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(72) Inventor; and
(71) Applicant : **SUNADIM, Andi Jayaprawira** [ID/ID]; Jl. Budi Indah III No. 1, RT/RW. 003/006, Kel. Ledeng, Kec. Cidadap, Bandung (ID).

(74) Agent: **WIDJOJO, George**; George Widjojo & Partners, Jalan Kali Besar Barat No. 5, Jakarta Kota 11230 (ID).

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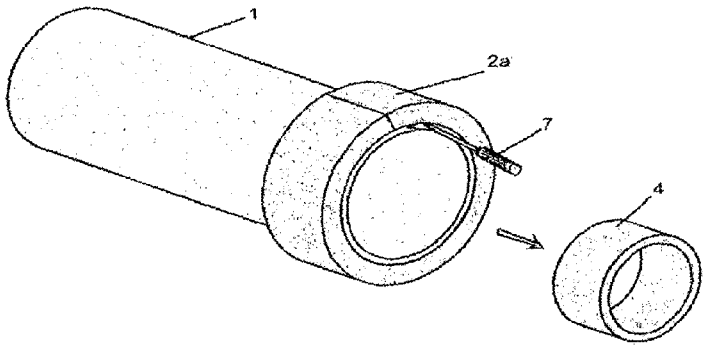

FIG. 3F

(57) Abstract: An improvement of connection quality of the [*bitttfusion*] method which consists of the following steps: providing two pieces of plastic pipe (1) with the same compound to be connected; installing the outer ring (2a) at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around on the outer surface of the end of the pipe (1) with electric current, where the outer ring (2a) is installed; and/or installing the inner ring (2b) at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around on the outer surface of the inner ring (2b) with electric current, where the inner ring (2b) is placed inside the pipe (1); and/or installing the leak-proof partition (2c) at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around the outer surface of the leak-proof partition (2c) with electric current, where the leak proof partition (2c) is placed inside the pipe (1); after the installation of outer ring (2a) and/or inner ring (2b) and/or the leak-proof partition (2c) at both ends of the plastic pipe (1) that will be connected has been completed, it is then continued by flattening and smoothing both ends of the plastic pipe (1) that will be connected; heating both ends of the pipe (1) that has been smoothed, flattened and cleaned up to a certain degree on the heating plate; separating both ends of the plastic pipe (1) that has been heated by the heating plate to be joined in a short time with certain pressure; cooling the connection of the ends of the pipes (1) that have been joined so that it fused compoundly.

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Description

THE IMPROVEMENT OF CONNECTION [*BUTTFUSION*] QUALITY WITH CONNECTION SUPPORTING COMPONENTS

Field of the Invention

This invention is related to an improvement of connection qualityof the end of the pipe-mixture [*buttfusion*]. In particular, this invention is related to an improvement of connection quality of the end of the pipe-mixture [*buttfusion*] with supporting components on the connection of the ends of the plastic pipe, by increasing the thickness of the pipe wall at the end of the plastic pipe through the assembly of new components that fit the invention, so that the strength of the connection can be accurately assured and the strength of theconnection at the end of the pipe can be guaranteed.

Background of the Invention

In the plastic industry, especially in the plastic pipe industry, one of the method of connecting the plastic pipe that is most frequently used is the method of connecting the end of the pipe-mixture [*buttfusion*]. The method of connecting the end of the pipe-mixture [*buttfusion*], can connect the two ends of plastic pipe compound by heating both ends using the heating plate. The common steps that are usually done in the method of connecting the end of the pipe-mixture [*buttfusion*] are as follows:

1) providing two pieces of plastic pipes with the same compound that will be connected;
2) flattening and smoothing both ends of the plastic pipes that will be connected;
3) sticking both ends of the plastic pipes that will be connected to heating plate;
4) heating both ends of the plastic pipes that will be connected by heating the heating plate;

5) both ends of the plastic pipesthat have been heated are separated from the heating plate and joined in a short time with a certain pressure;
6) leaving the connection to cool so that it fused compoundly;

The connection of the ends of the plastic pipes with the method of connecting the end of the pipe-mixture [*buttfusion*] usually left a little bulge at the connection both on the outside and the inside of the plastic pipe as a result of the application of pressure while the process of connection is ongoing. The excess of this bulge can be easily cleaned away.

The technology method of connecting the end of the pipe-mixture [*buttfusion*] has been invented and industrially applied in a long time. Some of the improvement on the technology of the heating plate has also been done such as covering the heating plate teflon to prevent the sticking of plastic pipe material on the plate, etc. However, the technology of connecting the end of the pipe-mixture [*buttfusion*], especially in plastic pipe connection technology, has several weaknesses. One of the weakness is found in the strength of the connection result of the method of connecting the end of the pipe-mixture [*buttfusion*], where is the strength of connection relies on the thickness of the material or pipe that will be connected.

At this point, if the strength of the connection want to be improved, then the thickness of the material or the pipe must be increased in order to thicken the connection surface for connecting the end of the pipe-mixture [*buttfusion*]. Therefore, in connecting the end of the pipe-mixture [*buttfusion*], it generally requires pipes with high thickness in order to ensure the result of connection to be strong and leak-proof, especially when the connection have to be bent. This causes that the plastic pipe that is going to be connected with buttfusion method must be produced with high thickness.This is very inefficient, causing excessive use ofraw materials, high prices, and the heavy weight of plastic pipe leads to high transportation costs. If that plastic pipe will be used as floating device as usually used in circular floating fish cage, the heavy weight of the plastic pipe will severely reduce buoyancy.

In relation with the existence of several obstacles as mentioned above, the inventor proposed a new invention that relates to the method of connecting the ends of the pipe by thickening the end of the plastic pipe that will be connected without having to thicken the whole of pipe, where the thickness addition is done through the addition of components such as the outer ring, inner ring and the leak-proof partition,which is applied by the inventor as a new invention, so that the process of connecting the end of the pipe-mixture [*buttfusion*] can produce a stronger connection without having to use excessive raw materials. Therefore, the pipe does not need to be produced too thickly, only needs to be produced with enough thickness for the particular needs, resulting in improvement of raw materials efficiency, price reduction, and ease of transportation.

There are three kinds of methods that are proposedto increase the thickness of the ends of pipes for buttfusion process.The first method is for the purpose of fluid material piping that is commonly used for drinking water pipes, gas pipes, and others. The thickness addition of the end of pipe is done outside of the pipe so that there is no obstacle to the flow of thefluid material inside the pipe.

