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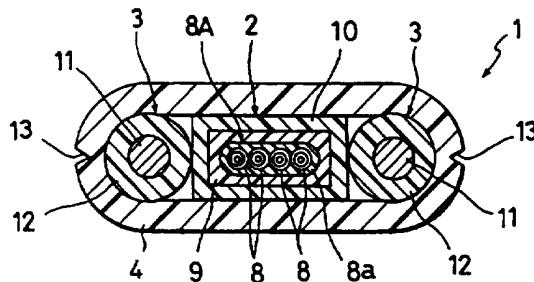
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(58) Field of Search
UK CL (Edition O) **G2J JGCA1**
INT CL⁶ **G02B**

(54) Flat optical cable with round edged sheath

(57) A flat optical fiber cable 1 is composed of an optical fiber ribbon cord 2 which is comprised of shock absorbing material (15, Fig.16) or tensile strength fibers 9 covering, so as to become a quadrilateral shape, an outside circumferential part of several optical fiber cores 8 which were paralleled and a sheath 10 or cord which covers an outside circumferential part of the tensile strength fiber. At least one tension member 3 is parallel in a row to one side of the optical fiber ribbon cord, and the outside circumferential part of tension member and optical fiber ribbon cord is covered with a second sheath 4 so as to become a nearly oval shape. The sheath 4 may have slots 13 corresponding to tension members 3.

