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(54) **Transmission unit with reduced crosstalk signal**

Übertragungseinheit mit reduziertem Übersprechungssignal

Unité de transmission avec signal de diaphonie réduit

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- **'@BULLET Electric Potential Energy and Potential Difference @BULLETRelation between Electric Potential and Electric Field @BULLETEquipotential Lines @BULLETThe Electron Volt, a Unit of Energy @BULLETElectric Potential Due to Point Charges Units of Chapter 17 @BULLET Capacitance @BULLET Dielectrics @B', [Online] 01 January 2005, XP055116490 Retrieved from the Internet: <URL:http://cherenkov.physics.iastate.edu/~ mkpohl/teach/112/ch17.pdf> [retrieved on 2014-05-06]**

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a transmission unit, and more particularly to a transmission unit that includes conductors surrounded by sheaths of different dielectric coefficients, so that a difference in dielectric property exists between the conductors to enable reduction of crosstalk occurred during high-speed signal transmission over the transmission unit.

BACKGROUND OF THE INVENTION

[0002] In recent years, the applications of audio and video signals have been constantly widened and improved. For example, video compact disk (VCD), digital versatile disk (DVD), high-definition digital television (HDTV), video call and video conference all have been introduced into people's daily life. Most of the currently available audio video (AV) systems process voice and image information in a completely digitalized manner to meet the newest technological trend. Different specifications and standards for AV systems have been constantly established, revised and updated, so that the AV systems can provide audio and visual signals with higher quality and can be applied to more different application fields to meet consumers' demands. Digital signals must be transmitted at further increased speed without the need of compression. Currently, there are many standardized digital video interfaces available for use, such as HDMI (high-definition multimedia interface), DVI (digital visual interface) and DisplayPort. Through digitized transmission of signals via these interfaces, images of enhanced quality can be displayed on electronic devices. The above-mentioned interfaces can be electrically connected to an adapter, a set-top box, a DVD player, a personal computer, a video game console, an integrated amplifier, a digital stereo system, etc. to enable long distance transmission of high quality signals at high speed, and are therefore widely welcome among consumers and can be seen everywhere now. The use of these standardized digital video interfaces to transmit video signals at high speed can provide better visual effect.

[0003] Most cables for DisplayPort connector, DVI connector and HDMI connector are round cables or flat cables. Inside these cables, there is a plurality of metal conductors, which are respectively surrounded by an insulating layer to prevent short circuit between the metal signal conductors. Each signal pair is further surrounded by a metal shield to prevent crosstalk between the signal pair. While the metal shield can reduce the crosstalk between the signal pair, it makes the whole cable stiff, heavy and inconvenient for use. Further, to connect the cable to the terminals of the connector, it is necessary to strip a length of the metal shield from the signal pair. By doing this, scraps would be produced. Moreover, cables with conductors surrounded by metal shields could not be used with piercing terminals to enable automated assembling of cables.

[0004] DE 20 2007 017762 U1 describes a bus cable comprising a plurality of conductors and an isolating sheath covering the conductors, wherein the conductors are spaced equally parallel to one another, whereby the cable is flat and flexible and the isolating sheath comprises a material protecting against electromagnetic waves, whereby protection against electromagnetic waves is gained.

SUMMARY OF THE INVENTION

[0005] It is therefor a primary object of the present invention to provide a transmission unit that can reduce crosstalk occurred during high-speed signal transmission over the transmission unit.

[0006] To achieve the above and other object, the transmission unit with reduced crosstalk signal according to the present invention includes a first conductor group, which includes at least one first conductor surrounded by a first sheath and at least one second conductor surrounded by a second sheath. The first and the second conductor are axially arranged corresponding to one another. The first sheath has a dielectric coefficient higher than that of the second sheath.

[0007] In the present invention, there is a dielectric difference between the first sheath and the second sheath. When the first conductor is surrounded by the first sheath made of a high-dielectric material, the first conductor would have higher dielectric coefficient than the second conductor. In other words, when the first sheath has a high dielectric coefficient, the first conductor surrounded by the first sheath would correspondingly have a high dielectric coefficient. Since the high-dielectric coefficient material has good ability of concentrating electric field to enable easy storage of electric field energy, the transmission unit including the first conductor surrounded by the high-dielectric first sheath can reduce the crosstalk occurred during high-speed signal transmission over the transmission unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accom-

panying drawings, wherein

Fig. 1 is a cross sectional view of a transmission unit with reduced crosstalk signal according to a first embodiment of the present invention;

Fig. 2 is a cross sectional view of a transmission unit with reduced crosstalk signal according to a second embodiment of the present invention;

Fig. 3 is a cross sectional view of a transmission unit with reduced crosstalk signal according to a third embodiment of the present invention;

Fig. 4 is a cross sectional view of a transmission unit with reduced crosstalk signal according to a fourth embodiment of the present invention;

Fig. 5 is a cross sectional view of a transmission unit with reduced crosstalk signal according to a fifth embodiment of the present invention;

Fig. 6 is a cross sectional view of a transmission unit with reduced crosstalk signal according to a sixth embodiment of the present invention;

Fig. 7 is a cross sectional view of a transmission unit with reduced crosstalk signal according to a seventh embodiment of the present invention;

Fig. 8 is a cross sectional view of a transmission unit with reduced crosstalk signal according to an eighth embodiment of the present invention;

Fig. 9 is a cross sectional view of a transmission unit with reduced crosstalk signal according to a ninth embodiment of the present invention;

Fig. 10 is a perspective view of a transmission unit with reduced crosstalk signal according to a tenth embodiment of the present invention;

Fig. 11 is a chart showing the result from an electromagnetic test conducted on a type "A" transmission unit according to the seventh embodiment of the present invention;

Fig. 12 is a chart showing the result from an electromagnetic test conducted on a type "B" transmission unit according to the seventh embodiment of the present invention;

Fig. 13 is a chart showing the result from an electromagnetic test conducted on a type "C" transmission unit according to the seventh embodiment of the present invention; and

Fig. 14 is a chart showing the result from an electromagnetic test conducted on a type "D" transmission unit according to the seventh embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] The present invention will now be described with some preferred embodiments thereof and with reference to the accompanying drawings. For the purpose of easy to understand, elements that are the same in the preferred embodiments are denoted by the same reference numerals.

[0010] Please refer to Fig. 1 that is a cross sectional view of a transmission unit with reduced crosstalk signal according to a first embodiment of the present invention. For the purpose of conciseness, the present invention is also briefly referred as a transmission unit and generally denoted by reference numeral 1 herein. As shown, in the first embodiment, the transmission unit 1 of the present invention includes a first conductor group 11.

[0011] The first conductor group 11 includes at least one first conductor 111 surrounded by a first sheath 1111 and at least one second conductor 112 surrounded by a second sheath 1121. The first and the second conductor 111, 112 are axially parallelly arranged side by side. The first sheath 1111 has a dielectric coefficient higher than that of the second sheath 1121.

[0012] The first conductor 111 is a signal conductor, and the second conductor 112 is an earth conductor.

[0013] Please refer to Fig. 2 that is a cross sectional view of a transmission unit 1 according to a second embodiment of the present invention. As shown, in the second embodiment, the transmission unit 1 includes a first conductor group 11, a second conductor group 12 and a third conductor group 13. Since the first conductor group 11 is structurally similar to that in the first embodiment, it is not repeated described in details herein. The second conductor group 12 includes at least one third conductor 121 surrounded by a first sheath 1111 and at least one fourth conductor 122 surrounded by a second sheath 1121. The third conductor group 13 includes at least one fifth conductor 131 surrounded by a first sheath 1111 and at least one sixth conductor 132 surrounded by a second sheath 1121.

[0014] In the second embodiment, there is a difference between the dielectric values of the first sheath 1111 and the second sheath 1121. Since a high-dielectric material has good ability to concentrate electric field, the use of a low-dielectric material for one conductor in each of the signal pairs can reduce electric field concentration and accordingly, reduce crosstalk noise interference between the signal pairs.

[0015] Fig. 3 is a cross sectional view of a transmission unit 1 according to a third embodiment of the present invention. As shown, in the third embodiment, the transmission unit 1 includes a first conductor group 11 having at least one first conductor 111 surrounded by a first sheath 1111 and at least one second conductor 112; a second conductor group 12 having at least one third conductor 121 surrounded by a first sheath 1111 and at least one fourth conductor 122; a third conductor group 13 having at least one fifth conductor 131 surrounded by a first sheath 1111 and at least one sixth conductor 132; and a second sheath 1121 surrounding all the first sheaths 1111 and the second, fourth and sixth conductors 112, 122, 132.

[0016] Please refer to Fig. 4 that is a cross sectional view of a transmission unit 1 according to a fourth embodiment of the present invention. As shown, in the fourth embodiment, the transmission unit 1 includes a first conductor group 1 having at least one first conductor 111 surrounded by a first sheath 1111 and at least one second conductor 112 surrounded by a second sheath 1121; a second conductor group 12 having at least one third conductor 121 surrounded by a first sheath 1111 and at least one fourth conductor 122 surrounded by a second sheath 1121; a first earth conductor 14; a second earth conductor 15; a third earth conductor 16; and a third sheath 1131. The first and second conductor groups 11, 12 can be differential signal pairs. The second earth conductor 15 is arranged between the first and the second conductor group 11, 12; the first earth conductor 14 is arranged to one side of the first conductor group 11 opposite to the second earth conductor 15; and the third earth conductor 16 is arranged to one side of the second conductor group 12 opposite to the second earth conductor 15. The third sheath 1113 surrounds all the first and second sheaths 1111, 1121 and the first, second and third earth conductors 14, 15, 16. The first and the second sheath 1111, 1121 may have the same dielectric coefficient, which is higher than that of the third sheath 1113.

[0017] In the fourth embodiment, the transmission unit 1 includes differential signal pairs and earth conductors. There is a difference between the dielectric values of the first and second sheaths 1111, 1121 and the third sheath 1113. Since a high-dielectric material has good ability to concentrate electric field, the use of a low-dielectric material for one conductor in each of the signal pairs can reduce electric field concentration and accordingly, reduce crosstalk noise interference between the signal pairs.

