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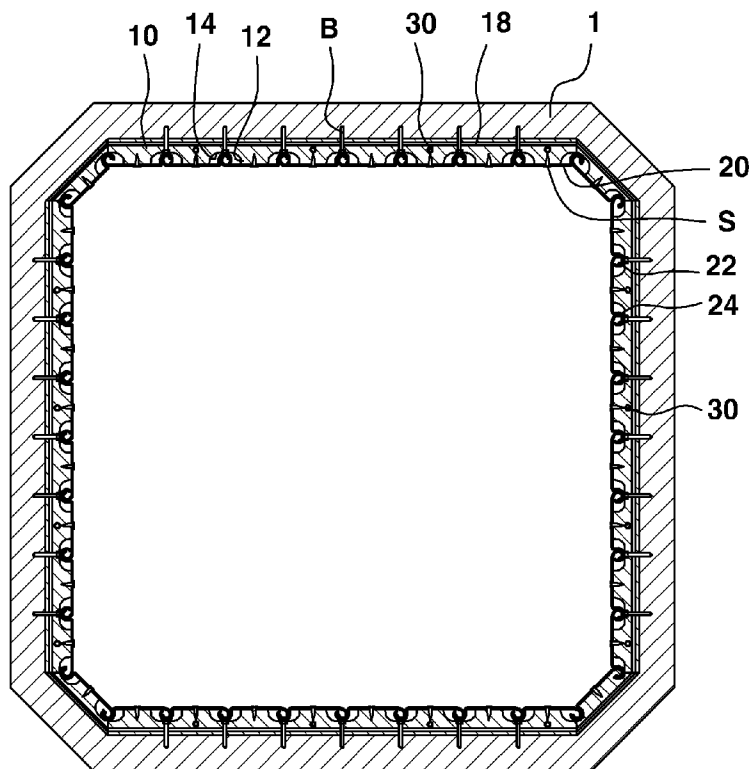
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[Continued on next page]

(54) Title: METHOD FOR REPAIRING CONDUIT LINE AND REPAIR MATERIAL



(57) Abstract: The present invention relates to a method for repairing conduit line, more specifically, it comprises a first process for successively installing support members lengthwise in conduit at a predetermined interval; a second process for installing a plurality of repair members so as to envelop the inside of the conduit through the support members at a predetermined interval with the conduit; a third process for injecting reinforcing filler material into the interval formed between the repair member and conduit; and a fourth process for sealing the filler hole when injection of reinforcing filler material is completed and coagulating the reinforcing filler material. Thus, according to the method for repairing conduit line according to the present invention, it is very easy to install support members or repair members, so it has effects of overall reduction of conduit repair work time and improvement of work efficiency.

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# Description

## METHOD FOR REPAIRING CONDUIT LINE AND REPAIR MATERIAL

### Technical Field

[1] The present invention relates to a method for repairing conduit line, and more specifically to a method for repairing conduit line and repair material, by which when conduit line buried underground as well as sewage conduit line is damaged by deterioration or corrosion, it is repaired easily without replacing for continued use.

[2]

### Background Art

[3] In general, conduit line buried underground as well as sewage conduit line is deteriorated when a certain period has passed or damaged because part of it is corroded by oxidized substances. Since the content flows out through the damaged portion to cause problems such as soil contamination or groundwater pollution, it is necessary to repair the conduit line having such a problem. One of the repairing methods is to replace the damaged conduit. Namely, the place where the conduit is buried is excavated and the deteriorated conduit is separated and a new conduit is buried. But such a repairing method has problems that it takes a lot of work time and also work efficiency is low because the conduit has to be replaced after excavating the place where the damaged conduit is buried. Especially, in case of working in a bustling urban center, it causes traffic congestion.

[4]

[5] So, a recent trend is that various methods of repairing without replacing deteriorated conduit are being developed and carried out. An example of such a method is repairing the damaged portion of conduit by pasting with mortar. If the extent of damage is light, it is possible to repair it by pasting the surface partially with mortar; but if the damaged portion of conduit is extensive, partial repair work is inefficient. Therefore, in such a case, repairing the whole conduit should be more effective.

[6]

[7] As an example of repairing conduit on the whole, there is a conduit repairing method disclosed in Korean Patent Laid-Open No. 2004-10353.