FIG. 4



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FIG. 1

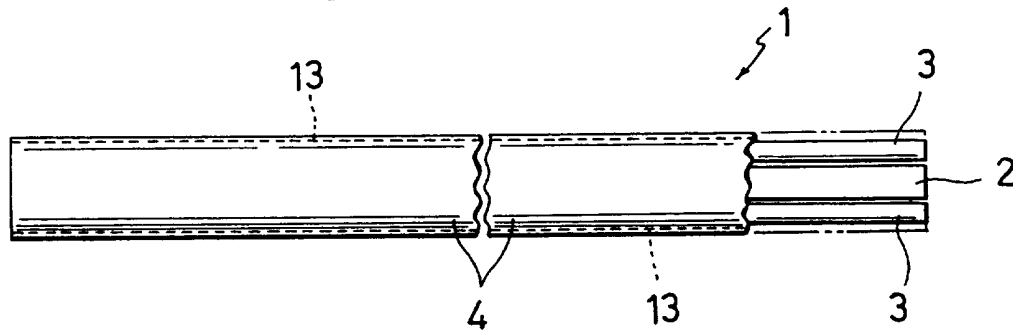


FIG. 2

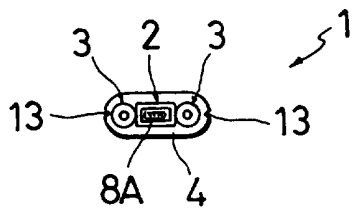


FIG. 3

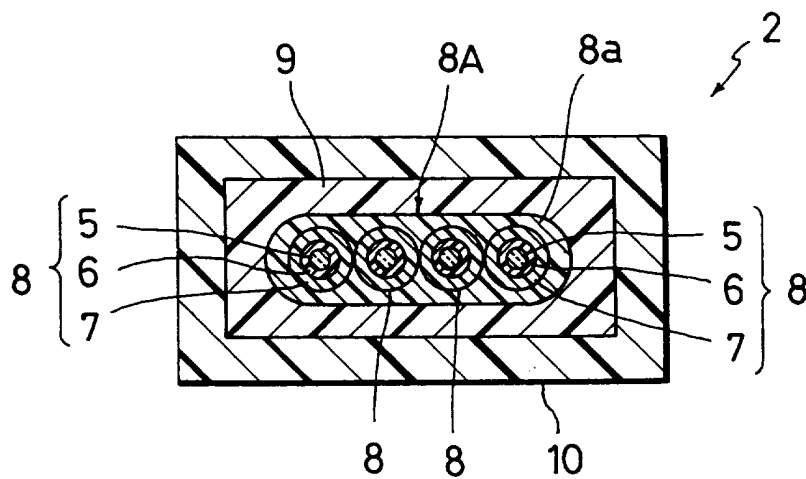


FIG. 4

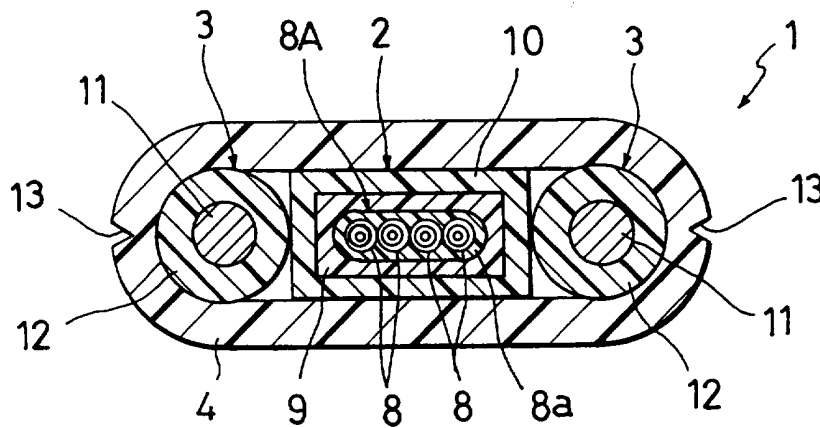


FIG. 5