[0018] Fig. 5 is a cross sectional view of a transmission unit 1 according to a fifth embodiment of the present invention. As shown, in the fifth embodiment, the transmission unit 1 includes a first conductor group 11 having at least one first conductor 111 surrounded by a first sheath 1111 and at least one second conductor 112 surrounded by a second sheath 1121; a second conductor group 12 having at least one third conductor 121 surrounded by a first sheath 1111 and at least one fourth conductor 122 surrounded by a second sheath 1121; a third conductor group 13 having at least one fifth conductor 131 surrounded by a first sheath 1111 and at least one sixth conductor 132 surrounded by a second sheath 1121; and a third sheath 1113 surrounding all the first sheaths 1111 and second sheaths 1121. All the first sheaths 1111 have a dielectric coefficient higher than that of the second sheaths 1121.

[0019] There are differences between the dielectric values of the first, the second and the third sheath 1111, 1121, 1113. Since a high-dielectric material has good ability to concentrate electric field, the use of a low-dielectric material for one conductor in each of the signal pairs can reduce electric field concentration and accordingly, reduce crosstalk noise interference between the signal pairs.

[0020] Fig. 6 is a cross sectional view of a transmission unit 1 according to a sixth embodiment of the present invention. As shown, in the sixth embodiment, the transmission unit 1 includes a first conductor group 11 having at least one first conductor 111 surrounded by a first sheath 1111 and at least one second conductor 112; and a second sheath 1121 surrounding the first sheath 1111 and the second conductor 112. The first and the second conductor 111, 112 are axially arranged corresponding to one another.

[0021] Fig. 7 is a cross sectional view of a transmission unit 1 according to a seventh embodiment of the present invention. As shown, in the seventh embodiment, the transmission unit 1 includes a first conductor group 11, a second conductor group 12, a first earth conductor 14, a second earth conductor 15, and a third earth conductor 16. The first conductor group 11 includes at least one first conductor 111 and at least one second conductor 112, which are respectively surrounded by a first sheath 1111; the second conductor group 12 includes at least one third conductor 121 and at least one fourth conductor 122, which are respectively surrounded by a first sheath 1111. The first and the second conductor

group 11, 12 are differential signal pairs. The second earth conductor 15 is arranged between the first and the second conductor group 11, 12; the first earth conductor 14 is arranged to one side of the first conductor group 11 opposite to the second earth conductor 15; and the third earth conductor 16 is arranged to one side of the second conductor groups 12 opposite to the second earth conductor 15. The first, second and third earth conductors 14, 15, 16 are respectively surrounded by a second sheath 1121. The first sheaths 1111 have a dielectric coefficient higher than that of the second sheaths 1121.

[0022] In the seventh embodiment, the transmission unit 1 includes differential signal pairs and earth conductors. There is a difference between the dielectric values of the first sheaths 1111 and the second sheaths 1121. Since a high-dielectric material has good ability to concentrate electric field, the use of a low-dielectric material for one conductor in each of the signal pairs can reduce electric field concentration and accordingly, reduce crosstalk noise interference between the signal pairs.

[0023] Fig. 8 is a cross sectional view of a transmission unit 1 according to an eighth embodiment of the present invention. As shown, the transmission unit 1 in the eighth embodiment is generally structurally similar to the seventh embodiment, except for a third sheath 1113 that surrounds all the first and second sheaths 1111, 1121.

[0024] In the eighth embodiment, the transmission unit 1 includes differential signal pairs and earth conductors. There are differences between the dielectric values of the first sheaths 1111, the second sheaths 1121, and the third sheaths 1113. Since a high-dielectric material has good ability to concentrate electric field, the use of a low-dielectric material for one conductor in each of the signal pairs can reduce electric field concentration and accordingly, reduce crosstalk noise interference between the signal pairs.

[0025] Please now refer to Fig. 9 is a cross sectional view of a transmission unit 1 according to a ninth embodiment of the present invention. As shown, the transmission unit 1 in the ninth embodiment is generally structurally similar to the eighth embodiment, except that the first and the second conductor group 11, 12 are respectively surrounded by a fourth sheath 1114 before being further surrounded by the third sheath 1113 along with the first, second and third earth conductors 14, 15, 16. The fourth sheath 1114 is aluminum foil in the ninth embodiment.

[0026] Fig. 10 is a perspective view of a transmission unit 1 according to a tenth embodiment of the present invention. As shown, the transmission unit 1 in the tenth embodiment is generally structurally similar to the first embodiment, except that the at least one first conductor 111 and the at least one second conductor 112 are twisted together in axial direction to form the first conductor group.

[0027] The transmission units according to different embodiments of the present invention are measured with a network analyzer (NA) under predetermined conditions, so as to find the influence of different combinations of the dielectric coefficients of the first and the second sheath 1111, 1121 on the signal transmission over the transmission units 1.

[0028] For example, several types of the transmission units 1 according to the seventh embodiment of the present invention are provided for measuring. Each type of the tested transmission units 1 according to the seventh embodiment has a different combination of the dielectric coefficients of the first sheaths 1111 and second sheaths 1121.

[0029] Please refer to Fig. 11 that is a chart showing the result from an electromagnetic test conducted on a type "A" transmission unit 1 according to the seventh embodiment of the present invention, wherein the type "A" transmission unit 1 includes first and second sheaths 1111, 1121 both having a dielectric coefficient of 3.8.

[0030] Fig. 12 is a chart showing the result from an electromagnetic test conducted on a type "B" transmission unit 1 according to the seventh embodiment of the present invention, wherein the type "B" transmission unit 1 includes first sheaths 1111 having a dielectric coefficient of 3.2 and second sheath 1121 having a dielectric coefficient of 3.8.

[0031] Fig. 13 is a chart showing the result from an electromagnetic test conducted on a type "C" transmission unit 1 according to the seventh embodiment of the present invention, wherein the type "C" transmission unit 1 includes first sheaths 1111 having a dielectric coefficient of 3.8 and second sheath 1121 having a dielectric coefficient of 3.2.

[0032] Fig. 14 is a chart showing the result from an electromagnetic test conducted on a type "D" transmission unit 1 according to the seventh embodiment of the present invention, wherein the type "D" transmission unit 1 includes first and second sheaths 1111, 1121 both having a dielectric coefficient of 3.2.

[0033] The measured data are listed in Table 1 below.

Table 1 Influence of Different Combinations of Dielectric Coefficients On Signal Transmission

Type	Worst Near-end Crosstalk (NEXT) Value (< -26dB)	Frequency at Worst Crosstalk Value (MHz)	Result
A	-13.81	2099	Fail
B	-16.43	1190	Fail
C	-29.95	2805	Pass
D	-20.32	4455	Fail

[0034] As can be seen from Table 1, the type "C" transmission unit according to the seventh embodiment of the present invention is proven in the electromagnetic test to show best data. In conclusion, when the signal transmission conductors in the transmission unit have sheaths with a dielectric coefficient higher than that of the sheaths for other conductors, the transmission unit can have effectively reduced crosstalk signal.

[0035] The present invention has been described with some preferred embodiments thereof and it is understood that many changes and modifications in the described embodiments can be carried out without departing from the scope of the invention that is intended to be limited only by the appended claims.

Claims

1. A transmission unit (1) with reduced crosstalk signal, comprising:

   a first conductor group (11) including at least one first conductor (111) surrounded by a first sheath (1111) and at least one second conductor (112) surrounded by a second sheath (1121);
   the first and second conductors (111, 112) being axially arranged corresponding to one another; **characterized in that** the first sheath (1111) having a dielectric coefficient higher than that of the second sheath (1121) and the first sheath (1111) surrounds a signal conductor and the second sheath (1121) surrounds an earth conductor.

2. The transmission unit (1) as claimed in claim 1, further comprising a second conductor group (12) and a third conductor group (13); the second conductor group (12) including at least one third conductor (121) surrounded by a first sheath (1111) and at least one fourth conductor (122) surrounded by a second sheath (1121), and the third conductor group (13) including at least one fifth conductor (131) surrounded by a first sheath (1111) and at least one sixth conductor (132) surrounded by a second sheath (1121).

3. The transmission unit (1) as claimed in claim 1, further comprising a second conductor group (12) and a third conductor group (13); the second conductor group (12) including at least one third conductor (121) surrounded by a first sheath (1111) and at least one fourth conductor (122), and the third conductor group (13) including at least one fifth conductor (131) surrounded by a first sheath (1111) and at least one sixth conductor (132); and the second sheath (1121) surrounding the second conductor (112) also surrounding all the first sheaths (1111), the fourth conductor (122) and the sixth conductor (132).

4. The transmission unit (1) as claimed in claim 1, further comprising a second conductor group (12), a first earth conductor (14), a second earth conductor (15), a third earth conductor (16), and a third sheath (1113); the second conductor group (12) including at least one third conductor (121) surrounded by a first sheath (1111) and at least one fourth conductor (122) surrounded by a second sheath (1112); the first and second conductor groups (11, 12) being differential signal pairs; the second earth conductor (15) being arranged between the first and the second conductor groups (11, 12), the first earth conductor (14) being arranged to one side of the first conductor group (11) opposite to the second earth conductor (15), and the third earth conductor (16) being arranged to one side of the second conductor group (12) opposite to the second earth conductor (15); the third sheath (1113) surrounding the first and the second sheaths (1111, 1121) as well as the first, second and third earth conductors (14, 15, 16); and the first sheaths (1111) having a dielectric coefficient higher than that of the second sheaths (1121).

5. The transmission unit (1) as claimed in claim 1, further comprising a second conductor group (12) and a third conductor group (13); the second conductor group (12) including at least one third conductor (121) and at least one fourth conductor (122) respectively surrounded by a first sheath (1111), and the third conductor group (13) including at least one fifth conductor (131) and at least one sixth conductor (132) respectively surrounded by a first sheath (1111); the second and the third conductor group (13) being single-ended signal pairs; the second sheath (1121) surrounding the second conductor (112) also surrounding all the first sheaths (1111); and the first sheaths (1111) having a dielectric coefficient higher than that of the second sheath (1121).