The second method is also for the purpose of fluid material piping, but applied when thickness addition of the end of the pipe is not possible to be added on the outside of the pipe, thus the thickness addition of the end of the pipe is added on the inside of pipe. Additional tools can be attached to this (eg: flow meters, pressure gauges, etc).

The third method is for the purpose of manufacturing a floating device, where the thickness addition of the end of the pipeis in the shape of a partition, to prevent water from entering the pipe.

Seeing broad application in this invention, the method that is proposed by the inventor in this invention can be used in many industries ranging from piping industry to floating fish cage industry, and greatly reduces cost.

Therefore, the inventor hopes that this new invention relating to the connection methods of the ends of the plastic pipes along with the engineering technologies on components that support this invention will be the best solution to the obstacles of plastic pipe connection that are discussed above.

Brief Description of the Invention

As described earlier that this invention is related to an improvement of connection quality of the end of the pipe-mixture [*buttfusion*]. In particular, this invention is related to an improvement of connection quality of the end of the pipe-mixture [*buttfusion*] with supporting components on the connection of the ends of the plastic pipe, by increasing the thickness of the pipe wall at the end of the plastic pipe through the assembly of new components that fit the invention, so that the strength of the connection can be accurately assured and the strength of the connection at the end of the pipe can be guaranteed.

An improvement of connection quality of the [*buttfusion*] method which consists of the following steps:

- providing two pieces of plastic pipe with the same compound to be connected,
- installing the outer ringat both ends of the plastic pipe that will be connected by heating the electrical wire winding around on the outer surface of the end of the pipe with electric current, where the outer ring is installed, and/or
- installing the inner ring at both ends of the plastic pipe that will be connected by heating the electrical wire winding around on the outer surface of the inner ring with electric current, where the inner ring is placed inside the pipe, and/or
- installing the leak-proof partition at both ends of the plastic pipe that will be connected by heating the electrical wire winding around the outer surface of the leak-proof partition with electric current, where the leak proof partition is placed inside the pipe,

- after the installation of outer ring and/or inner ring and/or the leak-proof partition at both ends of the plastic pipe that will be connected has been completed, it is then continued by flattening and smoothing both ends of the plastic pipe that will be connected,
- heating both ends of the pipe that has been smoothed, flattened and cleaned up to a certain degree on the heating plate,
- separating both ends of the plastic pipe that has been heated by the heating plate to be joined in a short time with certain pressure,
- cooling the connection of the ends of the pipes that have been joined so that it fused compoundly.

The main purpose of this invention is to provide an improved connection quality of the ends of the plastic pipes joint through an addition or modification of the [*buttfusion*] method, so that the strength of connection is increased and can be guaranteed.

Another purpose of this invention is to provide an improved connection quality of the ends of the plastic pipes joint through thickness addition at the ends of the pipes using engineering technologies on components that support it.

Further purpose of this invention is to provide an improved connection quality of the ends of the plastic pipes joint through thickness addition at the ends of the pipes by adding outer ring.

Further purpose of this invention is to provide an improved connection quality of the ends of the plastic pipes joint through thickness addition at the ends of the pipes by by adding inner ring.

Further purpose of this invention is to provide an improved connection quality of the ends of the plastic pipes joint through thickness addition at the ends of the pipes by by adding leak-proof partition.

Further purpose of this invention is to provide an improved connection quality of the ends of the plastic pipes joint through thickness addition at the ends of the pipes, without having to increase the whole thickness throughout the length of the plastic pipe that will be joined.

Further purpose of this invention is to provide an improved connection quality of the ends of the plastic pipes joint, where thickness addition is only applied at the ends of the plastic pipes that will be joined using components, therefore saving plastic pipe raw materials significantly.

Brief Description of the Drawings

For the purpose of facilitating the understanding of this invention, the next explanations will be explained together with reference to the attached Figures, which are:

Fig. 1A is side section view of pipe connections which illustrates the result of the plastic pipe connection [*buttfusion*] with the outer ring.

Fig. 1B is side section view of pipe connections which illustrates the result of the plastic pipe connection [*buttfusion*] with the inner ring.

Fig. 1C is side section view of pipe connections which illustrates the result of the plastic pipe connection [*buttfusion*] with the leak-proof partition

Fig. 2A is side section view and perspective view of a pipe which will be connected with certain diameter and certain thickness in accordance with this invention.

Fig. 2B is side section view and perspective view of an inner ring which will be installed in the inner of the end of pipe that will be connected in accordance with this invention.

Fig. 2C is side section view and perspective view of an inner ring which illustrates the inner ring has been wound by the electric heating wire in accordance with this invention.

Fig. 2D is side section view and perspective view of an inner ring which illustrates that inner ring is inserted into the pipe hole along with support in accordance with this invention.

Fig. 2E is perspective view of the plastic pipe and electric supply which illustrates the flowing of electric current to electric heating wire in order to heat the electric heating wire winding, at the same time belt or clamp is installed on the outside of the end of pipe which has been installed with the inner ring, in accordance with this invention.

Fig. 2F is perspective view of the plastic pipe which illustrates after the electric heating wire has been flowed with electric current and the support has been removed from the inner ring in accordance with this invention.

Fig. 2G is perspective view of the plastic pipe which illustrates after cleaning the surface of the end of pipe, it will soon be connected with buttfusion method, in accordance with this invention.

Fig. 3A is side section view and perspective view of the pipe which will be connected with certain diameter and a certain thickness, in accordance with this invention.

Fig. 3B is side section view and perspective view of an outer ring with slit which will be connected on the outside the end of pipe that will be connected, in accordance with this invention.

Fig. 3C is perspective view of the plastic pipe which illustrates one of the end of the pipe has been wound with the electric heating wire in accordance with this invention.

Fig. 3D is side section view and perspective view of the plastic pipe which illustrates the installation of an outer ring with slit and the support at one of the end of pipe in accordance with this invention.

Fig. 3E is perspective view of the plastic pipe and the electric supply which illustrates the flowing electric current to electric heating wire to heat the electric heating wire winding where at the same time belt or clamp is installed on the outside of outer ring partition, in accordance with this invention.

Fig. 3F is perspective view of the plastic pipe which illustrates after the electric heating wire has been flowed with electric current and the support has been removed from the hole of the end of pipe in accordance with this invention.

