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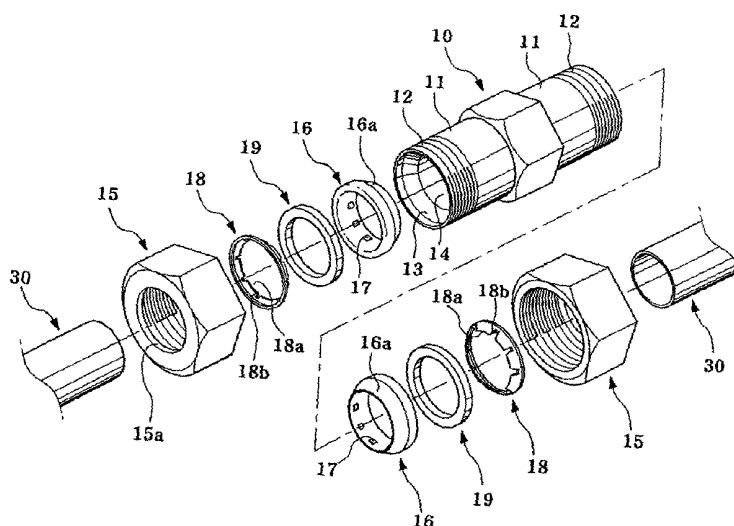
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[Continued on next page]

(54) Title: PIPE JOINT



(57) Abstract: Disclosed is a pipe joint, comprising a main body in which screw threaded portions are formed at both joint ends thereof, and internal inclined planes are formed at inner circumferential surfaces of both joint ends into which a pipe is introduced and have smaller diameter inward; a nut which is fitted with the screw threaded portion of the main body through insertion of the pipe and has a step formed at one side of an inner circumferential surface thereof; a rubber packing in which an outer inclined plane is formed at one side of an outer circumferential surface thereof for a sliding contact with the inner inclined plane of the main body when being fitted with the pipe, and a plurality of downward projections are regularly arranged at an inner circumferential surface thereof; a fixed washer in which a plurality of downward pieces and gaps are regularly disposed at an inner circumferential surface thereof; and an auxiliary washer which is disposed between the rubber packing and the fixed washer to be fitted with the pipe.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

- 1 -

PIPE JOINT

DESCRIPTION

5 Technical Field

The present invention relates to a pipe joint, and more particularly, to a pipe joint in which pipes can be connected tightly by using a fixing washer at the time of assembling the pipes, and leakage of fluids can be prevented perfectly by using a rubber packing, and which can be re-used after being disassembled.

10

Background Art

In general, a pipe joint which connects pipes is a connection device for preventing a fluid flowing through the pipes from leaking through the pipe joint.

15

As shown in FIG. 1, a compression gap 4a is formed at each outer circumferential surface of pipes 3 and 4 which are inserted into a main body 1. Here, if a nut 2 is turned so as to proceed toward the main body 1, a compression ring 6 proceeds toward a fixing ring 5 and is depressed into the compression gap 4a, to thereby fix the pipes 3 and 4.

20

Here, the compression ring 6 which is compressed by the internal inclined plane of the nut 2 and depressed into the compression gap 4a, is contracted to then become a fixed shape.

The above conventional pipe joint has an advantage which can joint pipes 3 and 4 firmly, but cannot prevent a fluid from leaking. Also, a particular compression gap 4a should be provided to one of the pipes 3 and 4, when the pipes 3 and 4 are jointed, which causes a cumbersome process to be added.

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Further, in the case that the conventional pipe joint is disassembled for re-use, the leading end portion formed in the compression gap should be cut since the compression ring 6 is contracted and compressed into the compression gap 4a in the pipe 4.

- 2 -

Disclosure of the Invention

To solve the above problems, it is an object of the present invention to provide a pipe joint in which pipes can be connected tightly by using a fixing washer at the time of assembling the pipes, and leakage of fluids can be prevented perfectly by using a rubber packing, and which can be re-used after being disassembled.