6. The transmission unit (1) as claimed in claim 1, further comprising a second conductor group (12), a first earth conductor (14), a second earth conductor (15), and a third earth conductor (16); the first and second conductors (111, 112) included in the first conductor group (11) being respectively surrounded by a first sheath (1111); the second conductor group (12) including at least one third conductor (121) and at least one fourth conductor (122) respectively surrounded by a first sheath (1111); the first and second conductor groups (11, 12) being differential signal pairs; the second earth conductor (15) being arranged between the first and the second conductor groups (11, 12), the first earth conductor (14) being arranged to one side of the first conductor group (11) opposite to the

second earth conductor (14), and the third earth conductor (16) being arranged to one side of the second conductor group (12) opposite to the second earth conductor (15); the first, second and third earth conductors (14, 15, 16) being respectively surrounded by a second sheath (1121); and the first sheaths (1111) having a dielectric coefficient higher than that of the second sheaths (1121).

7. The transmission unit (1) as claimed in claim 1, wherein the first and the second conductor (111, 112) are parallelly arranged side by side.

8. The transmission unit (1) as claimed in claim 1, wherein the first and the second conductor (111, 112) are axially twisted together.

9. The transmission unit (1) as claimed in claim 6, further comprising a third sheath (1113).

10. The transmission unit (1) as claimed in claim 9, further comprising a fourth sheath (1114) surrounding each of the first and the second conductor group (11, 12) to locate outside the first sheaths (1111); and the fourth sheath (1114) being aluminum foil.

Patentansprüche

1. Übertragungseinheit (1) mit reduziertem Übersprechungssignal umfassend:

eine erste Leitergruppe (11) mit einem ersten Leiter (111), der von einem ersten Mantel (1111) ummantelt ist und zumindest ein zweiter Leiter (112), der von einem zweiten Mantel (1121) ummantelt ist;
die ersten und zweiten Leiter (111, 112) in axialer Richtung korrespondierend zueinander angeordnet sind, **dadurch gekennzeichnet, dass** der erste Mantel (1111) einen höheren Dielektrizitätskoeffizienten auf als der zweite Mantel (1121) aufweist und der erste Leiter (111) ein Signalleiter ist und der zweite Leiter (112) eine Erdungsleiter ist.

2. Übertragungseinheit (1) nach Anspruch 1, ferner umfassend eine zweite Leitergruppe (12) und eine dritte Leitergruppe (13); die zweite Leitergruppe (12) umfasst zumindest einen dritten Leiter (121), der vom ersten Mantel (1111) ummantelt ist und zumindest einen vierten Leiter (122), der von einem zweiten Mantel (1121) ummantelt ist und die dritte Leitergruppe (13) umfasst zumindest einen fünften Leiter (131), der von einem ersten Mantel (1111) ummantelt ist und zumindest einen sechsten Leiter (132), der von einem zweiten Mantel (1121) ummantelt ist.

3. Übertragungseinheit (1) nach Anspruch 1, ferner umfassend eine zweite Leitergruppe (12) und eine dritte Leitergruppe (13); die zweite Leitergruppe (12) umfasst zumindest einen dritten Leiter (121), der von einem ersten Mantel (1111) ummantelt ist und zumindest einen vierten Leiter (122), und die dritte Leitergruppe (13) umfasst zumindest einen fünften Leiter (131), der von einem ersten Mantel (1111) ummantelt ist und zumindest einen sechsten Leiter (132); und der zweite Mantel (1121) ummantelt den zweiten Leiter (112) als auch alle ersten Mäntel (1111), den vierten Leiter (122) und den sechsten Leiter (132).

4. Übertragungseinheit (1) nach Anspruch 1, ferner umfassend eine zweite Leitergruppe (12), einen ersten Erdungsleiter (14), einen zweiten Erdungsleiter (15), einen dritten Erdungsleiter (16) und einen dritten Mantel (1113); die zweite Leitergruppe (12) umfasst zumindest einen dritten Leiter (121), der von einem ersten Mantel (1111) ummantelt ist und einen vierten Leiter (122), der von einem zweiten Mantel (1112) ummantelt ist; die erste und zweite Leitergruppe (11, 12) sind verschieden Signalpaare, der zweite Erdungsleiter (15) ist zwischen den ersten und zweiten Leitergruppen (11, 12) angeordnet, der erste Erdungsleiter (14) ist an einer Seite der ersten Leitungsgruppe (11) angeordnet gegenüberliegend zum zweiten Erdungsleiter (15) und der dritte Erdungsleiter (16) ist auf einer Seite der zweiten Leitergruppe (12) angeordnet, gegenüber zum zweiten Erdungsleiter (15); der dritte Mantel (1113) ummantelt die ersten und die zweiten Mäntel (1111, 1121) ebenso wie die ersten, zweiten und dritten Erdungsleiter (14, 15, 16); und die ersten Mäntel (1111) weisen einen höheren Dielektrizitätskoeffizienten auf als die zweiten Mäntel (1121) auf

5. Übertragungseinheit (1) nach Anspruch 1, ferner umfassend eine zweite Leitergruppe (12) und eine dritte Leitergruppe (13); die zweite Leitergruppe (12) umfasst zumindest einen dritten Leiter (121) und zumindest einen vierten Leiter (122), die jeweils von einem ersten Mantel (1111) ummantelt sind, und die dritte Leitergruppe (13) umfasst zumindest einen fünften Leiter (131) und zumindest einen sechsten Leiter (132), die jeweils von einem ersten Mantel

(1111) ummantelt sind; die zweite und die dritte Leitergruppe (13) sind Signalpaare; der zweite Mantel (1121) ummantelt den zweiten Leiter (112) und ummantelt auch die ersten Mäntel (1111); und die ersten Mäntel (1111) weisen einen höheren Dielektrizitätskoeffizienten als der zweite Mantel (1121) auf

6. Übertragungseinheit (1) nach Anspruch 1, ferner umfassend eine zweite Leitergruppe (12), einen ersten Erdungsleiter (14), einen zweiten Erdungsleiter (15) und einen dritten Erdungsleiter (16); die ersten und zweiten Leiter (111, 112), die in der ersten Leitergruppe (11) umfasst sind, sind jeweils von einem ersten Mantel (1111) ummantelt; die zweite Leitergruppe (12) umfasst zumindest einen dritten Leiter (121) und zumindest einen vierten Leiter (122), die jeweils von einem ersten Mantel (1111) ummantelt sind; die erste und zweite Leitergruppen (11, 12) sind verschiedene Signalpaare; der zweite Erdungsleiter (15) ist zwischen den ersten und zweiten Leitergruppen (11, 12) angeordnet, der erste Erdungsleiter (14) ist auf einer Seite der ersten Leitergruppe (11) gegenüberliegend zu dem zweiten Erdungsleiter (14) angeordnet und der dritte Erdungsleiter (16) ist auf einer Seite der zweiten Leitergruppe (12) gegenüber zum zweiten Erdungsleiter (15) angeordnet; die ersten, zweiten und dritten Erdungsleiter (14, 15, 16) sind jeweils von einem zweiten Mantel (1121) ummantelt; und die ersten Mäntel (1111) weisen einen höheren Dielektrizitätskoeffizienten als die zweiten Mäntel (1121) auf

7. Übertragungseinheit (1) nach Anspruch 1, wobei der erste und der zweite Leiter (111, 112) parallel nebeneinander angeordnet sind.

8. Übertragungseinheit (1) nach Anspruch 1, wobei der erste und der zweite Leiter (111, 112) axial miteinander verdrillt sind.

9. Übertragungseinheit (1) nach Anspruch 6, ferner umfassend einen dritten Mantel (1113).

10. Übertragungseinheit (1) nach Anspruch 9, ferner umfassend einen vierten Mantel (1114), der jede der ersten und der zweiten Leitergruppe (11, 12) außen an ersten Mänteln (1111) angeordnet ummantelt und der vierte Mantel (1114) ist eine Aluminiumfolie.

Revendications

1. Unité de transmission (1) avec signal à diaphonie réduite, comprenant:

un premier groupe de conducteurs (11) comprenant au moins un premier conducteur (111) entouré par une première gaine (1111), et au moins un deuxième conducteur (112) entouré par une deuxième gaine (1121); les premier et deuxième conducteurs (111, 112) étant agencés axialement, correspondant l'un à l'autre, **caractérisée en ce que** la première gaine (1111) possède un coefficient diélectrique supérieur à celui de la deuxième gaine (1121) et le premier conducteur (111) est un conducteur de signal et le deuxième conducteur (112) est un conducteur de mise à la terre.

2. Unité de transmission (1) selon la revendication 1, comprenant en outre un deuxième groupe de conducteurs (12) et un troisième groupe de conducteurs (13); le deuxième groupe de conducteurs (12) comprenant au moins un troisième conducteur (121) entouré par une première gaine (1111) et au moins un quatrième conducteur (122) entouré par une deuxième gaine (1121), et le troisième groupe de conducteurs (13) comprenant au moins un cinquième conducteur (131) entouré par une première gaine (1111) et au moins un sixième conducteur (132) entouré par une deuxième gaine (1121).

3. Unité de transmission (1) selon la revendication 1, comprenant en outre un deuxième groupe de conducteurs (12) et un troisième groupe de conducteurs (13); le deuxième groupe de conducteurs (12) comprenant au moins un troisième conducteur (121) entouré par une première gaine (1111) et au moins un quatrième conducteur (122), et le troisième groupe de conducteurs (13) comprenant au moins un cinquième conducteur (131) entouré par une première gaine (1111) et au moins un sixième conducteur (132); et la deuxième gaine (1121) entourant le deuxième conducteur (112) entourant également toutes les premières gaines (1111), le quatrième conducteur (122) et le sixième conducteur (132).

4. Unité de transmission (1) selon la revendication 1, comprenant en outre un deuxième groupe de conducteurs (12), un premier conducteur de mise à la terre (14), un deuxième conducteur de mise à la terre (15), un troisième conducteur de mise à la terre (16), et une troisième gaine (1113); le deuxième groupe de conducteurs (12) comprenant

au moins un troisième conducteur (121) entouré par une première gaine (1111) et au moins un quatrième conducteur (122) entouré par une deuxième gaine (1112); les premier et deuxième groupes de conducteurs (11, 12) étant des paires de signaux différentiels ; le deuxième conducteur de mise à la terre (15) étant agencé entre les premier et deuxième groupes de conducteurs (11, 12), le premier conducteur de mise à la terre (14) étant agencé sur un côté du premier groupe de conducteurs (11) en face du deuxième conducteur de mise à la terre (15), et le troisième conducteur de mise à la terre (16) étant agencé sur un côté du deuxième groupe de conducteurs (12) en face du deuxième conducteur de mise à la terre (15); la troisième gaine (1113) entourant les première et deuxième gaines (1111, 1121) ainsi que les premier, deuxième et troisième conducteurs de mise à la terre (14, 15, 16); et les premières gaines (1111) possédant un coefficient diélectrique supérieur à celui des deuxièmes gaines (1121).