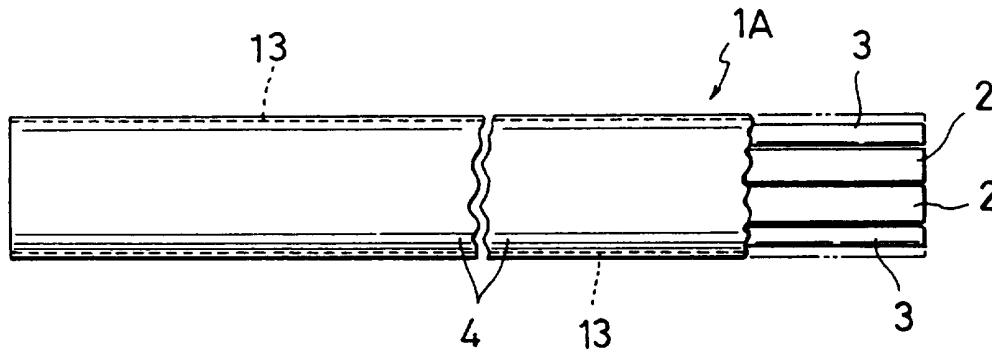


FIG. 6

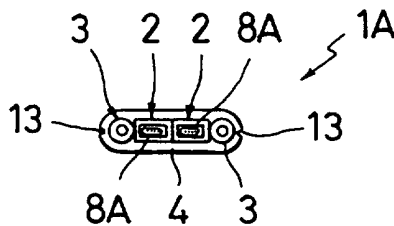


FIG. 7

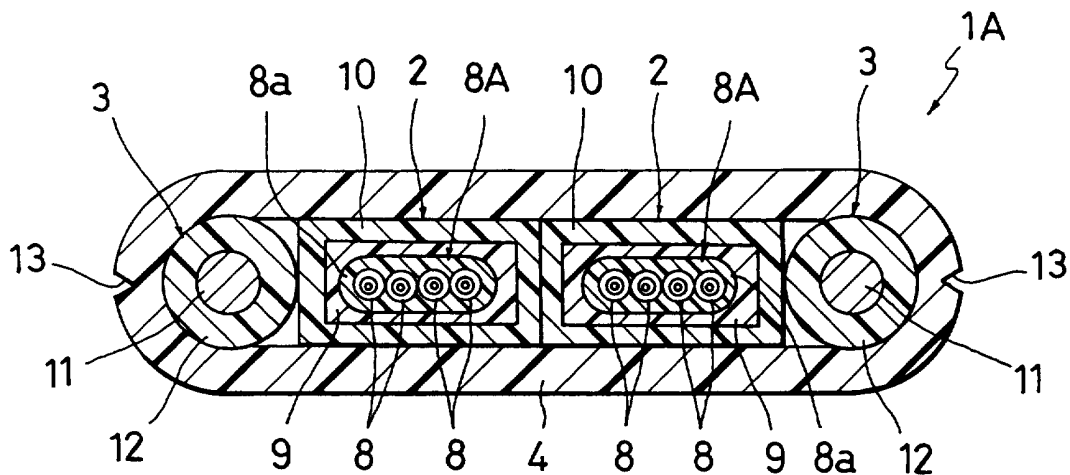


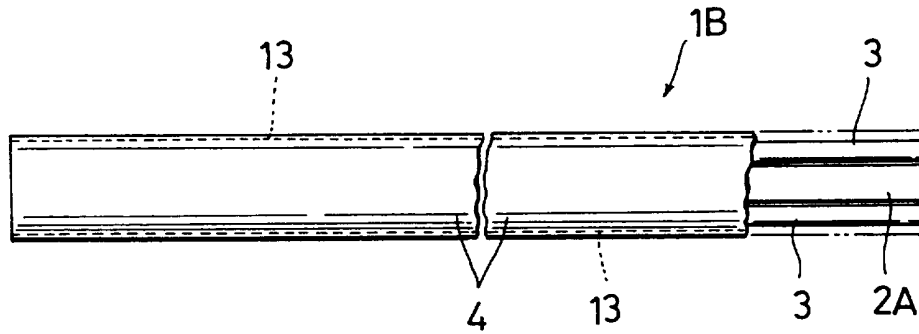
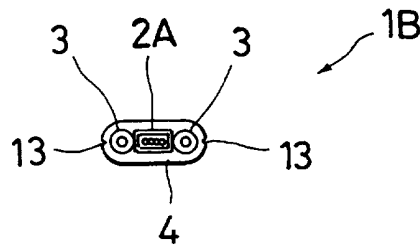
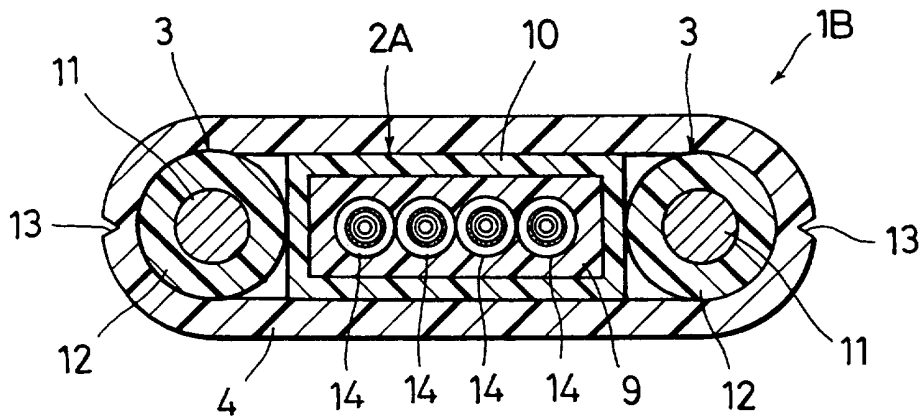
FIG. 8**FIG. 9****FIG. 10**