[8] In this conduit repairing method, a cylindrical body having an outer diameter smaller than the inner diameter of conduit is formed in the conduit, and the interval between cylindrical body and conduit inner wall is filled with grout material, which is hardened. This method is characterized by that an inflatable-deflatable tube-shaped pressure bag is placed lengthwise in the conduit in the interval between the cylindrical

body and conduit inner wall, and fluid is filled in the pressure bag to inflate the pressure bag, and the cylindrical body is supported by the inflated pressure bag. It is also characterized by that a triangular edge shaped support is introduced into the cylindrical body and this support supports three points of the top portion on the inside of the cylindrical body and of the left and right on the inside.

[9]

[10] However, such a conventional conduit repairing method has a problem that it is very inconvenient and complicated, thereby lowering work efficiency, because a cylindrical body is formed in the conduit and a pressure bag is installed between conduit and cylindrical body to support the cylindrical body. Moreover, it has another problem that the work of installing a triangular edge shaped support inside the cylindrical body for more stable support is also very inconvenient and bothersome, and takes a lot of time, thereby lowering work efficiency.

[11]

## **Disclosure of Invention**

### **Technical Problem**

[12] The present invention is to solve such aforementioned problems with an object to provide a conduit repairing method, by which a plurality of repair members can be installed inside the conduit very easily and stably and the conduit can be repaired easily by injecting and coagulating reinforcing filler into the interval between them.

[13]

[14] Another object of the present invention is to provide a conduit repairing method, by which a plurality of repair members are connected to each other and are configured in such a way that the angle made by two adjacent repair members is easily adjustable, so that the repair members can be installed by bending them easily according to the shape of conduit.

[15]

[16] Still another object of the present invention is to provide repair material to be used in such a conduit repairing method.

[17]

### **Technical Solution**

[18] In accordance with the present invention, there is provided a method for repairing conduit line comprising: a first process in which support members shaped in such a way that the protrusions and grooves are alternately formed on one side are fixed and installed on the ceiling, floor and both sides of the conduit inside, and these support members are successively installed at a predetermined interval lengthwise of the conduit; a second process in which after one repair member that has a latch portion

formed at one end widthwise and a catch portion corresponding to the latch portion is formed on the other end is adhered and fixed to the repair member, with the latch portion of another repair member inserted into and connected with the catch portion of the previously fixed repair member, another repair member is fixed by being pushed lengthwise to thrust the latch portion in the catch portion; a third process in which reinforcing filler material is injected and filled through a filler hole formed in said repair member into the interval formed between the repair member and conduit; and a fourth process in which when injection of said reinforcing filler material is completed the filler hole is sealed, and when a given time has passed the injected reinforcing filler material is coagulated.

### **Advantageous Effects**

[19] In the method for repairing conduit line according to the present invention, both the work of installing support members and the work of installing repair members are very easy, so the whole conduit repair work time is reduced and work efficiency is improved.

[20]

[21] Also, by the present invention, it is possible not only to reduce execution cost due to reduced work time, but also to reduce the manufacturing cost because the composition of support members and repair members are simple, thereby resulting in reduction of the whole execution cost.

[22]

[23] Moreover, since in the present invention a plurality of repair members are configured so as to be easily bent even if connected to each other, installation work of repair members can be carried out very easily even in repairing an angular edge portion of conduit.

[24]

[25] Furthermore, since the present invention has a cable housing pipe formed inside, it is possible to bury and install various cables and wires in the housing pipe of conduit as necessary.

[26]

### **Brief Description of the Drawings**

[27] These and other features, aspects, and advantages of preferred embodiments of the present invention will be more fully described in the following detailed description, taken accompanying drawings. In the drawings:

[28] Fig. 1 is a sectional view showing one portion of conduit repaired by the method for repairing conduit line according to the present invention;

[29] Fig. 2 is a sectional view taken along line A-A of Fig. 1;

- [30] Fig. 3 is a sectional view shown by enlarging one portion of Fig. 2;
- [31] Fig. 4 is an exploded perspective view showing repair materials used in the method for repairing conduit line according to the present invention; and
- [32] Fig. 5 is a sectional view showing another embodiment of repair member used in the present invention.
- [33]
- [34] [Description of numerals of major parts of the drawing]
- [35] 1: conduit 10: support member
- [36] 12: protrusion 14: groove
- [37] 16: fastening hole 18: steel skeleton
- [38] 19: insert hole 20: repair member
- [39] 22: latch portion 24: catch portion
- [40] 26: inlet hole 28: plug
- [41] 30: cable housing pipe B: bolt
- [42] M: reinforcing filler material S: screw
- [43]