Fig. 3G is perspective view of the plastic pipe which illustrates after cleaning the surface of the end of pipe, it will soon be connected with buttfusion method, in accordance with this invention.

Fig. 4A is side section view and perspective view of pipe which will be connected with certain diameter and a certain thickness, in accordance with this invention.

Fig. 4B is side section view and perspective view of pipe which will be connected with certain diameter and a certain thickness, in accordance with this invention.

Fig. 4C is side section view and perspective view of a leak-proof partition which illustrates the leak-proof partition have been wound with the electric heating wire in accordance with this invention.

Fig. 4D is side section view and perspective view of the plastic pipe which illustrates the leak-proof partition inserted into the hole of the end of the pipe along with support in accordance with this invention.

Fig. 4E is perspective view of the plastic pipe and the electric supply which illustrates the flowing of electric current to electric heating wire to heat the electric heating wire winding where at the same time belt or clamp is installed on the outside of the end of pipe which has been installed by the leak-proof partition in accordance with this invention.

Fig. 4F is perspective view of the plastic pipe which illustrates after the electric heating wire has been flowed with electric current and the support has been removed from the hole of the leak-proof partition that exist on the end of pipe in accordance with this invention.

Fig. 4G is perspective view of the plastic pipe which illustrates after the installation of the leak–proof partition is complete, after cleaning the surface of the end of pipe, it will soon be connected with buttfusion method, in accordance with this invention.

Detailed Description of the Invention

The following explanation will be elaborated clearly, completely, and in detail by referring to the respective Fig. in order to facilitate the understanding of this invention, where the Figures that are attached and the illustrations as well as the explanations in this description are not meant to limit the scope area of this invention, but merely to facilitate the understanding of this invention.

Referring to Fig. 1A, where Fig. 1A is the side section view of the connection of pipe (1), that illustrates the result of connection [*buttfusion*] of the plastic pipe (1) with the outer ring (2a), where is the outer ring is made from the compound plastic material, that have been perfectly installed.

Then referring to Fig. 1B, where Fig. 1B is the side section view of the connection of pipe (1), that illustrates the result of connection [*buttfusion*] of the plastic pipe (1) with the inner ring (2b). From the Fig. it is shown that the shape of one the end of inner ring (2b) having diagonal side to reduce the fluid obstascle that flows in the pipe, where the inner ring is made from compound plastic material, that have been perfectly installed.

Meanwhile in Fig. 1C, where Fig. 1C is the side section view of the connection of pipe (1), that illustrates the result of connection [*buttfusion*] of the plastic pipe (1) with the leak-proof partition (2c), where the leak proof partition is made from compound plastic material, that have been perfectly installed.

A quality improvement of the connection through the method [*buttfusion*] consists of the following steps:

- providing two pieces of plastic pipe (1) with the same compound to be connected,
- installing the outer ring (2a)at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around on the outer surface of the end of the pipe (1) with electric current, where the outer ring (2a) is installed, and/or
- installing the inner ring (2b) at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around the outer surface of the inner ring (2b) with electric current, where the inner ring (2b) is placed inside the pipe (1), and/or
- installing the leak-proof partition (2c) at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around on the outer surface of the leak-proof partition (2c) with electric current, where the leak proof partition (2c) is placed inside the pipe (1),
- after the installation of outer ring (2a) and/or inner ring (2b) and/or the leak-proof partition (2c) at both ends of the plastic pipe (1) that will be connected has been completed, it is then continued by flattening and smoothing both ends of the plastic pipe (1) that will be connected,

- heating both ends of the pipe (1) that has been smoothed, flattened and cleaned up to a certain degree on the heating plate.
- separating both ends of the plastic pipe (1) that has been heated by the heating plate to be joined in a short time with certain pressure,
- cooling the connection of the ends of the pipes (1) that have been joined so that it fused compoundly.

Then referring to Fig. 2A, where Fig. 2A are the side section view and perspective view of pipe (1) that will be connected with certain diameter and certain thickness in accordance with this invention. The referred number (2a') of the Fig. 2A shows side section view from one of the plastic pipe, while the referred number (2a'') shows a perspective view from the plastic pipe.

Next, refer to Fig. 2B, where Fig. 2B is the side section view and perspective view of an inner ring (2b) which will be installed inside the end of the plastic pipe (1) that will be connected in accordance with this invention. Still at the referred number (2b') of the Fig. 2B that constitutes the side section view from one of the inner ring (2b), while at the referred number (2b'') shows a perspective view from an inner ring (2b). At the one of end of the inner ring (2b), the inside is made diagonal shape to reduce obstacle. This inner ring (2b) is made from the compound plastic material.

Further, referring to Fig. 2C, where Fig. 2C is the side view and perspective view of an inner ring (2b) which illustrates the inner ring (2b) is wound by the electric heating wire (3) in accordance with this invention. Still at the referred number (2c') of the Fig. 2C that constitutes the side section view from one of the inner ring (2b), while at the referred number (2c'') shows a perspective view from an inner ring (2b). This Fig. 2C particularly illustrates the winding of electric heating wire installation (3), where the electric heating wire has been wound around the outside of the inner ring (2b).

Then referring to Fig. 2D, where the Fig. 2D is theside section view and perspective view of an inner ring which illustrates the inner ring (2b) has been put into

the pipe hole (1) along with support (4) in accordance with this invention. Still at the referred number (2d') of the Fig. 2D that constitutes the side section view of one of the pipe (1) and one inner ring (2b), along with the support (4), while at the referred number (2d'') shows a perspective view the outside of a plastic pipe (1), where the inner ring (2b) that has been wound by the electric heating wire (3) along with the support (4) have been installed at one of the end of pipe (1). The purpose of the support is to keep the shape of the pipe (1) in round shape so the installation during buttfusion is accurate, and also to withstand pressure from belt or clamp during the electric heating process.

Next, refer to Fig. 2E, where the Fig. 2E is a perspective view of the plastic pipe (1) and the electric supply (6) which illustrates the belt or clamp (5) installation outside the end of the pipe (1) where inner ring (2b) is installed in accordance with this invention. Particularly the Fig. 2E illustrates the outside of the plastic pipe (1) pressed by using belt or clamp (5), then the electric heating wire is flowed with electric current, which heats the plastic until it reaches the melting point of the plastic.