To accomplish the above object of the present invention, there is provided a pipe joint comprising: a main body in which screw threaded portions are formed at both joint ends thereof, and internal inclined planes are formed at inner circumferential surfaces of both joint ends into which a pipe is introduced and have smaller diameter inward; a nut which is fitted with the screw threaded portion of the main body through insertion of the pipe and has a step formed at one side of an inner circumferential surface thereof; a rubber packing in which an outer inclined plane is formed at one side of an outer circumferential surface thereof for a sliding contact with the internal inclined plane of the main body when being fitted with the pipe, and a plurality of downward projections are regularly arranged at an inner circumferential surface thereof; a fixing washer in which a plurality of downward pieces and gaps are regularly disposed at an inner circumferential surface thereof; and an auxiliary washer which is disposed between the rubber packing and the fixing washer to be fitted with the pipe.

Brief Description of the Drawings

The above object and other advantages of the present invention will become more apparent by describing the preferred embodiment thereof in more detail with reference to the accompanying drawings in which:

FIG. 1 is a sectional view showing a conventional pipe joint;

FIG. 2 is an exploded perspective view showing a pipe joint according to the present invention;

FIG. 3 is a plan view showing a rubber packing according to the present invention;

- 3 -

FIG. 4 is a sectional view showing a rubber packing according to the present invention;

FIG. 5 is a plan view showing a fixing washer according to the present invention;

5 FIG. 6 is a front view showing a fixing washer according to the present invention; and

FIGs. 7A and 7B are sectional views showing assembly processes of the pipe joint according to the present invention, respectively.

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

A preferred embodiment of the present invention will be described with reference to the accompanying drawings.

As shown in FIGs. 2 through 6, screw threaded portions 12 which are threaded with nuts 15 are formed at both joint ends 11 thereof, in a main body
15 10 of a pipe joint according to the present invention. Internal inclined planes 13 having smaller diameter 14 inward are formed at the leading end portions of the inner circumferential surfaces thereof.

A rubber packing 16 in which an outer inclined plane 16a is formed at one side of an outer circumferential surface thereof, is pushed by the nut 15
20 which is threaded with the main body 10 while being fitted onto the outer circumferential surface of the pipe 30, and then pushed into a gap formed between the internal inclined plane 13 and the outer circumferential surface of the pipe 30, to thereby prevent a fluid from leaking perfectly.

A plurality of downward projections 17 are regularly arranged at an
25 inner circumferential surface of the rubber packing 16. Here, the cross-sectional area becomes greater toward the direction at which the pipe 30 is connected. Accordingly, the outer circumferential surface of the pipe 30 is compressed with a stronger force when connecting the pipe 30.

An auxiliary washer 19 is disposed between the rubber packing 16 and
30 the fixing washer 18 to then be fitted with the outer circumferential surface of

- 4 -

the pipe 30. Then, the auxiliary washer 19 proceeds toward the main body 10 at the time of locking the nut 15, and pushes the rubber packing 16 with a uniform force, to then compressively contact the outer inclined plane 16a.

Also, the auxiliary washer 19 is preferably made of stainless steel.

5 Meanwhile, a plurality of downward pieces 18a and gaps 18b are regularly disposed at an inner circumferential surface of the fixing washer 18, in the direction at which the pipe 30 is connected. Accordingly, when the nut 15 is tightened with a pipe wrench or spanner, the plurality of downward pieces 18a are contracted to compress the outer circumferential surface of the pipe 30. As
10 a result, modified portions 20 (shown in FIGs. 7A and 7B) which are concave inwards are made to thereby prevent the pipe 30 from freely rotating and make the pipe 30 fixed firmly.

Also, it is preferable that the fixing washer 18 is made of stainless steel.

15 The nut 15 which is fitted with the screw threaded portion 12 of the joint end 11 while being inserted into the outer circumferential surface of the pipe 30 has a step 15a formed at one side of an inner circumferential surface of the fixing washer 18.

The operation of the pipe joint having the above-described structure according to the present invention will be described below.