### **Best Mode for Carrying Out the Invention**

- [44] Below will be described in detail the present invention with reference to the accompanying drawings.
- [45] Fig. 1 is a sectional view showing one portion of conduit repaired by the method for repairing conduit line according to the present invention; Fig. 2 is a sectional view taken along line A-A of Fig. 1; Fig. 3 is a sectional view shown by enlarging one portion of Fig. 2; Fig. 4 is an exploded perspective view showing repair materials used in the method for repairing conduit line according to the present invention; and Fig. 5 is a sectional view showing another embodiment of repair member used in the present invention.
- [46]
- [47] First, referring to Fig. 4, the repair material used in the present invention is composed of a plurality of support members 10 and repair members 20.
- [48] A support member 10 has a predetermined width, and one side of it is formed so as to be adhered to the inside of conduit, and the other side has shape which has protrusions 12 and grooves 14 formed alternately. And the groove 14 has a fastening hole 16 through-formed for a bolt to be fastened. And, inside the support member 10 is buried at least one steel skeleton 18 extended lengthways along the lengthwise direction to reinforce the strength. And, in the direction perpendicular to the lengthwise direction, that is, in the width direction, is through-formed an insert hole 19 into which at least one cable housing pipe 30 is inserted. Here, the cable housing pipe 30 refers to

a pipe for housing various cables and wires.

[49] The repair member 20 has a latch portion 22 formed at one end widthwise, and a catch portion 24 formed at the other end corresponding to the latch portion 22 for the latch portion 22 of another adjacent repair member 20 to be inserted and connected. Here, it is preferable that the latch portion 22 and the catch portion 24 have a shape of partly opened circular ring shape so as to freely adjust the angle made by adjacent two repair members 20 within a given range when the latch portion 22 and the catch portion 24 are connected to each other. However, these portions are not limited to ring shape, and as shown in Fig. 5, but they can have a variety of shapes such as a roughly rectangular, hexagonal, octagonal shape, etc. Also, in one part of the repair member 20 is through-formed a filler hole 26, which can be opened or closed selectively via a plug 28. Here, the filler hole 26 can be formed limitedly in only part of repair members 20, or in all of repair members 20. And, as for the plug 28, a screw method may instead be adopted, but any method can be applied as long as the filler hole 26 can be selectively sealed.

[50] Meanwhile, the support member 10 and repair member 20 may be preferably made of synthetic resin to have its unit price reduced, but it may instead be made of a different material.

[51]

[52] Now, referring to Figs. 1 to 3, the method for repairing conduit line by the aforementioned repair material will be described.

[53] First, support members 10 are adhered to the ceiling and floor and both sides of conduit 1, and then bolts B are fastened in fastening holes 16 to fix support members 10 on the inner wall of conduit 1. And, installation work of these support members 10 is carried out successively at a predetermined interval lengthwise of conduit 1. At this time, the support members 10 installed on the ceiling, floor and both sides may be installed on the same line, or in zigzag.

[54] When installation of support members 10 is completed, at least one cable housing pipe 30 is installed in the insert hole 19. Here, the cable housing pipe 30 is installed for the purpose of installing various cables and wires in the housing pipe of the conduit as necessary. For reference, in case it is not necessary to install a cable housing pipe 30, just proceed to the next process.

[55] When installation of the cable housing pipe 30 is completed, any one of repair members 20 is fixed by fastening screws S while adhered to the protrusion 12 of the corresponding support member 10. Next, with the latch portion 22 of another repair member 20 inserted into and connected with the catch portion 24 of the previously fixed repair member 20, push another repair member 20 lengthwise continuously to have the latch portion 22 inserted into the catch portion 24. After that, the repair

member 20 is fixed to the support member 10 by screws S. By connecting and installing a plurality of repair members 20 continuously in this manner, the inside of conduit 1 is enveloped. At this time, since it is possible by the present invention to freely adjust the angle made by adjacent two repair members within a given range, even with a plurality of repair members 20 connected, it is possible to install repair members by easily bending them according to the shape of conduit 1.

[56] When installation of repair members 20 is completed, reinforcing filler material M such as mortar is injected to fill the interval formed between repair members 20 and conduit 1 through filler holes 26 formed on repair members 20. Namely, a pre-determined interval is formed by support members 10 between repair members 20 and conduit 1, and reinforcing filler material M is filled in this interval.