Further, refer to Fig. 2F, where the Fig. 2F is a perspective view of the plastic pipe (1) which illustrates after the electric heating wire (3) have been flowed by electric current and the support (4) has been removed from the inner ring (2b) in accordance with this invention. After the wire have been flowed with electric current, the wire bulge that stick out of the way is cut, then is put into the sloth between inner ring (2b) and pipe (1) by using screwdriver (7), and then the support (4) is removed.

Meanwhile Fig. 2G, where the Fig. 2G is a perspective view of the plastic pipe (1) which illustrates after the surface of the end of pipe (1) is completely cleaned then it will soon be connected accordance with this invention. Still with the Fig. 2G, after both of the ends of the pipes have flattened, and the surface of the end of pipe is smoothed, then the connecting process of the ends of the pipes using buttfusion method commence.

Then referring to Fig. 3A, where the Fig. 3A is the side section view and perspective view of the plastic pipe (1) which will be connected with certain diameter and certain thickness in accordance with this invention. Still at the referred number (3a') of the Fig. 3A that constitutes the side section view of the plastic pipe (1), while at the referred number (3a'') shows a perspective view of the plastic pipe (1).

Next, refer to Fig. 3B, where the Fig. 3B is the side section view and perspective view of the outer ring that will be installed on the outside of the end of pipe (1) which will be connected in accordance with this invention. Still at the referred number (3b') of the Fig. 3B that constitutes the side section view from one of the outer ring (2a), while at the referred number (3b'') shows a perspective view of an outer ring (2a). This outer ring (2a) is made from the compound plastic material. Notice that there is a slit on the outer ring (2a). The outer ring (2a) can be whole or can have slit on it.

Further, refer to Fig. 3C where the Fig. 3C is a perspective view of the plastic pipe (1) which illustrates one of the end of the plastic pipe (1) has been wound by the electric heating wire (3) in accordance with this invention.

Then referring to Fig. 3D, where the Fig. 3D is the side section view and perspective view of the plastic pipe which illustrates the outer ring installation (2a) and the support (4) at one of the end of the pipe in accordance with this invention. Still at the referred number (3d') of the Fig. 3D that constitutes the side section view from one of the pipe (1) and one outer ring (2a) as well as the support (4), while at the referred number (3d'') shows a perspective view of the outside of a plastic pipe (1), where the outer ring (2a) at one of the end of pipe (1) has been installed where the wire (3) is located and the support (4) is installed inside the plastic pipe (1). The outer ring (2a) is installed outside of the plastic pipe (1) on the part that is wound by wire, and the support (4) is installed in the inside of plastic pipe (1) where the outer ring (2a) is installed. The purpose of the support (4) is to keep the shape of the pipe in round shape so the installation during buttfusion is accurate, and also to withstand pressure from belt or clamp during the electric heating process.

Next, refer to Fig. 3E, where Fig. 3E is a perspective view of the plastic pipe (1) and the electric supply (6) which illustrates the flows of electric current through electric heating wire (3) in order to heat the electric heating wire (3) in accordance with this invention. The outside of the outer ring (2a) is pressed using belt or clamp (5), then the electric heating wire (3) is flowed with electric current, heating the plastic until it reaches the melting point of the plastic.The slit on the outer ring (2a) would close by itself because of pressure from the belt or clamp (5). The purpose of the slit is to provide expansion space on the ring so that the ring can be tightened according to needs, and therefore produces tight outer ring (2a) connection to pipe (1).

Further, referring to Fig. 3F, where the Fig. 3F is perspective view of the plastic pipe which illustrates after the electric heating wire (3) has been flowed by electric current from electric supply (6) and the support (4) was removed from the end hole of pipe (1) in accordance with this invention. After the wire has been flowed with electric current, the bulge wire that stick out of the way is cut and then put into the sloth between the outer ring (2a) and pipe (1) using screw driver (7) and the support (4) is removed.

Meanwhile at Fig. 3G that is a perspective view of the plastic pipe (1) which illustrates after the cleaning the surface of the end of pipe (1) is complete, then it will soon be connected in accordance with this invention. After both of the ends of the pipes are flattened, and the surface of the end of pipe is smoothed, then the connecting process of the ends of the pipes using buttfusion method commence.

Then referring to Fig. 4A, where the Fig. 4A is the side section view and perspective view of the plastic pipe (1) which will be connected with certain diameter and certain thickness in accordance with this invention. Still at the referred number (4a') of the Fig. 4A that constitutes the side section view from one of the pipe (1), while at the referred number (4a'') shows a perspective view ofthe plastic pipe (1).

Next, referring to Fig. 4B, where the Fig. 4B is the side section view and perspective view of the leak-proof partition (2c) that will be installed on the inside of

the end of pipe (1) which will be connected accordance with this invention. Still at the referred number (4b') of the Fig. 4B that constitutes the side section view from one of the leak-proof partition (2c), while at the referred number (4b'') shows a perspective view of a leak-proof partition (2c). This leak proof partition (2c) is made from the compound plastic material.

Further, referring to Fig. 4C where the Fig. 4C is the side section view and a perspective view of the leak-proof partition (2c), which illustrates the leak-proof partition (2c) is wound by the electric heating wire (3) accordance with this invention. Still at the referred number (4c') of the Fig. 4C that constitutes the side section view from one of the leak-proof partition (2c), while at the referred number (4c'') shows a perspective view from a leak-proof partition (2c), which illustrates that around the outside surface of the leak-proof partition (2c) have been wound by the electric heating wire (3)

Then referring to Fig. 4D, where the Fig. 4D is the side section view and perspective view of the plastic pipe (1) which illustrates the leak-proof partition (2c) together with the support (4) are inserted to the inside of the end of the pipe (1) in accordance with this invention. Still at the referred number (4d') of the Fig. 4D that constitutes the side section view from one of the pipe (1) and a leak-proof partition (2c), also a support (4) in the inside, while at the referred number (4d'') shows a perspective view the outside of a plastic pipe (1), where the leak-proof partition (2c) at one of the end of pipe has been installed and the support was installed in the inside of the leak-proof partition (2c). The cover of leak-proof partition (2c) is inserted into the plastic pipe (1), and the support (4) is installed inside of the leak-proof partition (2c).