5. Unité de transmission (1) selon la revendication 1, comprenant en outre un deuxième groupe de conducteurs (12) et un troisième groupe de conducteurs (13); le deuxième groupe de conducteurs (12) comprenant au moins un troisième conducteur (121) et au moins un quatrième conducteur (122) respectivement entourés par une première gaine (1111), et le troisième groupe de conducteurs (13) comprenant au moins un cinquième conducteur (131) et au moins un sixième conducteur (132) respectivement entourés par une première gaine (1111); les deuxième et troisième groupes de conducteurs (13) étant des paires de signaux asymétriques ; la deuxième gaine (1121) entourant le deuxième conducteur (112) entourant également toutes les premières gaines (1111); et les premières gaines (1111) possédant un coefficient diélectrique supérieur à celui de la deuxième gaine (1121).

6. Unité de transmission (1) selon la revendication 1, comprenant en outre un deuxième groupe de conducteurs (12), un premier conducteur de mise à la terre (14), un deuxième conducteur de mise à la terre (15), et un troisième conducteur de mise à la terre (16); les premier et deuxième conducteurs (111, 112) inclus dans le premier groupe de conducteurs (11) étant respectivement entourés par une première gaine (1111); le deuxième groupe de conducteurs (12) comprenant au moins un troisième conducteur (121) et au moins un quatrième conducteur (122) respectivement entourés par une première gaine (1111); les premier et deuxième groupes de conducteurs (11, 12) étant des paires de signaux différentiels ; le deuxième conducteur de mise à la terre (15) étant agencé entre les premier et deuxième groupes de conducteurs (11, 12), le premier conducteur de mise à la terre (14) étant agencé sur un côté du premier groupe de conducteurs (11) en face du deuxième conducteur de mise à la terre (14), et le troisième conducteur de mise à la terre (16) étant agencé sur un côté du deuxième groupe de conducteurs (12) en face du deuxième conducteur de mise à la terre (15); les premier, deuxième et troisième conducteurs de mise à la terre (14, 15, 16) étant respectivement entourés par une deuxième gaine (1121); et les premières gaines (1111) possédant un coefficient diélectrique supérieur à celui des deuxièmes gaines (1121).

7. Unité de transmission (1) selon la revendication 1, dans laquelle les premier et deuxième conducteurs (111, 112) sont agencés parallèlement côte à côte.

8. Unité de transmission (1) selon la revendication 1, dans laquelle les premier et deuxième conducteurs (111, 112) sont torsadés axialement ensemble.

9. Unité de transmission (1) selon la revendication 6, comprenant en outre une troisième gaine (1113).

10. Unité de transmission (1) selon la revendication 9, comprenant en outre une quatrième gaine (1114) entourant chacun des premier et deuxième groupes de conducteurs (11, 12) pour se positionner à l'extérieur des premières gaines (1111) ; et la quatrième gaine (1114) étant une feuille d'aluminium.