[57] When injection of reinforcing filler material M is completed, plugs 28 are inserted into filler holes 26 to seal them, and when the injected reinforcing filler material M is coagulated after a given time period has passed, conduit repair work is completed.

[58] Of course, in order to reduce the coagulation time of reinforcing filler material M, hot air may be supplied using hot air blower. At this time, hot air can be supplied by using the art in public domain, so the detailed description is omitted.

[59] Although the present invention has been described in connection with the exemplary embodiments illustrated in the drawings, it is only illustrative. It will be understood by those skilled in the art that various modifications and equivalents can be made to the present invention. Therefore, the true technical scope of the present invention should be defined by the appended claims.

[60]

### **Industrial Applicability**

[61] In accordance with the present invention, both the work of installing support members and the work of installing repair members are very easy, so the whole conduit repair work time is reduced and work efficiency is improved.



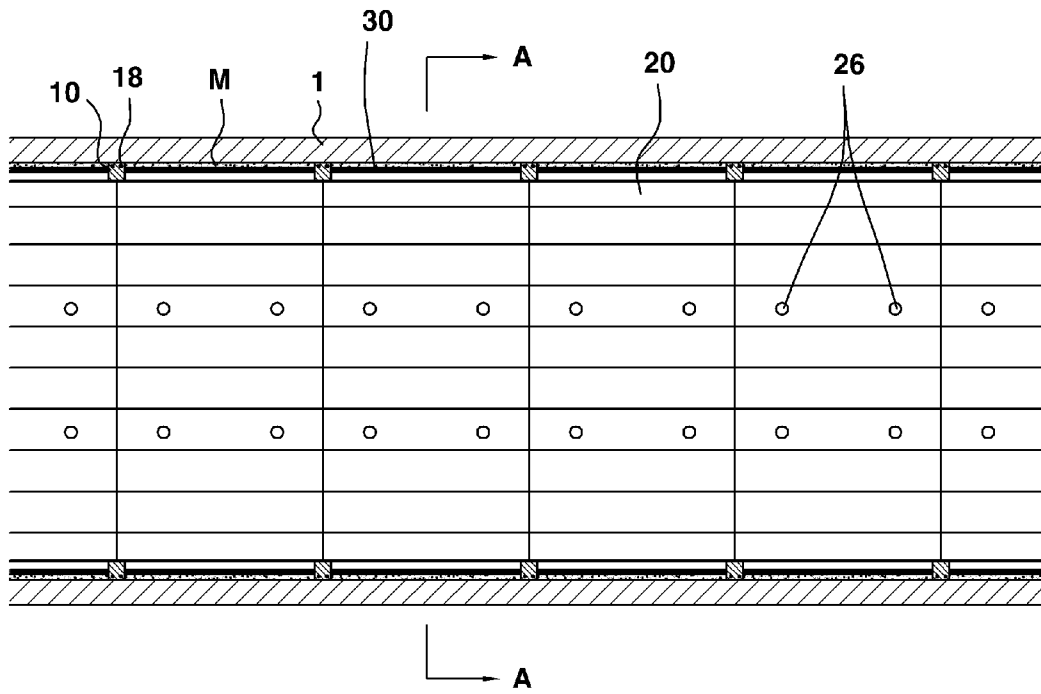
## Claims

- [1] A method for repairing conduit line comprising: a first process in which support members shaped in such a way that the protrusions and grooves are alternately formed on one side are fixed and installed on the ceiling, floor and both sides of the conduit inside, and these support members are successively installed at a pre-determined interval lengthwise of the conduit;  
a second process in which after one repair member that has a latch portion formed at one end widthwise and a catch portion corresponding to the latch portion is formed on the other end is adhered and fixed to the repair member, with the latch portion of another repair member inserted into and connected with the catch portion of the previously fixed repair member, another repair member is fixed by being pushed lengthwise to thrust the latch portion in the catch portion;  
a third process in which reinforcing filler material is injected and filled through a filler hole formed in said repair member into the interval formed between the repair member and conduit; and  
a fourth process in which when injection of said reinforcing filler material is completed the filler hole is sealed, and when a given time has passed the injected reinforcing filler material is coagulated.
- [2] The method for repairing conduit line of claim 1, further comprising a process in which at least one cable housing pipe is installed in the insert hole formed in the support member before injecting said reinforcing filler material.
- [3] The method for repairing conduit line of claim 1, further comprising a process in which a hot air blower is used to supply hot air in order to reduce the coagulation time of said reinforcing filler material.
- [4] Repair material for repairing conduit comprising:  
support members having a shape in which one side is adhered to the inside of conduit and the protruding portions and grooves are alternately formed on the other side, and fastening holes are through-formed in grooves for bolts to be fastened therethrough, and  
repair members having latch portions formed on one end widthwise and catch portions corresponding to the latch portions formed on the other end, wherein the latch portion of one repair member is inserted in the catch portion of another adjacently placed repair member to be connected to each other.
- [5] The repair material for repairing conduit of claim 4, said support member has at least one steel skeleton buried inside along its lengthwise direction for reinforcement of strength, and at least one insert hole is formed along its widthwise