FIG. 11

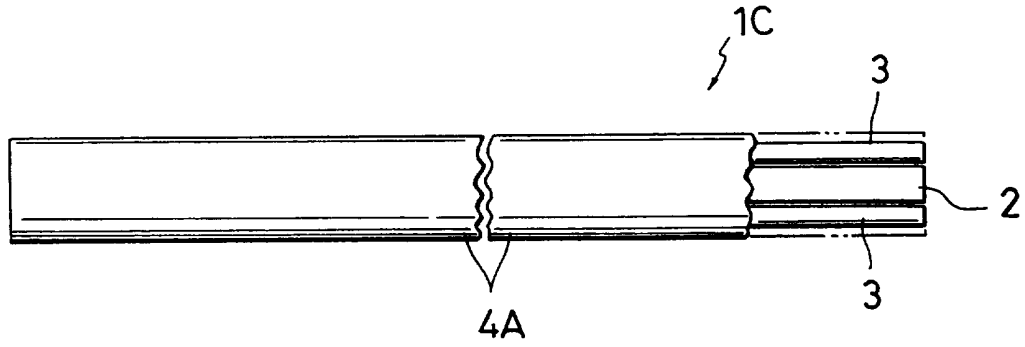


FIG. 12

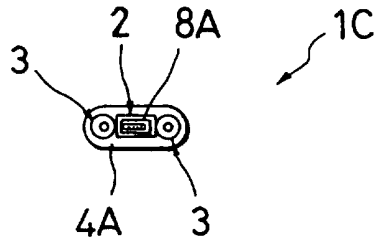


FIG. 13

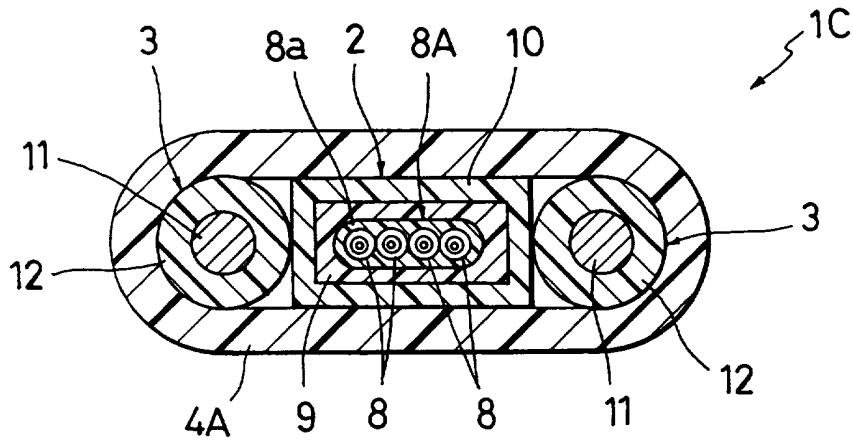


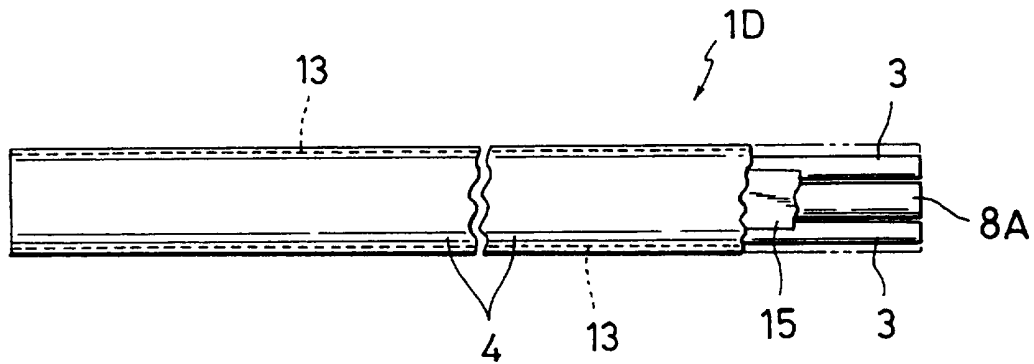
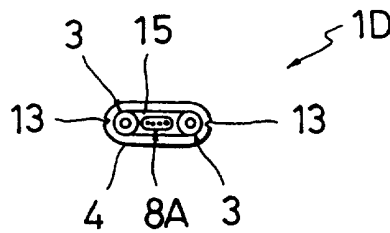
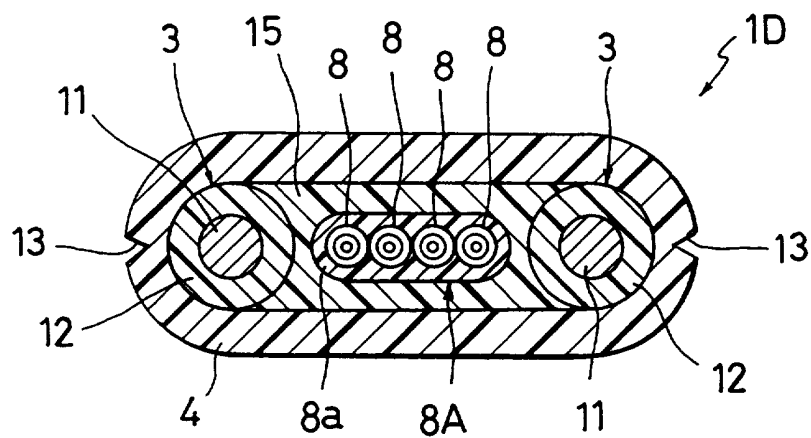
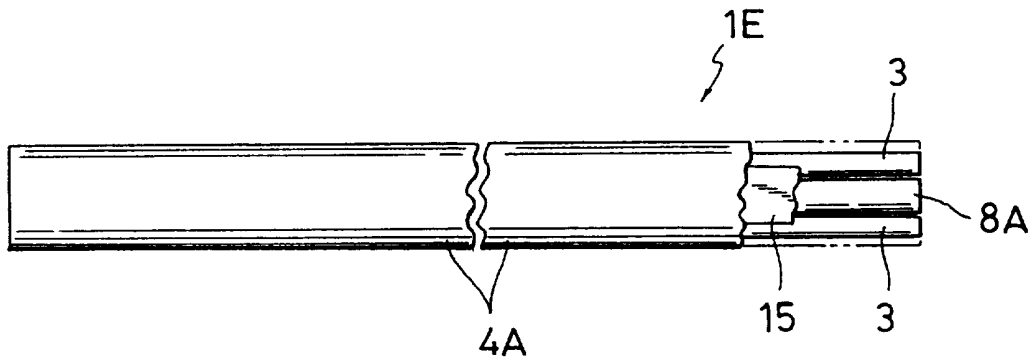
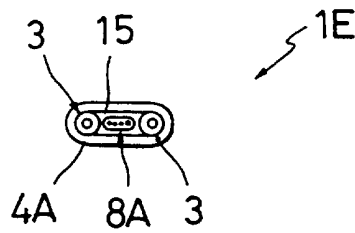