20 As shown in FIGs. 7A and 7B, the nut 15, the fixing washer 18, the auxiliary washer 19 and the rubber packing 16 are fitted in turn along the outer circumferential surface of the pipe 30. Then, the pipe 30 is pushed into the inner circumferential surface of both joint ends 11 in the main body 10.

25 Then, the nut 15 is threadedly engaged with the screw threaded portion 12 at both joint ends 11 in the main body 10. As a result, the fixing washer 18, the auxiliary washer 19 and the rubber packing 16 are compressed with each other while moving in the axial direction along the outer circumferential surface of the pipe 30.

30 Here, the circumferential surface of the fixing washer 18 is depressed by the step 15a while being pushed by the nut 15 which moves toward the both joint

- 5 -

ends 11. Accordingly, the plurality of downward pieces 18a of the fixing washer 18 are contracted to compress the outer circumferential surface of the pipe 30 and to then make modified portions 20 which are concave inwards. As a result, the pipe 30 is fixed firmly, to prevent the pipe 30 from freely rotating.

5 Also, the fixing washer 18 closely contacts both joint ends 11 of the main body 10, together with the pipe 30, to then push the auxiliary washer 19. At the same time, the auxiliary washer 19 pushes the rubber packing with a uniform force at the state where the former closely contacts the latter, to thereby prevent the rubber packing 16 from being deformed or damaged.

10 Here, the rubber packing 16 is pushed by the auxiliary washer 19, and thus the outer inclined plane 16a thereof slides along the internal inclined plane 13 at both joint ends 11 in the main body 10. At the same time, the inner circumferential surface of the rubber packing 16 is compressed on the outer circumferential surface of the pipe 30, to accordingly interrupt a fluid which
15 leaks between the outer circumferential surface of the pipe and the inner circumferential surface of the main body 10 completely, so that the fluid does not leak outside the pipe 30.

Industrial Applicability

20 As described above, the pipe joint according to the present invention can be installed simply and easily. Further, the present invention can prevent a fluid from leaking and accomplish a firm joint of pipes at the time of connecting the pipes, and can re-use a rubber packing, an auxiliary washer, a fixing washer after being disassembled, to resultantly lower a production cost and enhance a
25 productivity.

- 6 -

CLAIMS

1. A pipe joint, comprising a main body (10) in which screw threaded portions (12) are formed at both joint ends (11) thereof, and internal inclined planes (13) are formed at inner circumferential surfaces of both joint ends (11) into which a pipe (30) is introduced and have smaller diameter inward; and a nut (15) which is fitted with the screw threaded portion (12) of the main body (10) through insertion of the pipe (30) and has a step (15a) formed at one side of an inner circumferential surface thereof, the pipe joint comprising:

a rubber packing (16) in which an outer inclined plane (16a) is formed at one side of an outer circumferential surface thereof for a sliding contact with the internal inclined plane (13) of the main body when being fitted with the pipe (30);

a fixing washer (18) in which a plurality of downward pieces (18a) and gaps (18b) are regularly disposed in the direction where the pipe (30) is introduced, at an inner circumferential surface thereof when being fitted with the pipe (30), with a result that the plurality of downward pieces (18a) are contracted on the outer circumferential surface of the pipe (30) to be compressively fixed to the outer circumferential surface of the pipe (30) at the time of assembling the nut (15), to thereby prevent the pipe (30) from being dismantled; and

an auxiliary washer (19) which is disposed between the rubber packing (16) and the fixing washer (18) to make the rubber packing (16) separated, and to be fitted with the pipe (30) to support the downward pieces (18a).

