescent paint.

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Fig.1

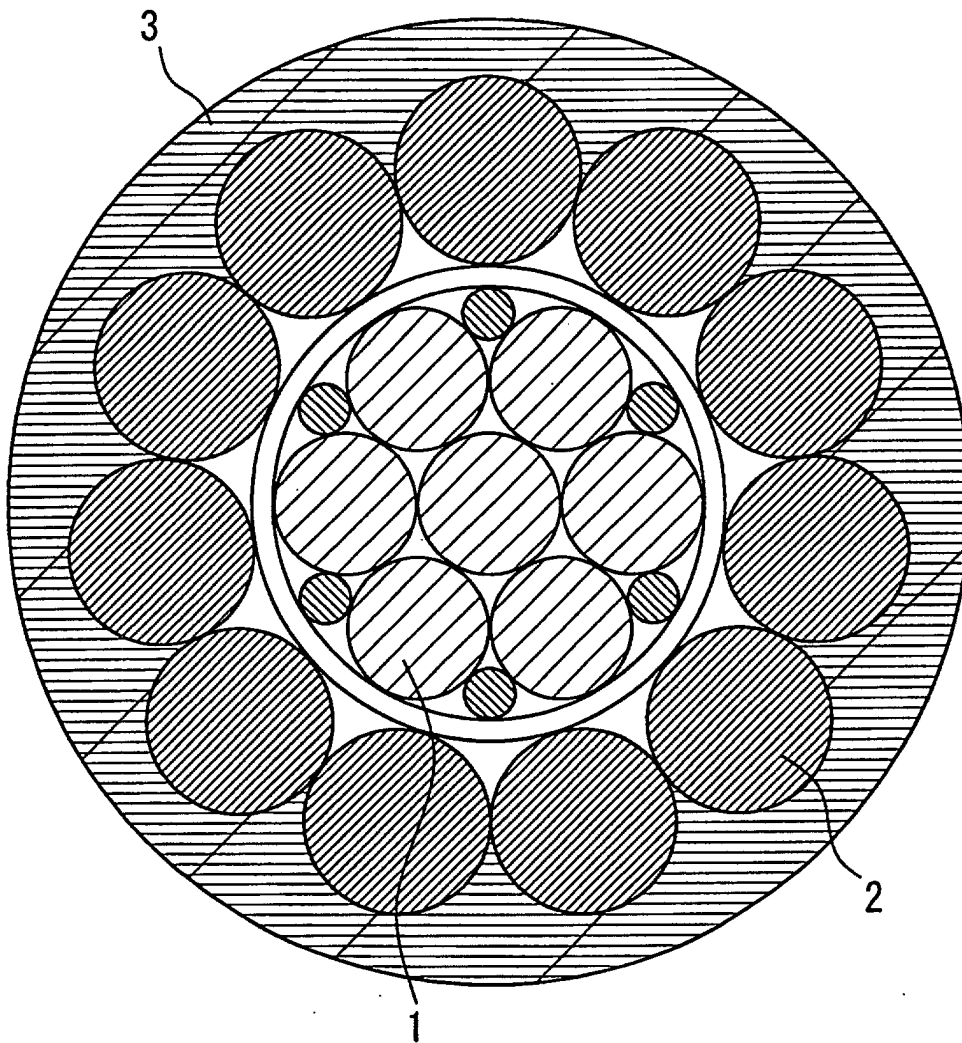
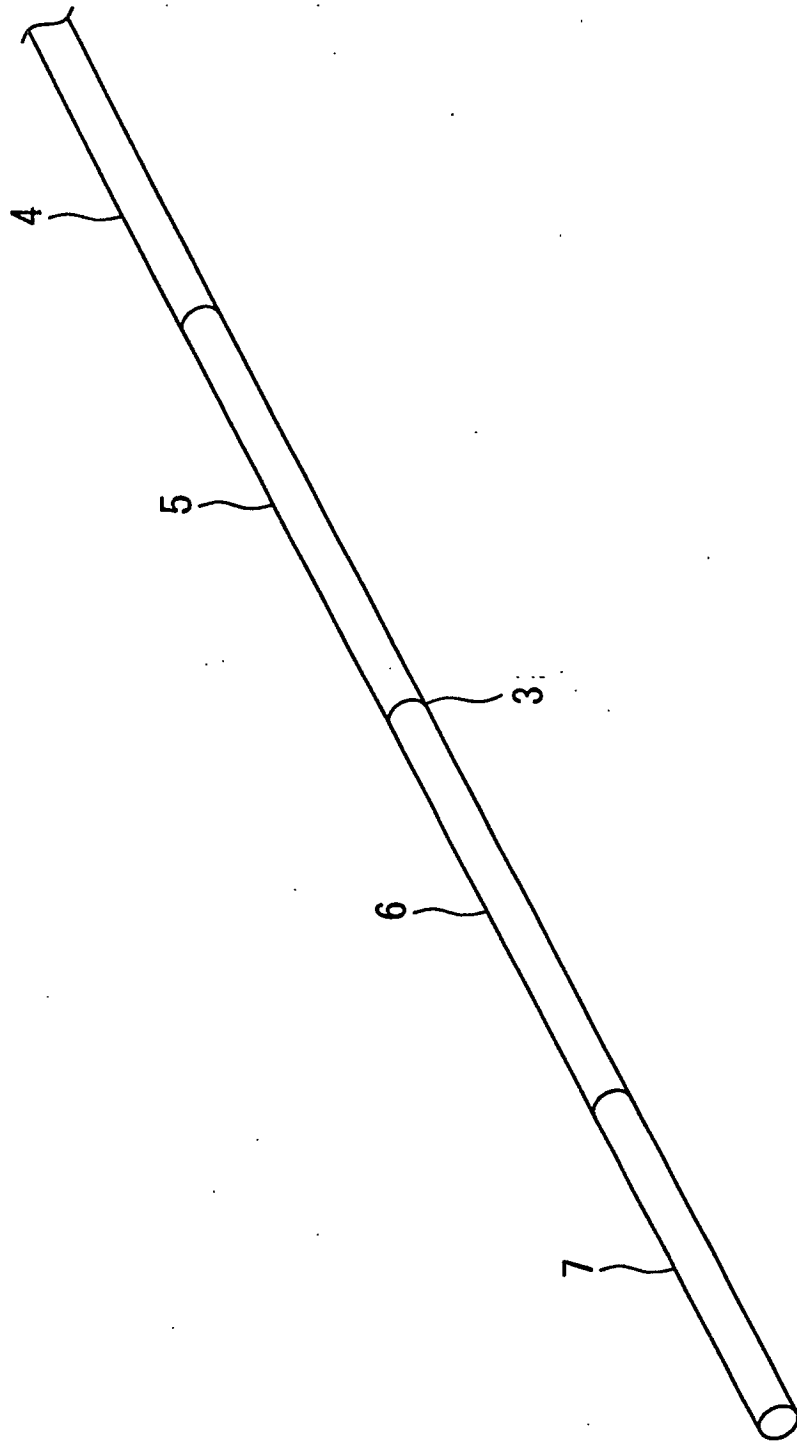