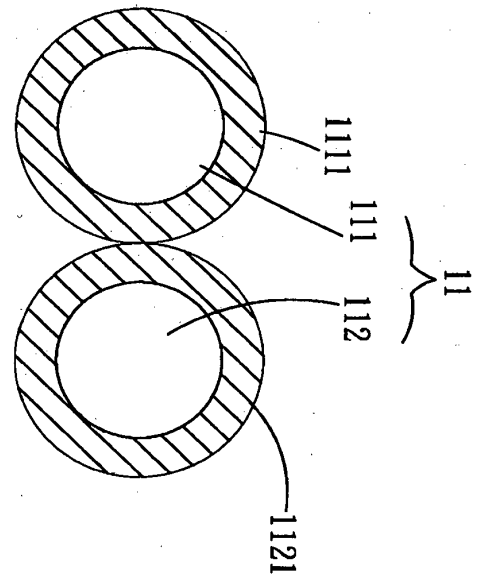


Fig. 1

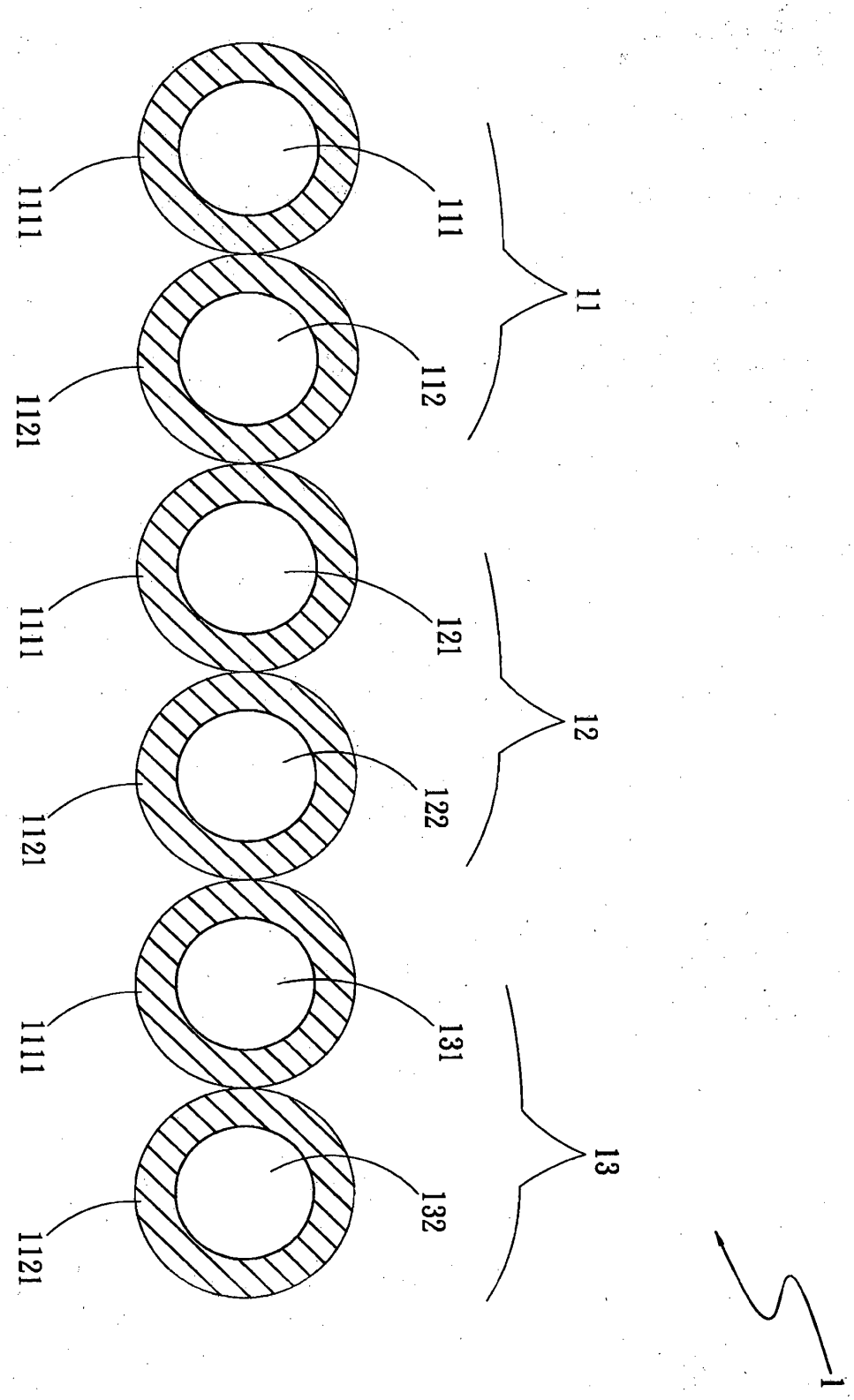


Fig. 2

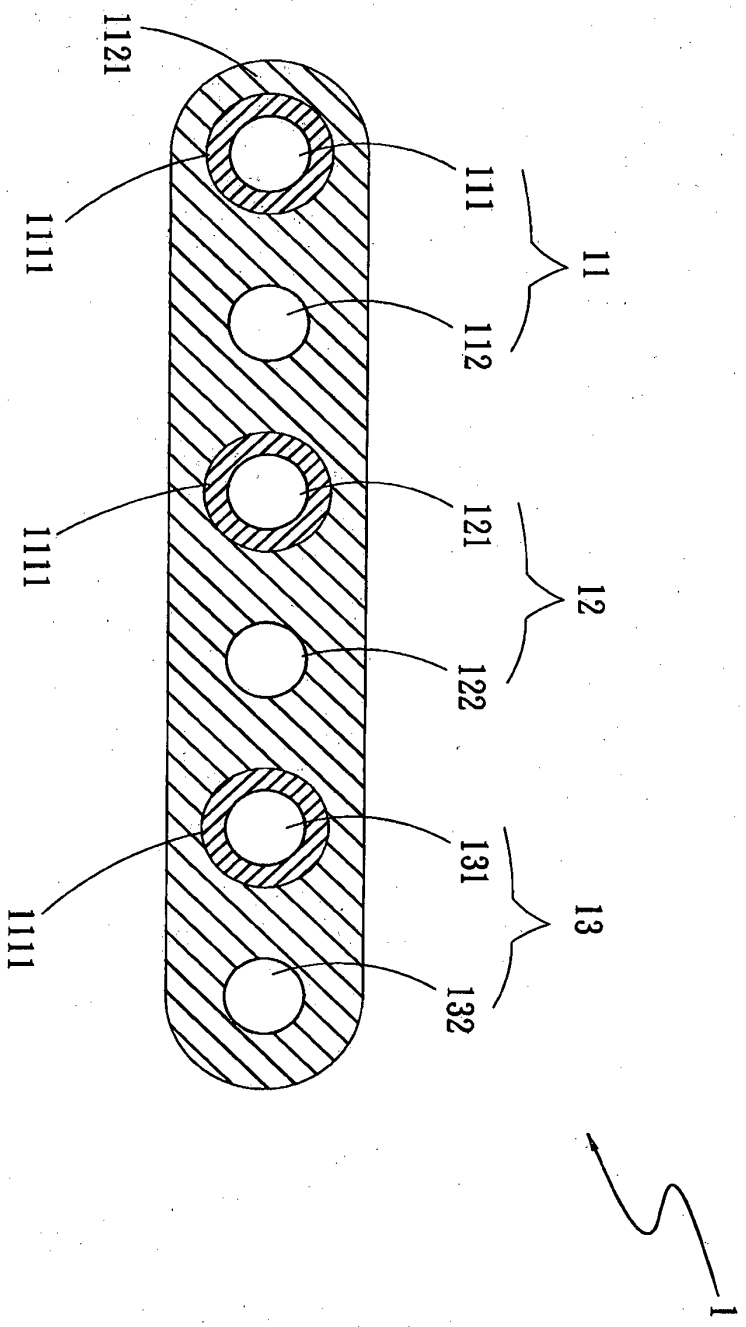


Fig. 3

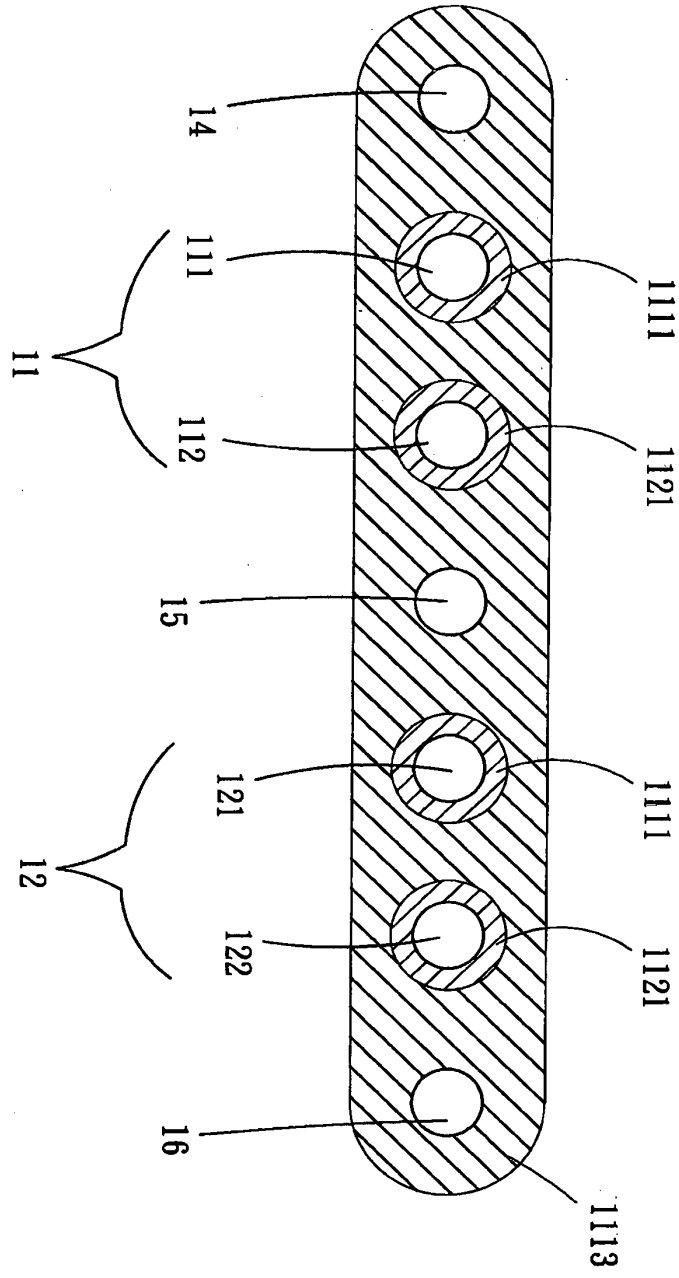


Fig. 4

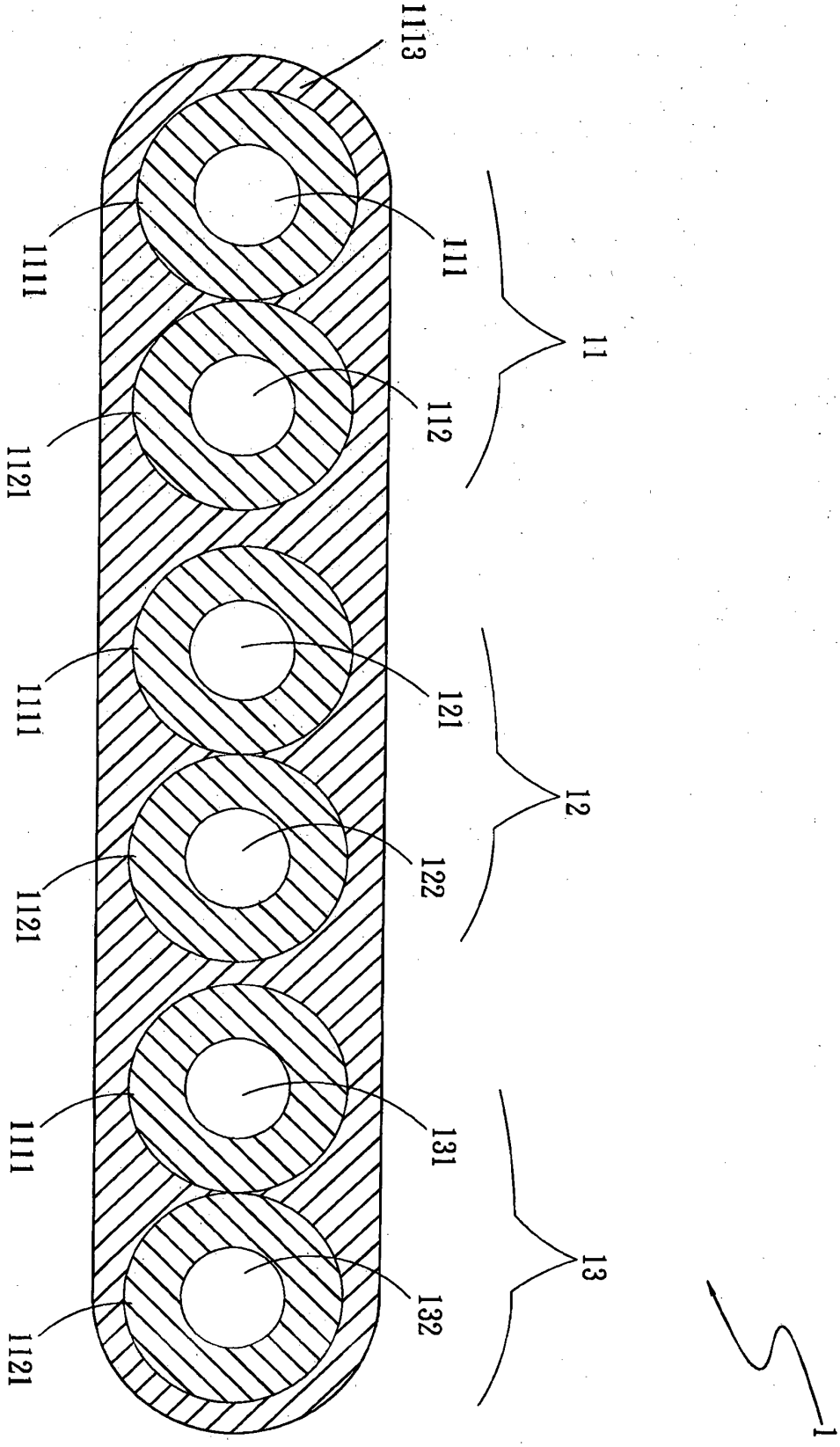

1113
1111
111
11
112
1121
1111
121
12
122
1121
1111
131
13
132
1121
1

Fig. 5

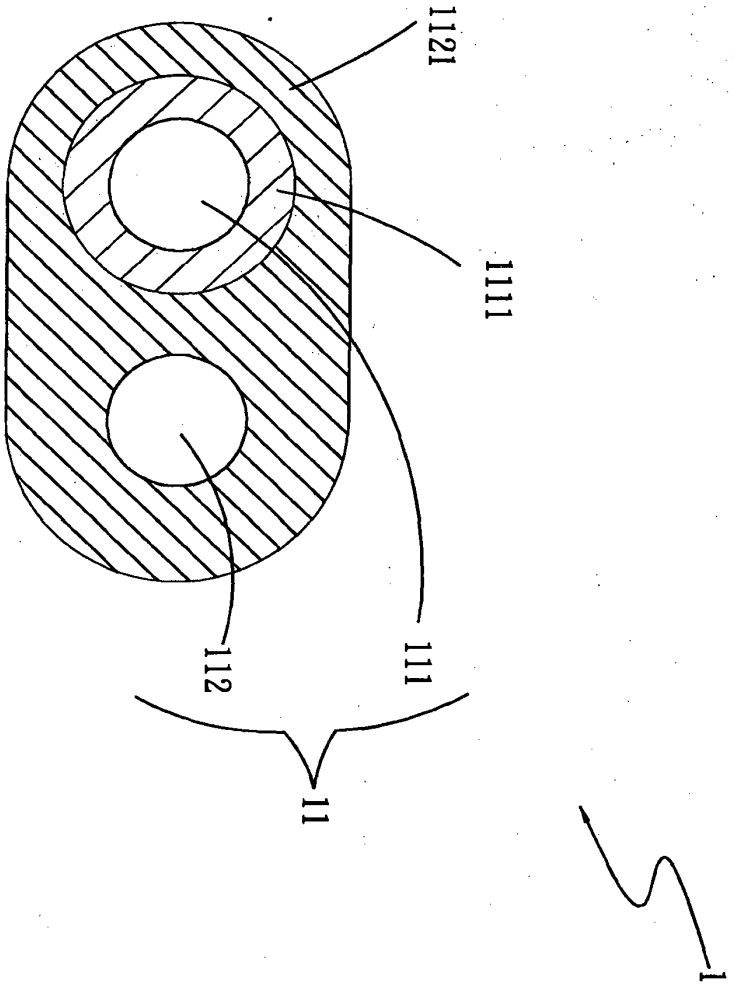


Fig. 6