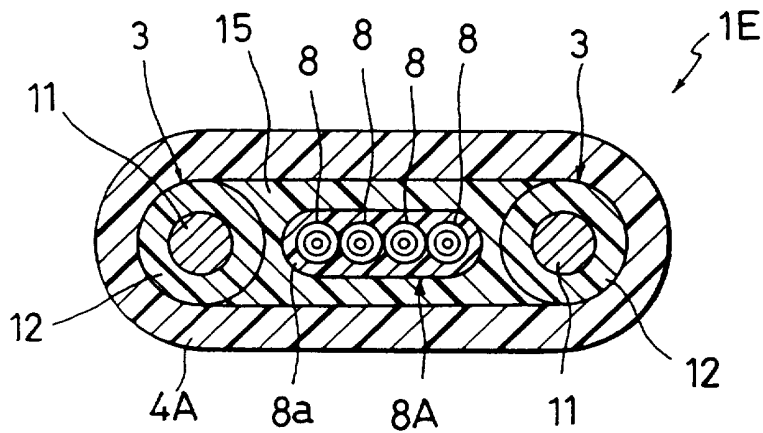
FIG. 14**FIG. 15****FIG. 16**

FIG. 17**FIG. 18****FIG. 19**

FLAT OPTICAL FIBER CABLE

5 This invention relates to an optical fiber ribbon core which is paralleled several optical fiber cores in a row or a flat optical fiber cable which is paralleled optical fiber cord in a row.