Next, referring to Fig. 4E, where the Fig. 4E is a perspective view of the plastic pipe (1) and the electric supply (6) which illustrates the installation of belt or clamp (5) on the outside of the end of pipe (1) that is installed with leak-proof partition (2c) in accordance with this invention. The outside of the plastic pipe (1) is pressed using

belt or clamp (5), then the electric heating wire (3) is flowed with electric current, heating the plastic until it reaches the melting point of the plastic.

Further, referring to Fig. 4F, where the Fig. 4F is perspective view of the plastic pipe (1) which illustrates after the electric heating wire (3) has been flowed by electric current and the support (4) is removed from the hole of leak-proof partition (2c) on the end of plastic pipe (1) in accordance with this invention. After the wire has been flowed with electric current, the bulge wire that stick out is then cut and put into the sloth between the pipe and the partition by using screw driver (7), then the support (4) is removed.

Finally referring to the Fig. 4G, where the Fig. 4G is a perspective view of the plastic pipe (1) which illustrates after the installation of leak-proof partition (2c) is complete, then followed by cleaning the surface of the end of pipe (1) that will soon be connected in accordance with this invention. After both of the ends of the pipes (1) are flattened, and the surface of the end of pipe is smoothed, then the connecting process of the ends of the pipes using buttfusion method commence.

All invention has been explained and elaborated clearly in complete and in detail, so that by reading the whole or a part of this description or by seeing the Figures that is attached, someone who have an expertise in this field can easily engineer its technology by changing the form, dimension, or making variations and modifications on this invention, which did not deviate from the spirit and scope of this invention.Therefore we ask for the protection of all variation and modifications that is included in this invention by stating claims as follows:

Claims:

1. An improvement of connection quality of the [*buttfusion*] method which consists of the following steps:
   - providing two pieces of plastic pipe (1) with the same compound to be connected,
   - installing the outer ring (2a) at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around on the outer surface of the end of the pipe (1) with electric current, where the outer ring (2a) is installed, and/or
   - installing the inner ring (2b) at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around on the outer surface of the inner ring (2b) with electric current, where the inner ring (2b) is placed inside the pipe (1), and/or
   - installing the leak-proof partition (2c) at both ends of the plastic pipe (1) that will be connected by heating the electrical wire winding (3) around the outer surface of the leak-proof partition (2c) with electric current, where the leak proof partition (2c) is placed inside the pipe (1),
   - after the installation of outer ring (2a) and/or inner ring (2b) and/or the leak-proof partition (2c) at both ends of the plastic pipe (1) that will be connected has been completed, it is then continued by flattening and smoothing both ends of the plastic pipe (1) that will be connected,
   - heating both ends of the pipe (1) that has been smoothed, flattened and cleaned up to a certain degree on the heating plate,
   - separating both ends of the plastic pipe (1) that has been heated by the heating plate to be joined in a short time with certain pressure,
   - cooling the connection of the ends of the pipes (1) that have been joined so that it fused compoundly.

2. An improvement of connection quality of the [*buttfusion*] method, in accordance with the claim 1, where the improvement of connection quality of the buttfusion

method in accordance with the Invention is through adding thickness on the outside of the ends of the pipes with outer ring (2a) only.

3. An improvement of connection quality of the [*buttfusion*] method, in accordance with the claim 1, where the improvement of connection quality of the buttfusion method in accordance with the invention is through adding thickness on the inside of the ends of the pipes with inner ring (2b) only.

4. An improvement of connection quality of the [*buttfusion*] method, in accordance with the claim 1, where the improvement of connection quality of the buttfusion method in accordance with the invention is through adding thickness on the inside of the ends of the pipes with leak proof partition (2c) only.

5. An improvement of connection quality of the [*buttfusion*] method, in accordance with the claim 1, where the improvement of connection quality of the buttfusion method in accordance with the invention is through adding thickness on the inside and outside of the ends of the pipes through the inner ring (2b) and the outer ring (2a) altogether.

6. An improvement of connection quality of the [*buttfusion*] method, in accordance with the claim 1, where one of the end inner ring (2b) having diagonal shape to reduce obstacle.

7. An improvement of connection quality of the [*buttfusion*] method, in accordance with the claim 1, where the outer ring (2a) is added with slit which ease installation and can resolve the problem of outer ring expansion during the electric heating process, as well as enabling maximum of tightening.

8. An improvement of connection quality of the [*buttfusion*] method, in accordance with the claim 1, where the connection quality improvement of the buttfusion method in accordance with the invention is by adding thickness at the ends of the pipe using supporting components without having to thicken the whole pipe.