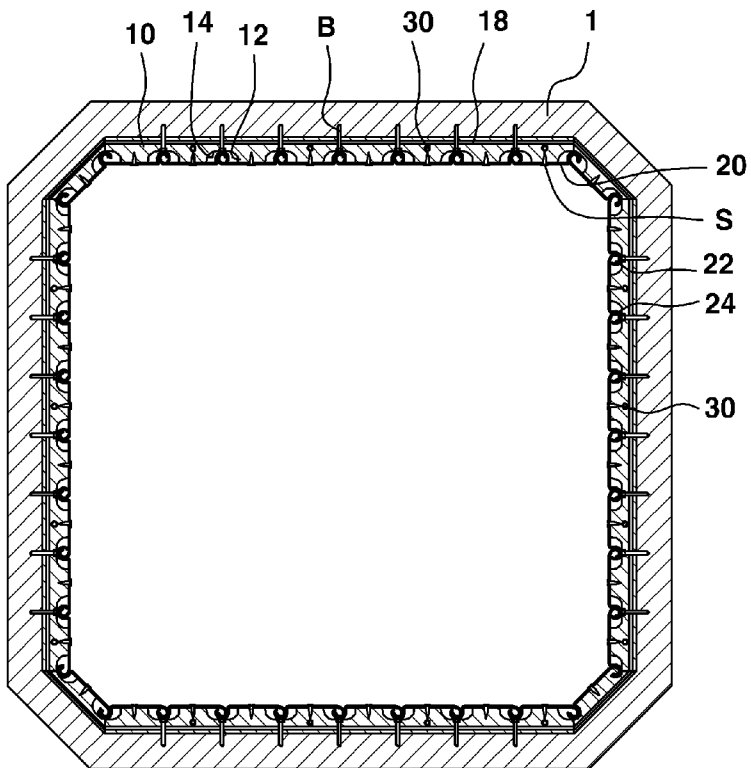
direction for installing a cable housing pipe.

- [6] The repair material for repairing conduit of claim 4, wherein the latch portions and catch portions of said repair material have a partly opened circular ring shape so as to freely adjust the angle made by adjacent two repair members, with the latch portions and catch portions of said repair material connected to each other.
- [7] The repair material for repairing conduit of claim 4 or claim 6, wherein a filler hole is through-formed in one part of said repair member and the filler hole is selectively opened or closed by a plug.

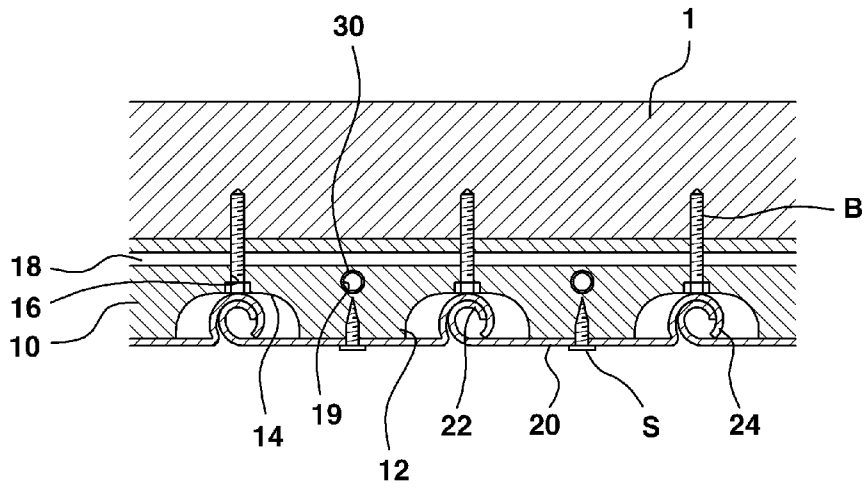
[Fig. 1]