10 Former optical fiber ribbon cord type cable lies and arranges the outside circumferential part of tension member, and has been covered with a sheath through ribbon.

15 Because the above-mentioned former optical fiber ribbon cord type cable was hard and thick, it was difficult to perform the construction and manage to terminal, and there was a fault that the large laying area is required.

20

 In view of the foregoing, it is an object of the present invention to provide a flat optical fiber cable which does not suffer optical fiber damage and does not make the performance of optical fiber fall because it is easy to perform the operating of the construction and terminal management.

 It is another object of the present

invention to provide a flat optical fiber cable which requires small lying area because it is easy to perform the operating of construction and terminal management.

5 The above and further objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawings. It is to be expressly
10 understood, however, that the drawings are for the purpose of illustration only and is not intended as a definition of the limits of the invention.

15

Fig. 1 is a partial cutaway top view showing a first embodiment of the present invention;

20 Fig. 2 is a side view showing the first embodiment of the present invention;

Fig. 3 is an expanded sectional view for optical fiber ribbon cord showing the first embodiment of the present invention;

25 Fig. 4 is an expanded sectional view showing the first embodiment of the present invention;

Fig. 5 is a partial cutaway top view showing a second embodiment of the present

invention;

Fig. 6 is a side view showing the second embodiment of the present invention;

5 Fig. 7 is an expanded sectional view showing the second embodiment of the present invention;

Fig. 8 is a partial cutaway top view showing a third embodiment of the present invention;

10 Fig. 9 is a side view of the third embodiment of the present invention;

Fig. 10 is an expanded sectional view showing the third embodiment of the present invention;

15 Fig. 11 is a partial cutaway top view showing a fourth embodiment of the present invention;

Fig. 12 is a side view showing the fourth embodiment of the present invention;

20 Fig. 13 is an expanded sectional view showing the fourth embodiment of the present invention;

Fig. 14 is a partial cutaway top view showing a fifth embodiment of the present invention;

25 Fig. 15 is a side view showing the fifth embodiment of the present invention;

Fig. 16 is an expanded sectional view showing the fifth embodiment of the present

invention;

Fig. 17 is a partial cutaway top view showing a sixth embodiment of the present invention;

5 Fig. 18 is a side view showing the sixth embodiment of the present invention; and

Fig. 19 is an expanded sectional view showing the sixth embodiment of the present invention.

10

Preferred embodiments of the present invention will be described in more details referring to the accompanying drawings.

15 Figs. 1 to 4 illustrate a first embodiment of the present invention. A flat optical fiber cable 1 is composed of an optical fiber ribbon cord 2, tension members 3, 3 which are
20 arranged parallel in a row at both sides of this optical fiber ribbon cord 2, and a sheath 4 which covers the outside circumferential part of optical fiber ribbon cord 2 and tension members 3, 3 so as to become a
25 nearly oval shape.

An optical fiber ribbon cord 2 shown Fig. 3 is comprised four pieces of optical fiber cores 8, 8, 8, 8, optical fiber ribbon core 8A, tensile strength fiber 9, and the sheath for

cord 10. Several optical fiber cores, four
pieces of optical fiber cores in this embodi-
ment, 8, 8, 8, 8, consist of optical fiber 5, and
the inner layer 6 and outer layer 7 which
5 cover the outside circumferential part of the
optical fiber 5. Optical fiber 5 used is in
general use, and inner layer 6 and outer layer
7 are ultraviolet curable resin.

Optical fiber ribbon core 8A covers the outside
10 circumferential part of four pieces of optical
fiber cores 8, 8, 8, 8 with ultraviolet curable
resin 8a so as to become an oval shape. Tensile
strength fiber 9 covers the outside circum-
ferential part of optical fiber ribbon core 8A
15 so as to become a quadrilateral or a
rectangular shape. The sheath or cord 10
covers the outside circumferential part of
tensile strength fiber 9.