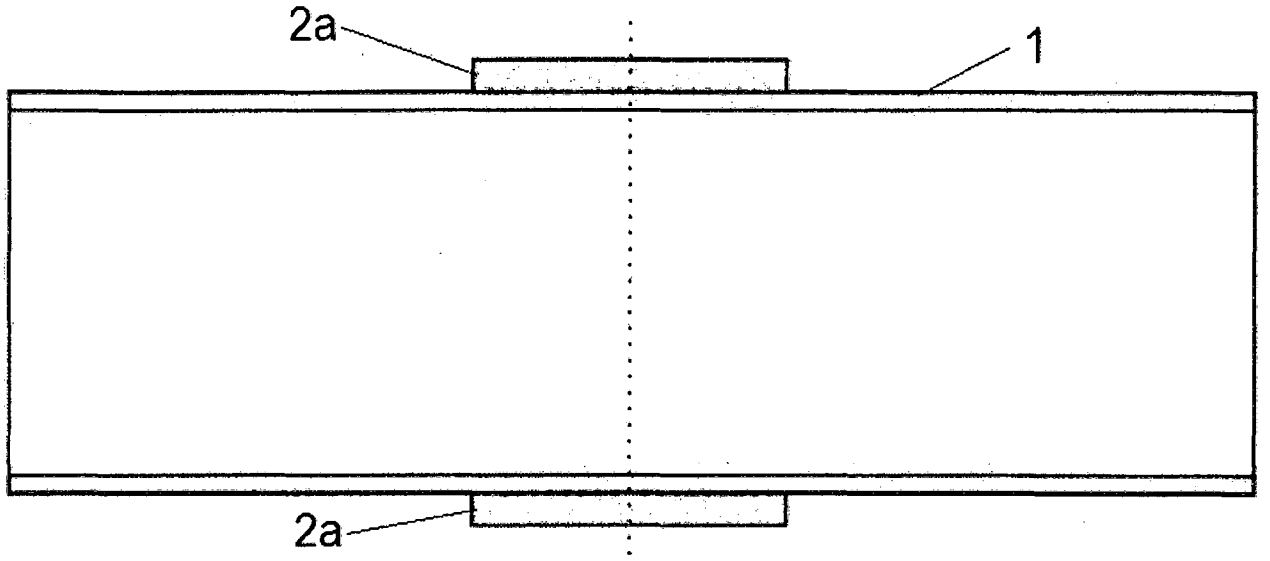

FIG. 1A

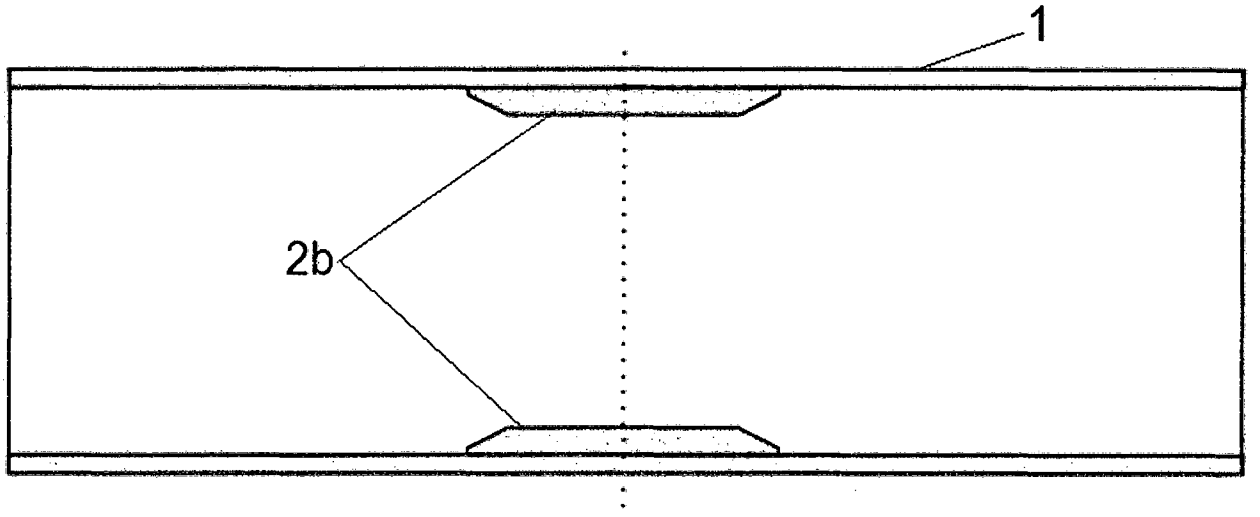

FIG. 1B

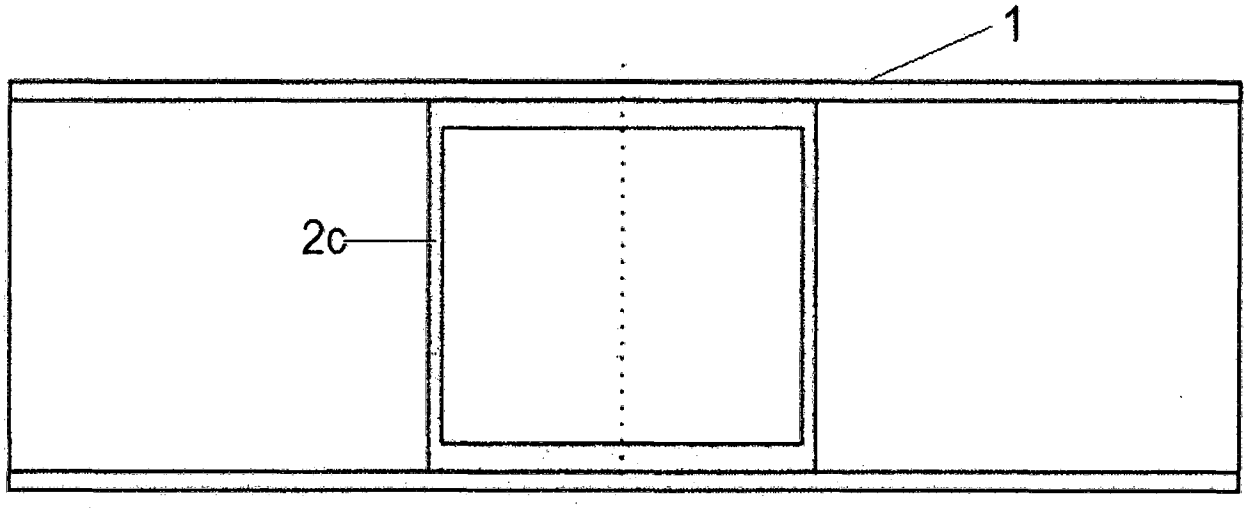

FIG. 1C

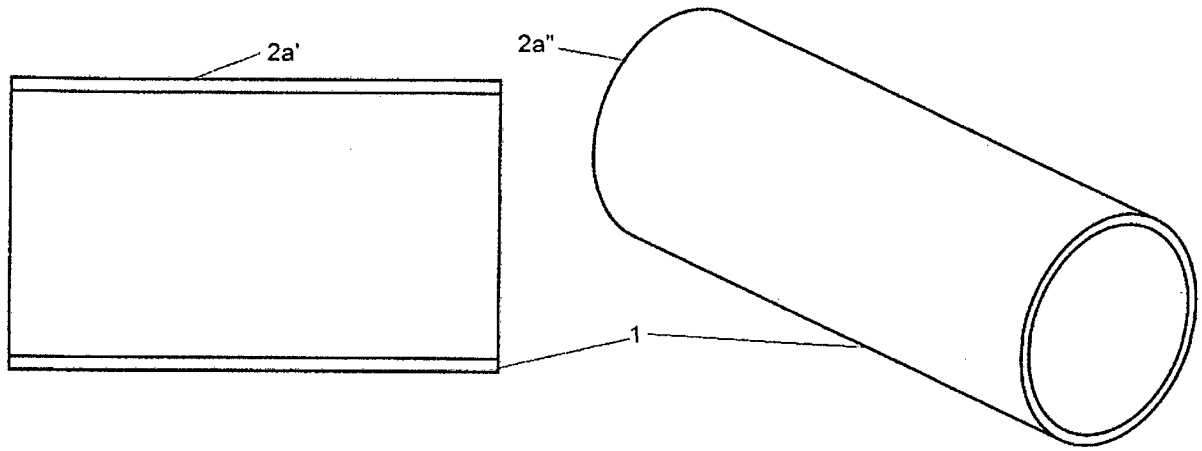

FIG. 2A