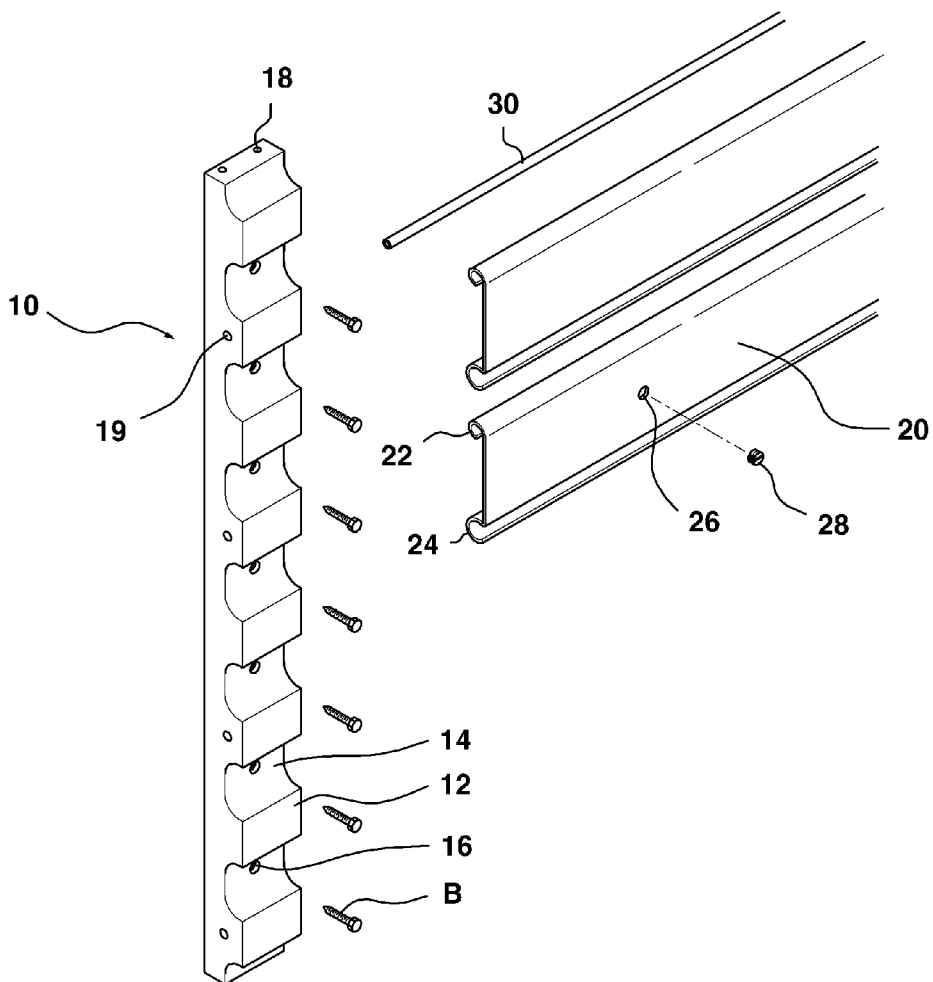
[Fig. 2]



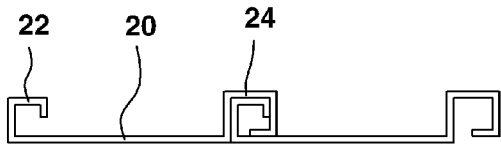
[Fig. 3]



[Fig. 4]



[Fig. 5]



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR2007/000204**A. CLASSIFICATION OF SUBJECT MATTER***F16L 55/16(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)  
IPC 8 F16L 55/16Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
Korean utility models and applications for utility models since 1975  
Japanese utility models and applications for utility models since 1975Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
eKIPASS (KIPO internal) & keywords : "repair" and "panel"**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2003-314197 A (IIDA CONSTRUCTION INCORPORATION) 6 November 2003 See paragraphs 39-51, 68 and figures 2-7.	1-7
A	JP 09-132930 A2 (KURIMOTO LTD.) 20 May 1997 See paragraphs 19-23, 41-52 and figures 1, 2, 15, 18, 23.	1-7
A	JP 2002-310378 A (ASHIMORI INDUSTRY CO., LTD.) 23 October 2002 See paragraphs 24-31, 40-42 and figures 1-4.	1-7
A	JP 2001-021092 A (SHONAN SYNTHETIC-RESIN FACTORY et al.) 26 January 2001 See paragraphs 19-26 and figures 1, 2.	1-7

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

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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