Tension member 3 shown Fig. 4 is formed so
20 its height measure is nearly the same amount as
height measure of optical fiber ribbon cord 2
or higher than the height measure of optical
fiber ribbon cord 2.

Although this tension member 3 used is
25 in general use, tension member 3 in this em-
bodiment covers the outside
circumferential part of steel wire 11 with a
sheath 12.

As sheath 4 is used material in general

5

use. And it has torn slots 13, 13 at the central part at both sides which correspond with tension members 3, 3 for tearing in order to take out the sheath 4 of a terminal easily at the time of terminal management.

10

Because flat optical fiber cable 1 has tension members 3, 3 parallel to both sides of the optical fiber ribbon cord 2, the tension members 3, 3 receive tractive force and pushing pressure. and the tension members 3, 3 prevent forces being transmitted to the optical fiber ribbon core 8A of optical fiber ribbon cord 2.

15

20

Other embodiments of the present invention will now be described referring to Figs. 5 to 19. Though the drawings of the embodiments, like components are denoted by like numerals as of the first embodiment and will be explained in more details.

25

Figs. 5 to 7 show a second embodiment of the present invention which is distinguished from the first embodiment by the fact that tension members 3, 3 were arranged in a row at each side of several optical ribbon cords 2, 2,

however, two pieces of optical fiber ribbon
cords 2, 2 are used in this embodiment. A flat optical
fiber cable 1A which was formed in this way
according to the second embodiment will provide
5 the same effects as the first embodiment.

Figs. 8 to 10 show a third embodiment
of the present invention which is distinguished
from the first embodiment by the fact that
optical fiber ribbon cord 2A is formed with
10 using four pieces of optical fiber cords 14, 14,
14, 14 which are paralleled in a row. A flat
optical fiber cable 1B with optical fiber
ribbon cord 2A according to the third
embodiment will provide the same effects as the
15 first embodiment.

Figs. 11 to 13 show a fourth embodiment
of the present invention which is distinguished
from the first embodiment by the fact that a
sheath 4A without a torn slot is used. A flat
20 fiber cable 1C with sheath 4A according to the
fourth embodiment will provide the same effects
as the first embodiment.

Figs. 14 to 16 show a fifth embodiment of
the present invention which is distinguished
25 from the first embodiment by the fact that
optical fiber ribbon core 8A which covered with
a shock absorbing material 15 is established
between tension members 3, 3. A flat optical
fiber cable 1D with optical fiber ribbon core

8A according to the fifth embodiment will provide the same effects as the first embodiment.

5 Figs. 17 to 19 show a sixth embodiment of the present invention which is distinguished from the fifth embodiment by the fact that a sheath 4A without a torn slot is used. A flat optical fiber cable 1E with a sheath 4A according to the sixth embodiment will provide
10 the same effects as the fifth embodiment.

15 As set forth above, the advantages of the present invention are as follows:

(1) A flat optical fiber is composed of at least one optical fiber ribbon cord, tension member, and a sheath. The or each optical fiber ribbon cord consists of
20 several optical fiber cores which are parallel in a row, a tensile strength fiber which covers the outside circumferential part of several optical fiber core so as to become a quadrilateral shape, and the sheath for cord
25 which covers the outside circumferential part of the tensile strength fiber. The tension members are arranged so as to parallel at each sides part of at least an optical fiber ribbon cord or more which was paralleled in a row.

A sheath becomes an oval shape

at the outside circumferential part of the optical fiber ribbon cord and tension member which was paralleled in a row. Thus, the optical fibers are
5 protected- from tractive force and pushing pressure by the tension member which are paralleled to both sides of optical fiber ribbon cord that has several optical fiber cores parallel in a row.