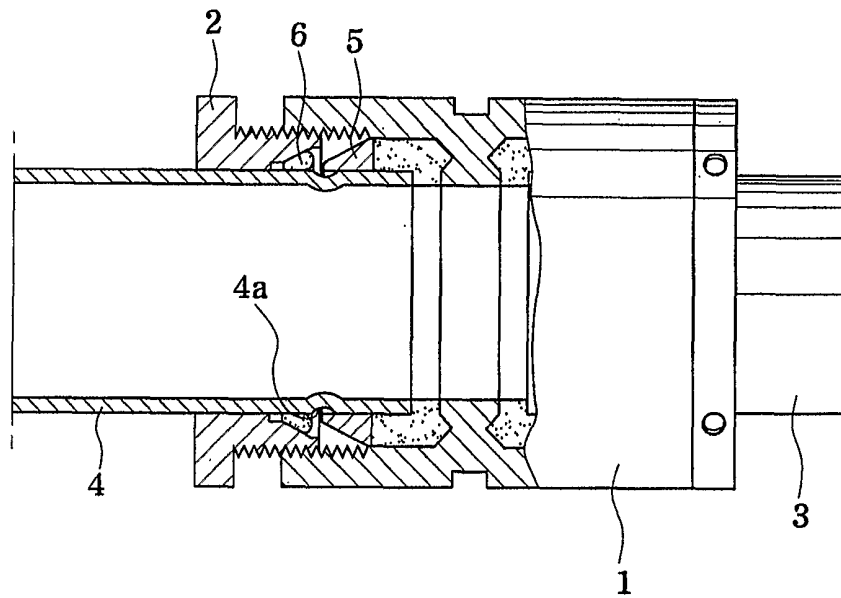
2. The pipe joint according to claim 1, wherein a plurality of downward projections (17) having a larger cross-sectional area in the direction where the pipe (30) is introduced, are formed at an inner circumferential surface of the rubber packing (16).