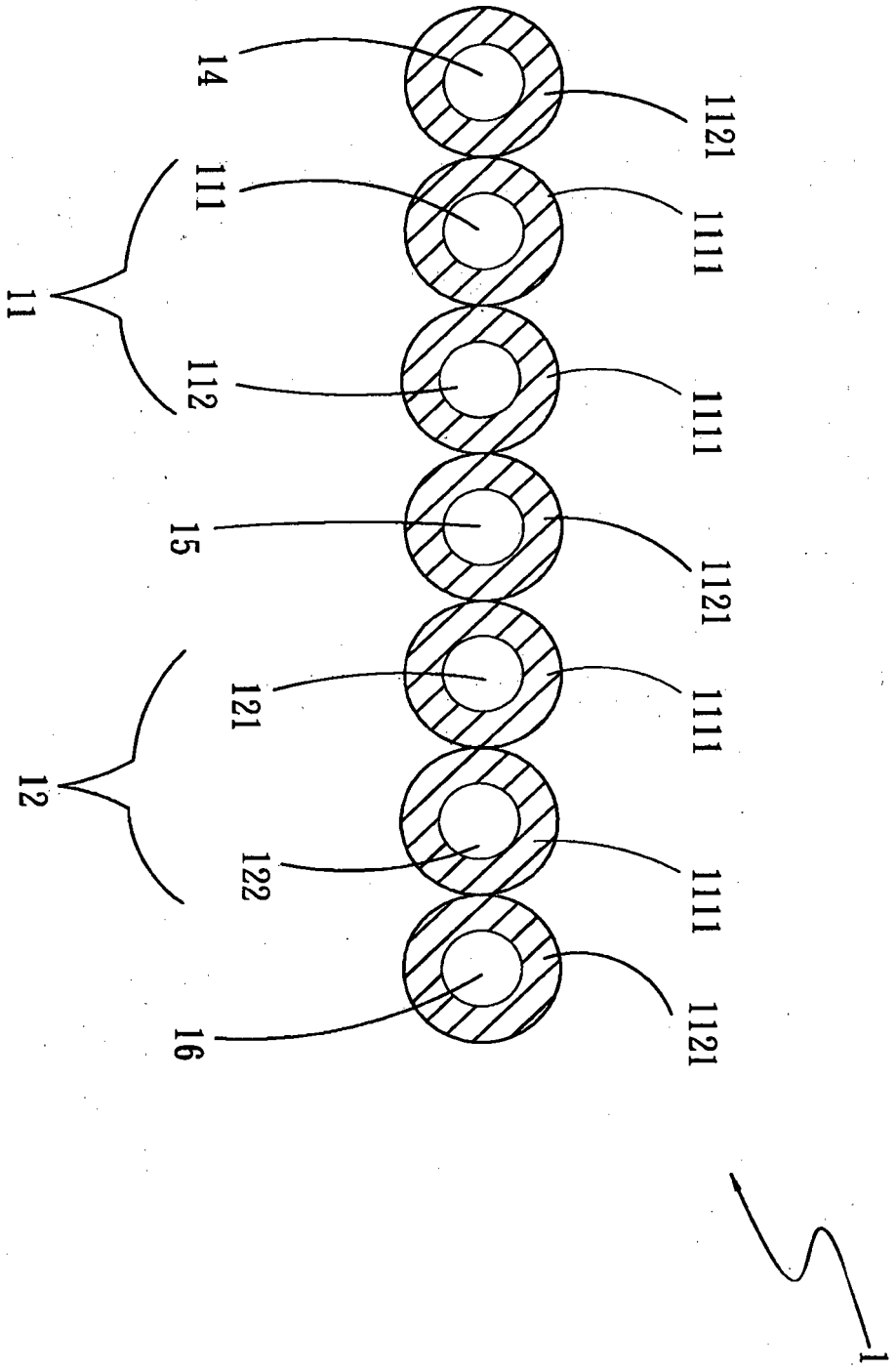

14
111
11
112
15
121
12
122
16
1121
1111
1111
1121
1111
1111
1121
1

Fig. 7

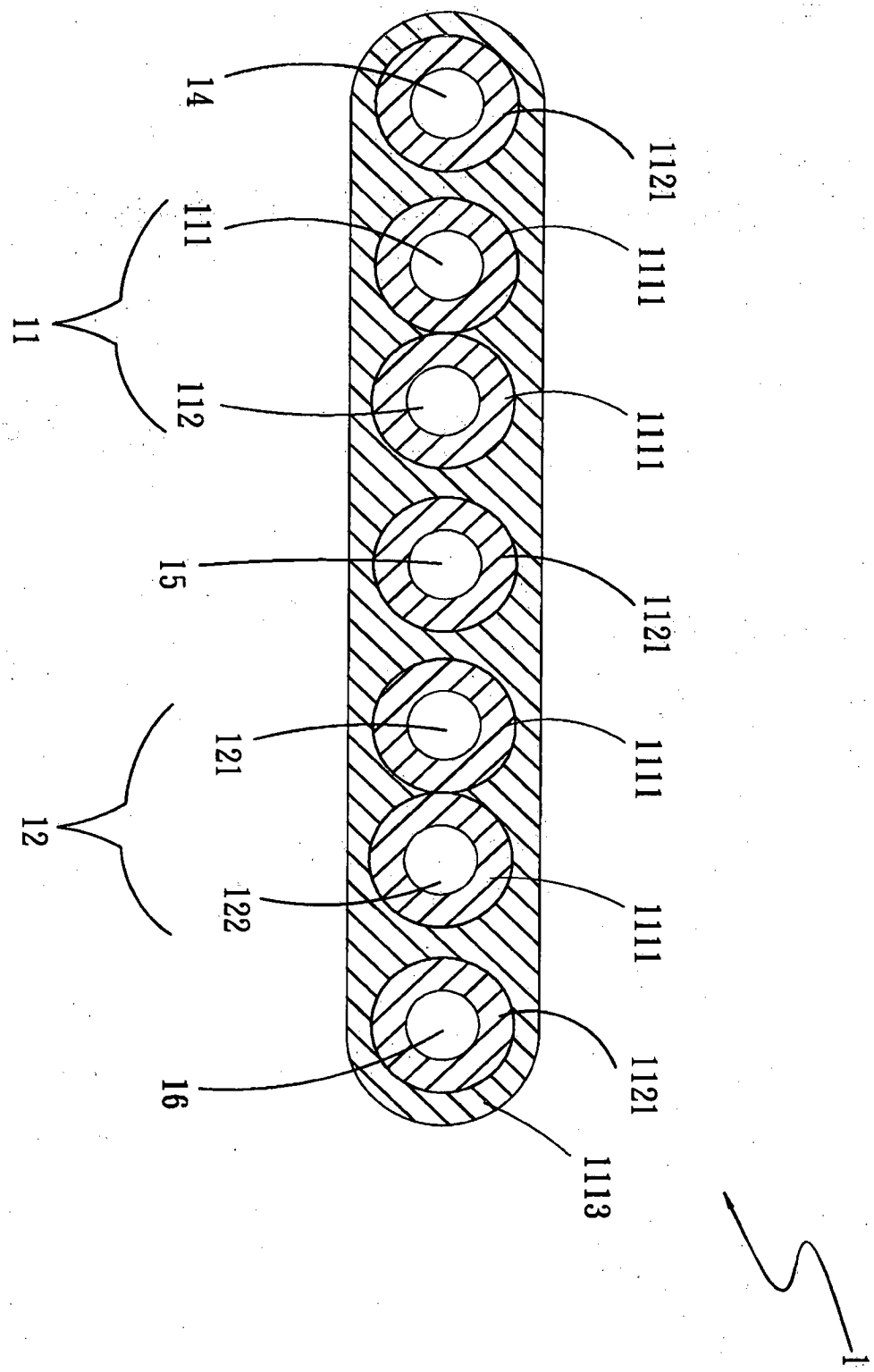

14
111
11
112
15
121
12
122
16
1121
1111
1111
1121
1111
1111
1121
1113
1

Fig. 8

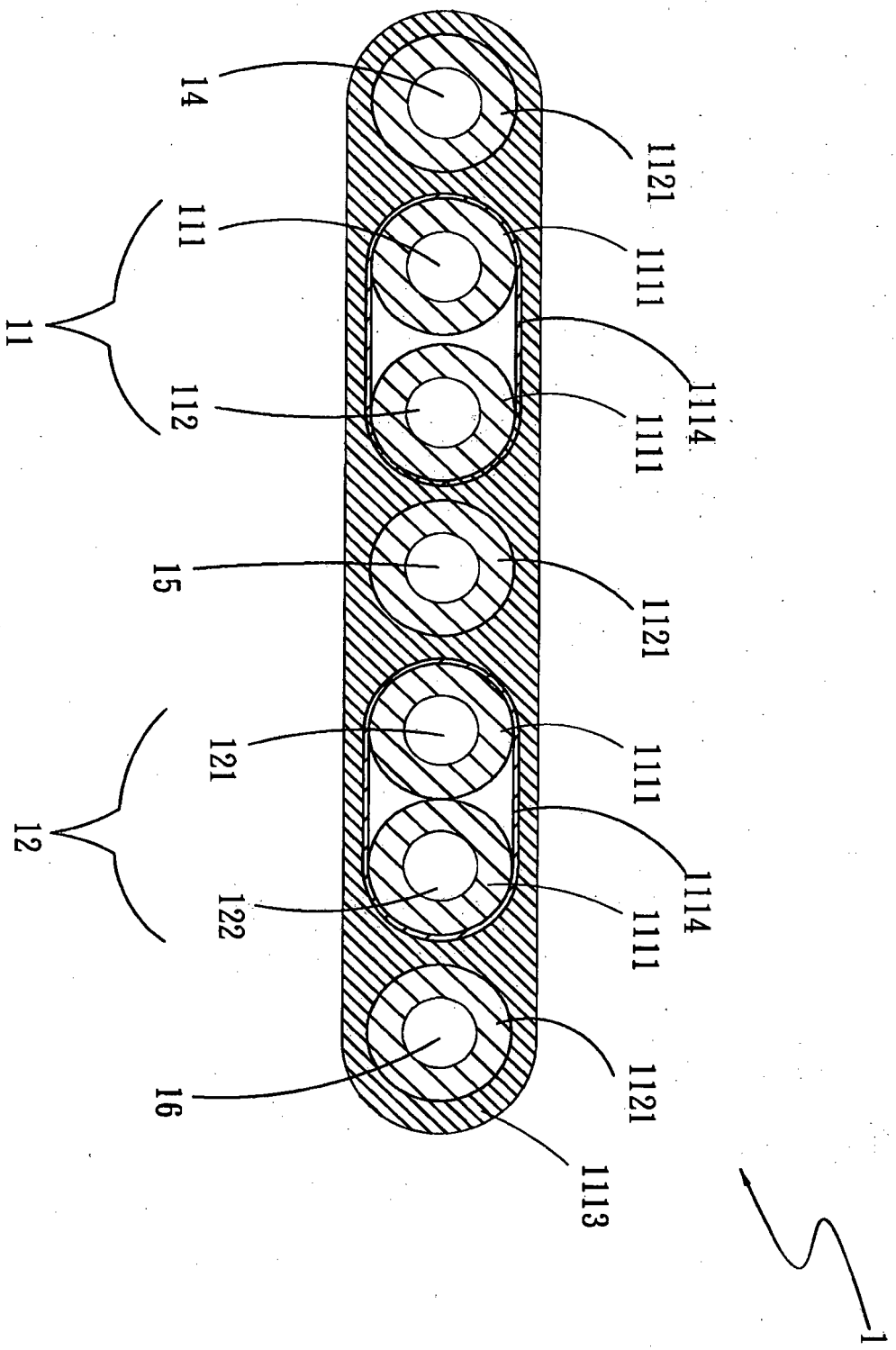

14
1121
111
1111
11
1114
112
1111
15
1121
121
1111
12
1114
122
1111
1121
16
1113
1