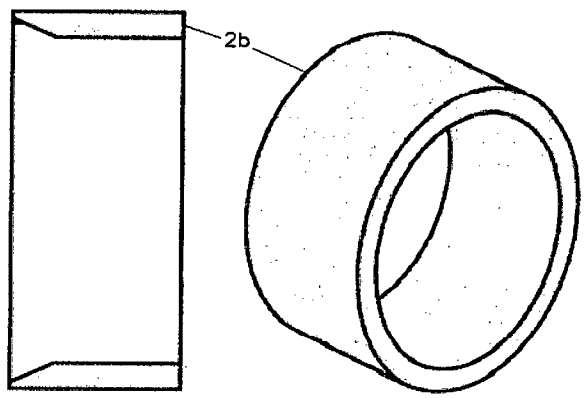

FIG. 2B

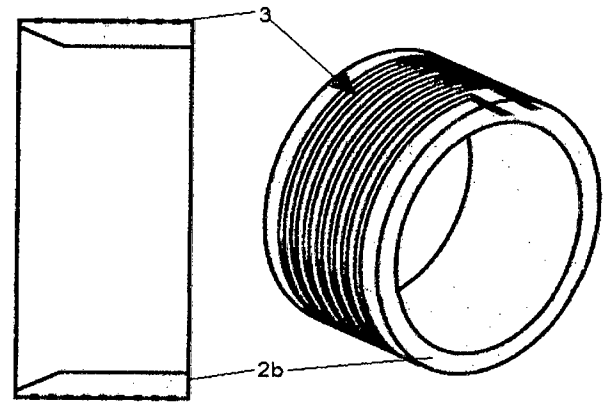

FIG. 2C

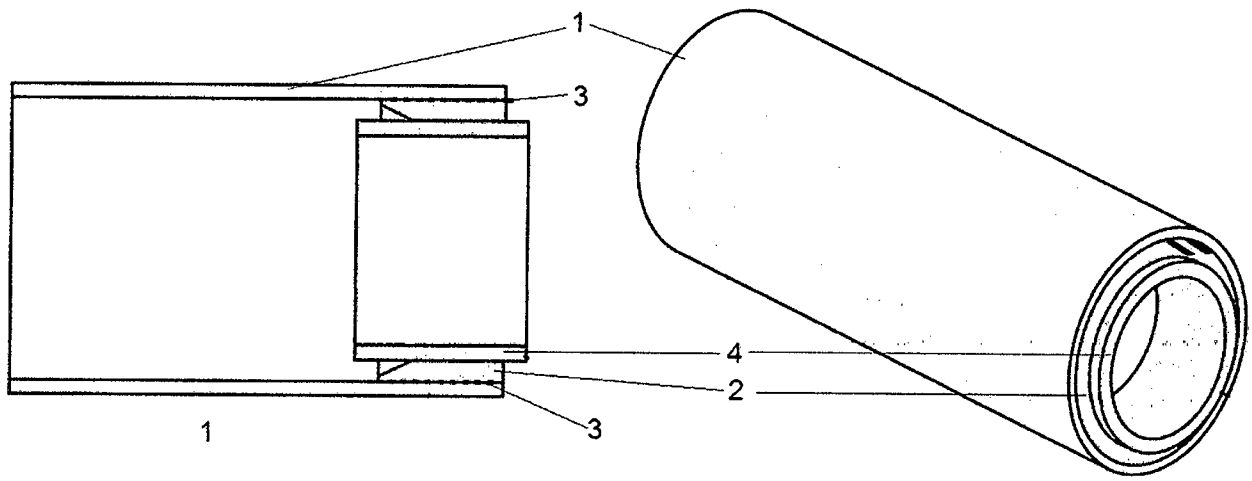

FIG. 2D

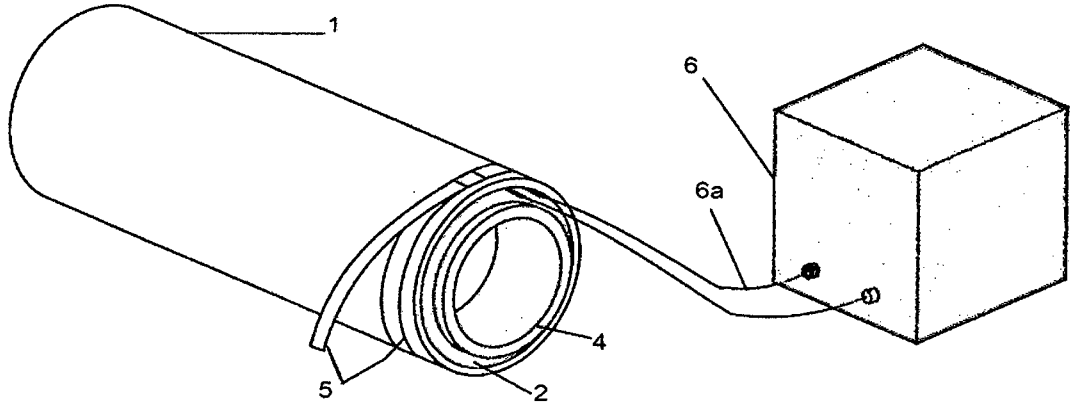

FIG. 2E

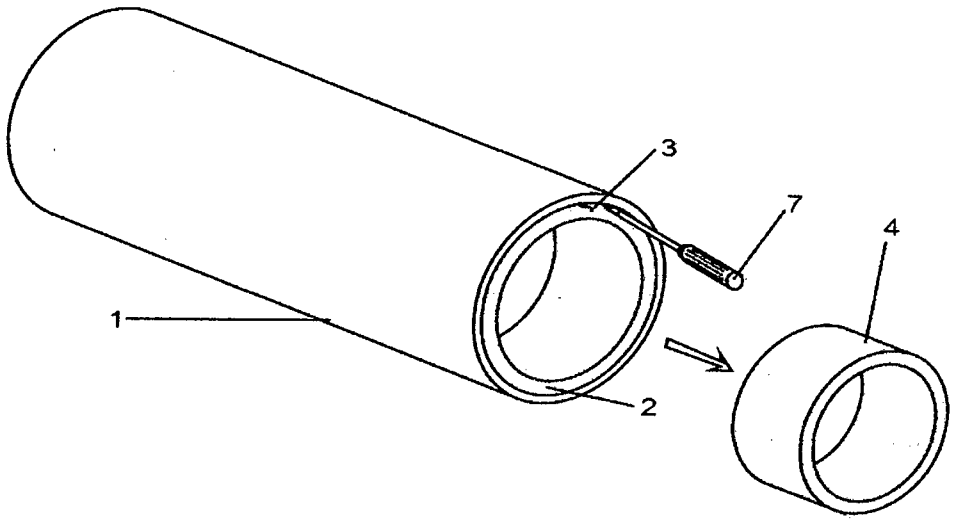