3. The pipe joint according to claim 1, wherein said fixing washer (18) is made of stainless steel.

1/6

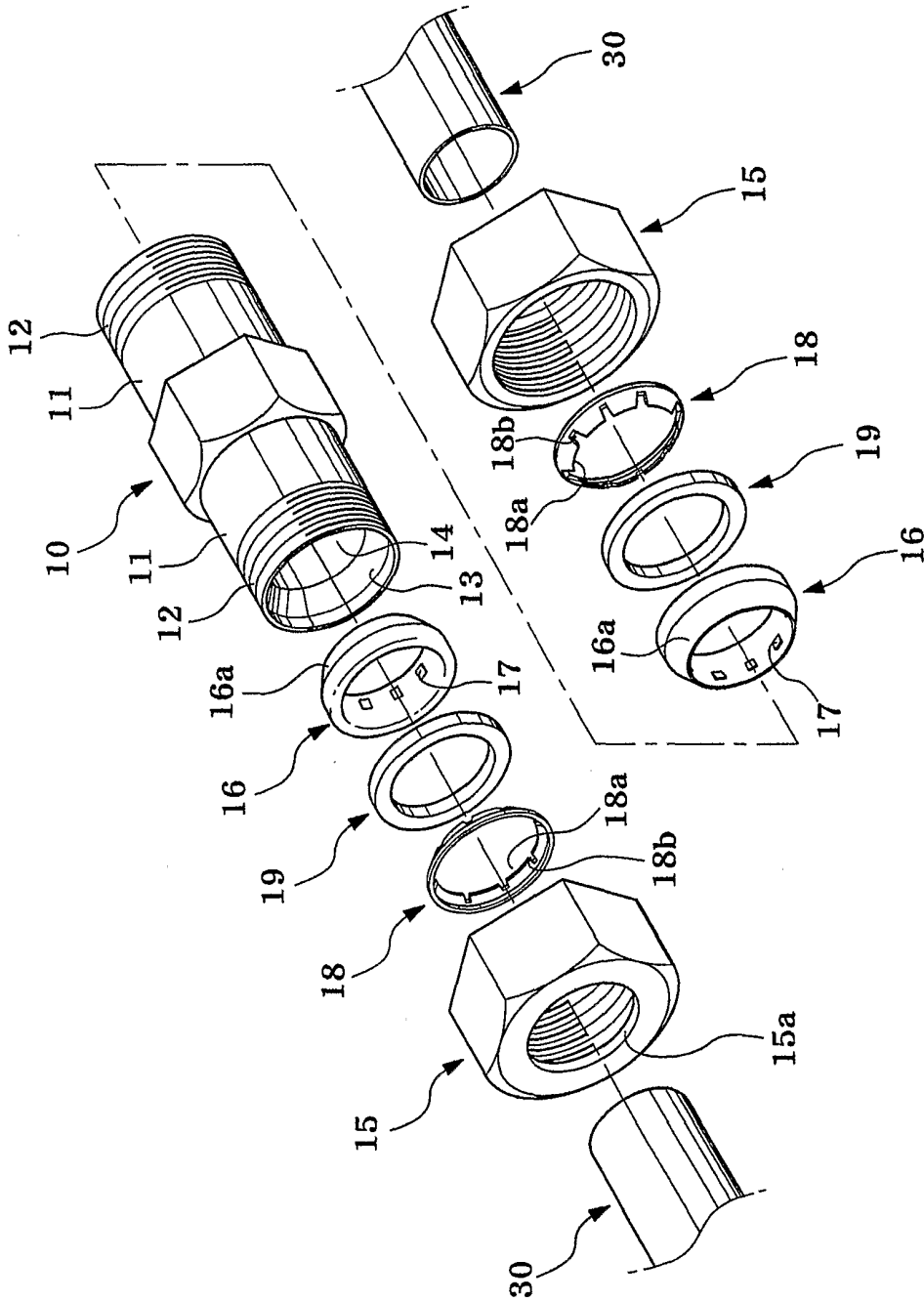
DRAWINGS

FIG. 1



2/6

FIG. 2



3/6

FIG. 3

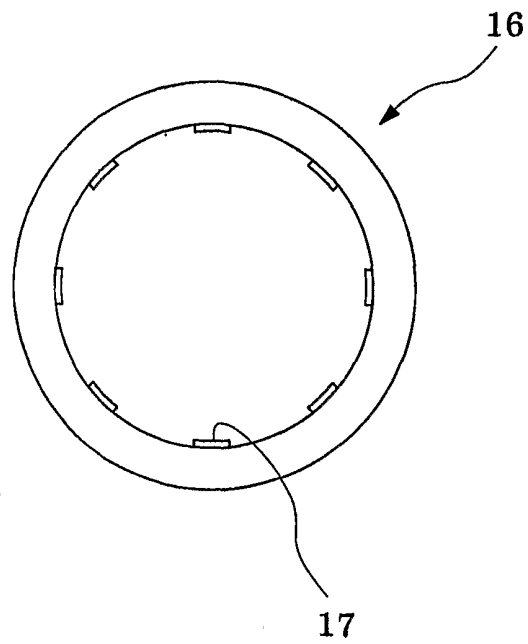
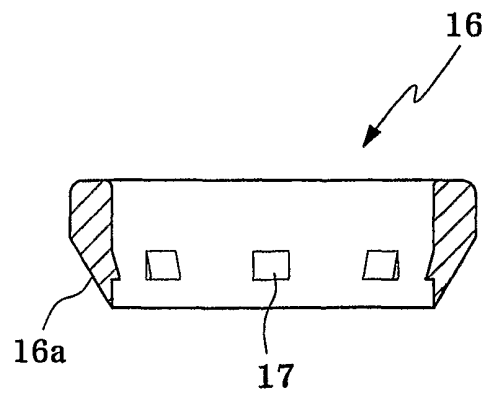