Fig. 9

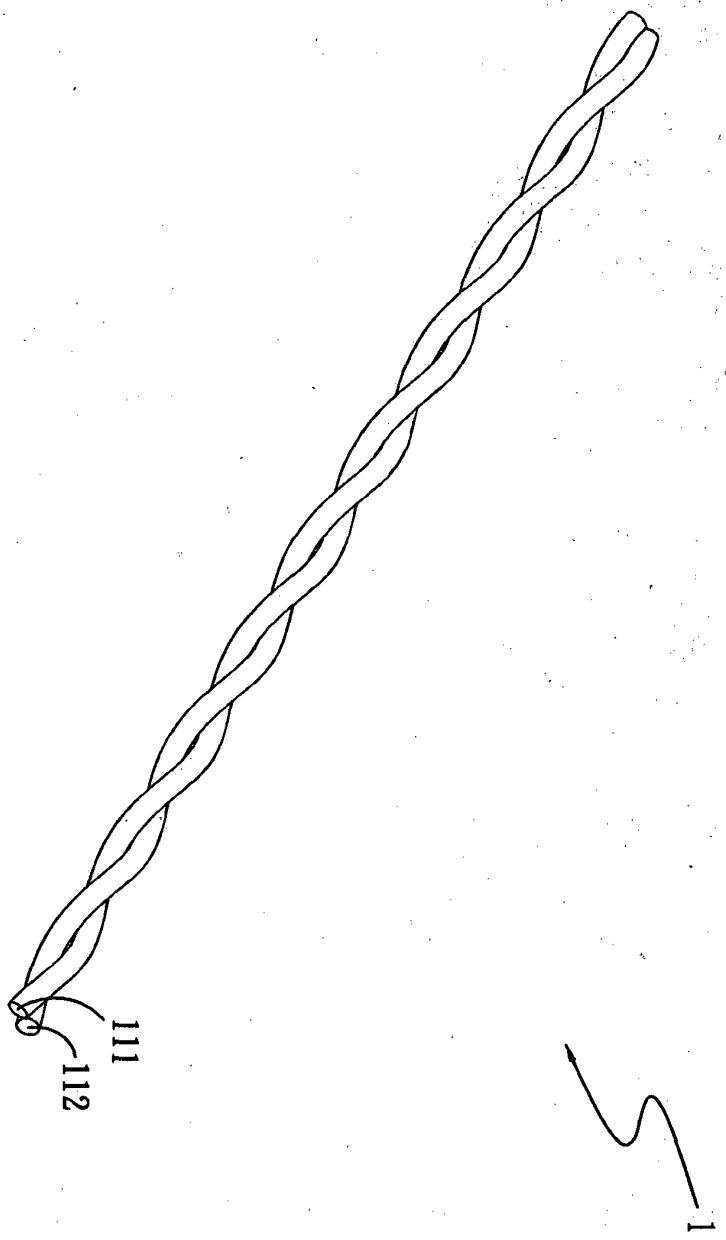


Fig. 10

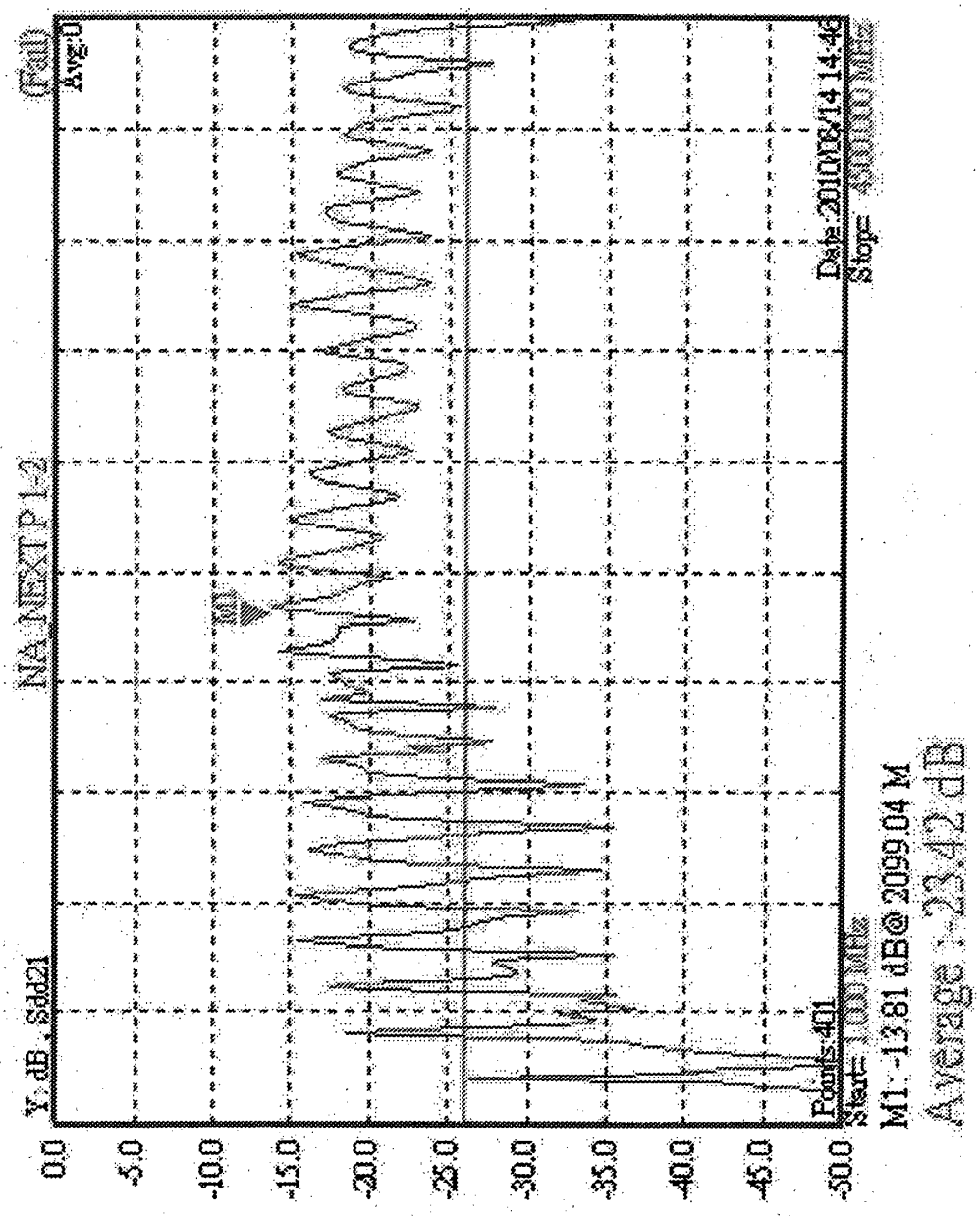

Ch1
Avg:0
NA NEXT P1-2
Y: dB , Sdd21
M1
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-45.0
-50.0
Points:401
M1: -13.81 dB@ 2099.04 M
Average : -23.42 dB