10 Therefore, flat optical fiber can be used for the wiring in a floor surface and the like.

(2) As depicted in the above paragraph (1), because it is used optical fiber ribbon cord which has several parallel optical fiber
15 cores in a row, it can be prevented efficiently to shift the position of optical fiber core at the time of producing and be paralleled accurately an optical fiber ribbon cord and tension member into a sheath.

Therefore, it can make reliable products.

20 (3) As depicted in the above paragraph (1), it can be manufactured easily because the construction is simple.

Claims:

1. A flat optical fiber cable comprising:
at least an optical fiber ribbon cord or
more which consist(s) of a plurality of optical
5 fiber cores which are parallel in a row, a
tensile strength fiber which covers the
outside circumferential part of said plurality of
optical fiber cores so as to become a
quadrilateral shape, and a first sheath
10 which covers the outside circumferential part
of said tensile strength fiber;
at least one tension member arranged
parallel in a row at one side of said at least
one optical fiber ribbon cord which
15 are parallel in a row; and
a second sheath which covers the
outside circumferential part of said tension
member(s) and said optical fiber ribbon cords so as to
become a nearly oval shape.

20 2. A flat optical fiber cable according
to claim 1, characterized in that said second sheath
is formed with a torn slot to tear away said second sheath
in the central part at both sides of said
sheath at the time of terminal management.

25 3. A flat optical fiber cable according
to claim 1, characterized in that the tension
member(s) is/are built up so as to become thicker
than the height of said optical fiber
ribbon cords.

4. A flat optical fiber cable comprising:
at least an optical fiber ribbon cord or
more which consist(s) of a plurality of optical
fiber cords which are parallel in a row,
5 a tensile strength fiber which covers the
outside circumferential part of said plurality of
optical fiber cores so as to become a quadri-
lateral shape, and a first sheath which
covers the outside circumferential part of said
10 tensile strength fiber;

at least one tension member which is arranged
parallel in a row at one side of said at least
one optical fiber ribbon cord which
are parallel in a row; and

15 a second sheath which covers the
outside circumferential part of said tension
member and said optical fiber ribbon cord so as to
become a nearly oval shape.

5. A flat optical fiber cable according
20 to claim 4, characterized in that said second sheath
is formed with a torn slot to tear away said second sheath
in the central part at both sides of said
sheath at the time of terminal management.

6. A flat optical fiber cable according
25 to claim 4, characterized in that said tension
member is built up so as to become thicker than
the height of said optical fiber
ribbon cord.

7. A flat optical fiber cable comprising:

an optical fiber ribbon core which is parallel to plural of optical fiber cores in a row;

5 a tension member arranged as to stand in a row at both sides of said optical fiber ribbon core; and

10 a sheath which covers, so as to become a nearly oval shape, the outside circumferential part of said optical fiber ribbon core and said tension member which is paralleled in a row.

8. A flat optical fiber cable according to claim 7, characterized in that said sheath is formed with a torn slot to tear away a sheath in the central part of both sides of said sheath at the time of terminal management.

9. A flat optical fiber cable according to claim 7, characterized in that said tension member is built up so as to have a diameter greater than to the height of said optical fiber ribbon cord.



Application No: GB 9623603.9
Claims searched: 1-9

Examiner: Chris Ross
Date of search: 10 December 1997

**Patents Act 1977
Search Report under Section 17**

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.O): G2J(JGCA1)
Int CI (Ed.6): G02B
Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2208945 A (STC) Figs 2,3	7 at least
"	GB 1562676 A (") the Fig	"
"	GB 1436319 A (BICC) Fig 6	"
"	GB 1422147 A (") Figs 4-6	"
"	EP 0031972 A2 (PHILIPS) Fig 3	"
"	US 5039195 A (AT&T) Figs 1,2	"
"	US 4895427 A (SIECOR) Fig 5	"
"	US 4815814 A (COOPER) Figs 2,6	"
"	US 4729628 A (SIECOR) Figs 2,3	"
"	JP 0300020704 A (UBE) Figs 1-4	"

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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