Fig.2



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP00/05671

A. CLASSIFICATION OF SUBJECT MATTER Int.Cl ⁷ B66B 7/06		
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 ⁷ B77B 1/00-B66B 19/06, B66C, B66D, G01B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2001 Kokai Jitsuyo Shinan Koho 1971-2001 Toroku Jitsuyo Shinan Koho 1994-2001		
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, 8-261972, A (Inventio AG),	4-5
Y	11 October, 1996 (11.10.96), & AU, 4584896, A & AU, 700649, A & BR, 9600892, A & CA, 2169431, A & CN, 1134484, A & CZ, 9600649, A & EP, 0731209, A1 & HK, 1011391, A & HU, 9600548, A & NO, 960880, A & NZ, 286035, A & PL, 313088, A & TR, 960867, A & ZA, 9601733, A & US, 5834942, A	1-3
Y	CD-ROM of the specification and drawings annexed to the request of Japanese Utility Model Application No. 38602/1993 (Laid-open No. 4487/1995), (Kabushiki Kaisha Tsubaskimoto Chain), 24 January, 1995 (24.01.95), (Family: none)	1-3
A	JP, 4-372802, A (Hitachi Cable Ltd.), 25 December, 1992 (25.12.92), (Family: none)	1
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
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Date of the actual completion of the international search 27 April, 2001 (27.04.01)		Date of mailing of the international search report 15 May, 2001 (15.05.01)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)