FIG. 4



4/6

FIG. 5

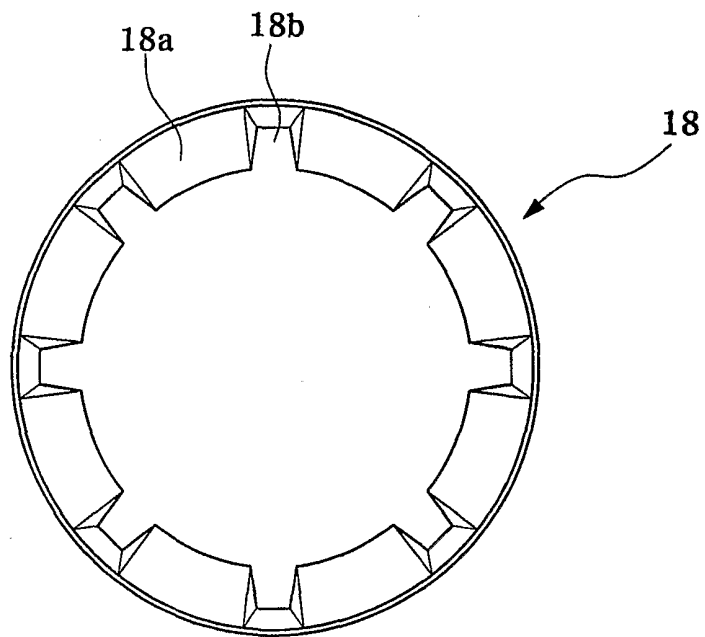


FIG. 6

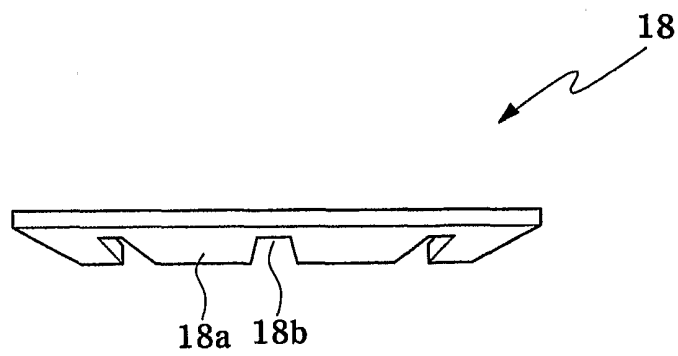


FIG. 7A

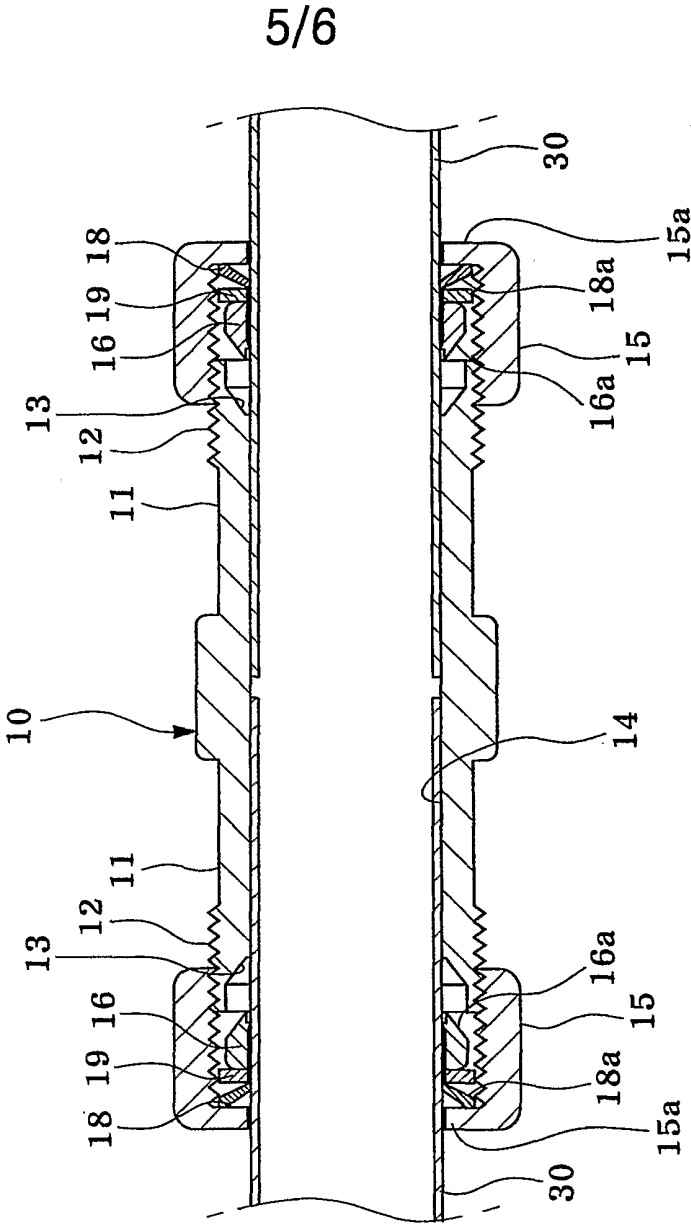
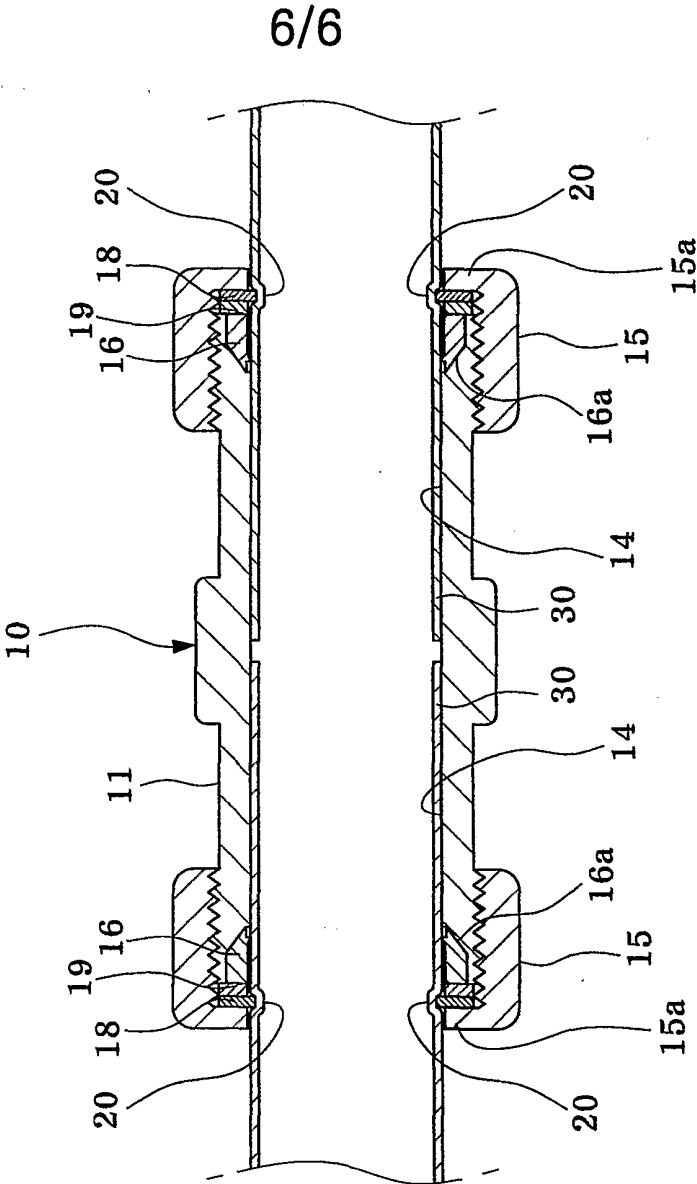


FIG. 7B



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR01/02111**A. CLASSIFICATION OF SUBJECT MATTER****IPC7 F16L 15/00**

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)

F16L19/08, F16L21/08, F16L37/12

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

KS, JP, US : IPC as above

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.
A	US 5,779,284A(John Derek Guest) 14. Jul 1998 SEE THE WHOLE DOCUMENT	1-3
A	US 4,919,457A(Erminio Moretti) 24. Apr 1990 SEE THE WHOLE DOCUMENT	3
Y	JP11-336964(Onda INC) 7. Dec 1999 SEE FIGURE 2,4,7	1-3
Y	JP1-58889(Junko INC) 13. Apr 1989 SEE FIGURE 2,5	1-3
A	JP8-35588(Hitachi Metal INC) 6. Feb 1996 SEE FIGURE 1,2	1

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

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