Fig. 11

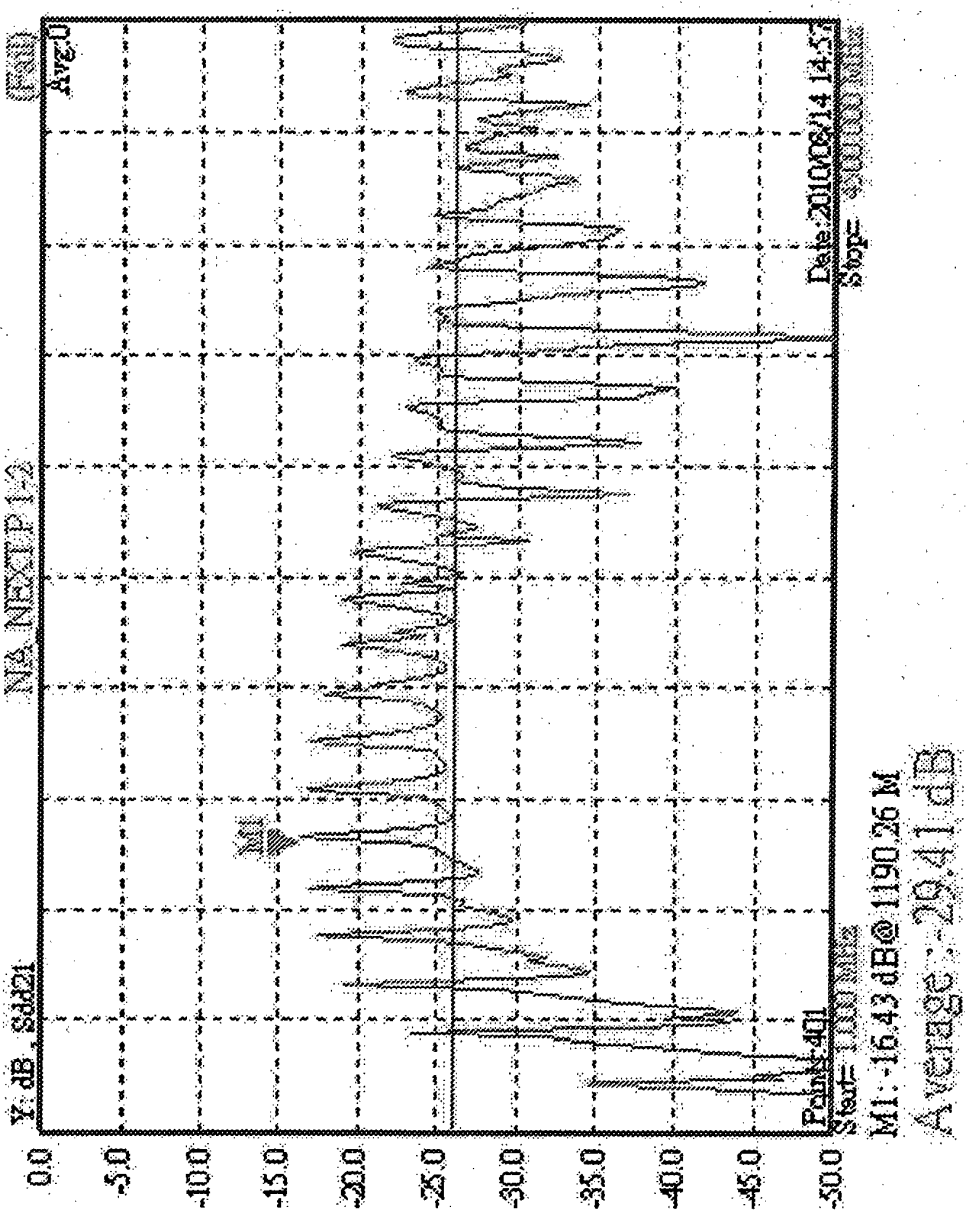

Ch1
Avg:0
NEXT P 1-2
Y: dB S4321
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-45.0
-50.0
M1
Date:2010/08/14 14:57
Stop=
Start=
Points:401
M1: -16.43 dB@ 1190.26 M
Average: -29.41 dB

Fig. 12

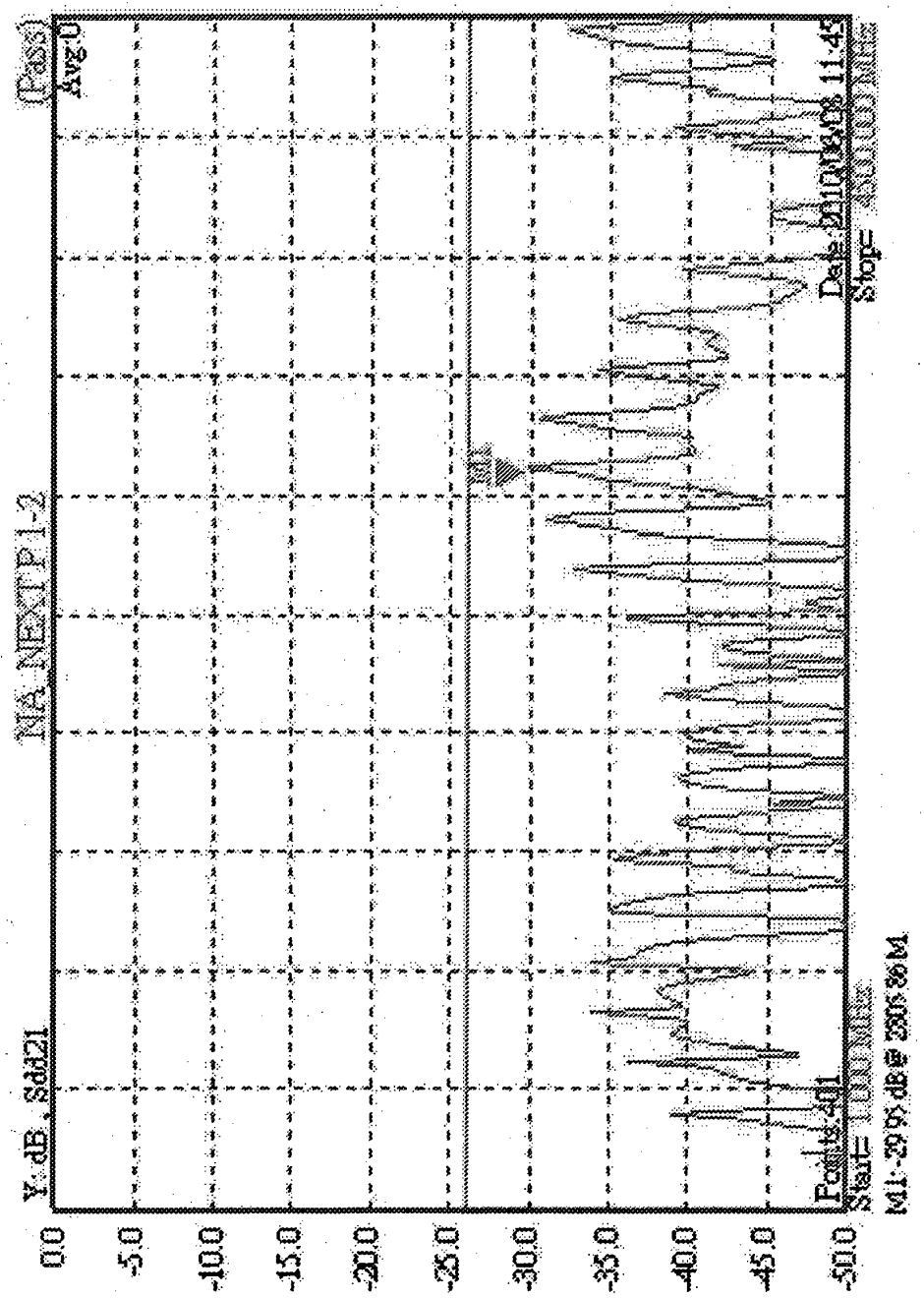

(Pass)
Avg:0
NA NEXT P1-2
Y: dB, Sdd21
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-45.0
-50.0
Points:401
M1: -29.05 dB @ 2305.86 M
Date:2010/03/03 11:45
Stop=

Fig. 13

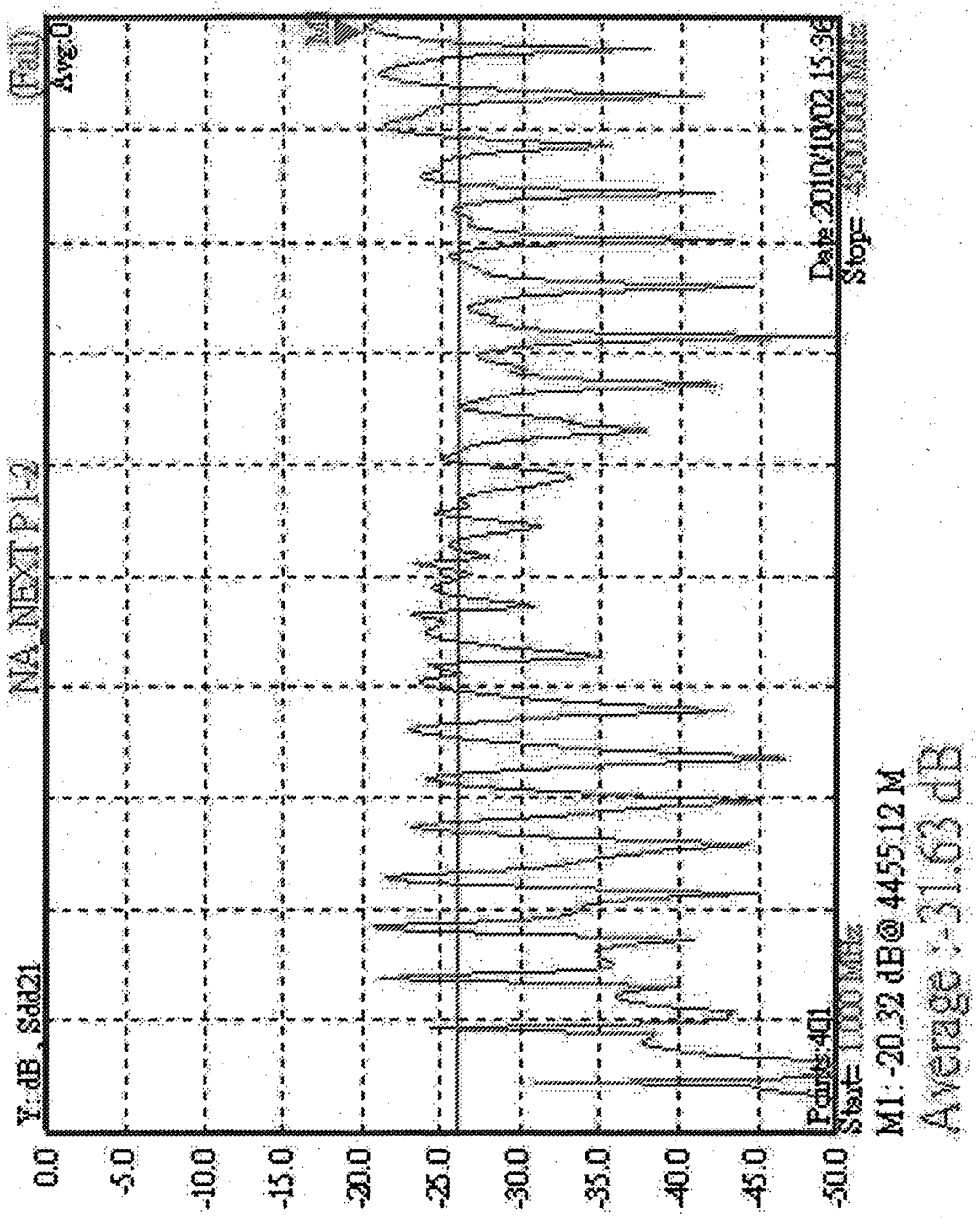

(Full)
Avg:0
NA NEXT P1-2
Y: dB , Sdd21
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-45.0
-50.0
Date:2010/10/02 15:39
Stop=
Points:401
Start=
M1: -20.32 dB@ 4455.12 M
Average : -31.63 dB

Fig. 14

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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