FIG. 2F

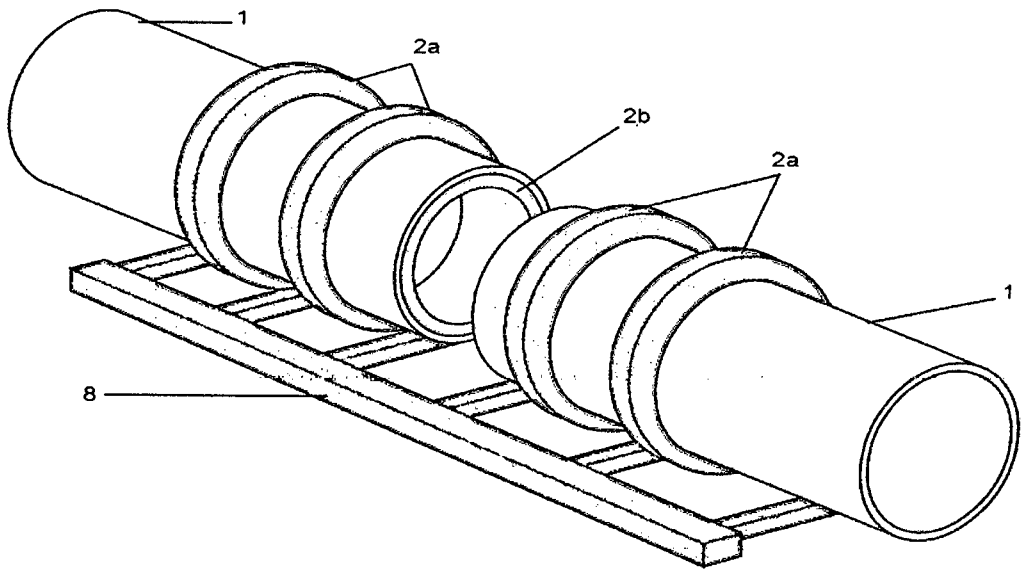

FIG. 2G

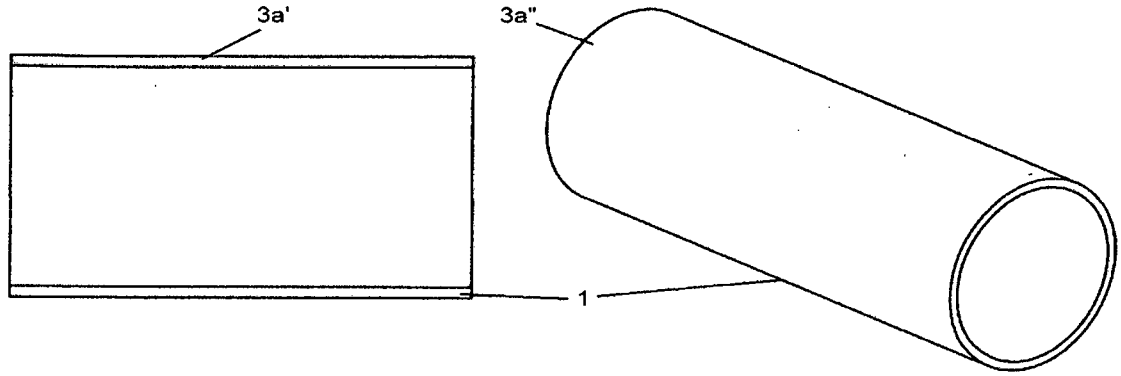

FIG. 3A

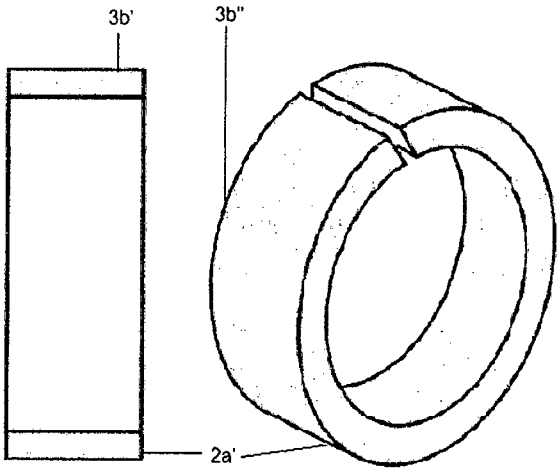

FIG. 3B

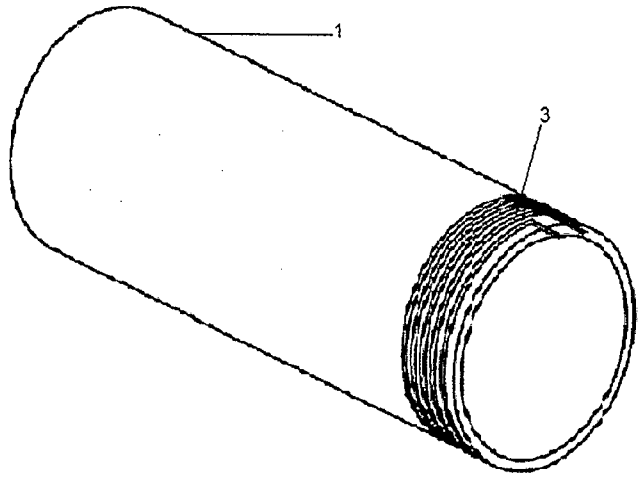

FIG. 3C

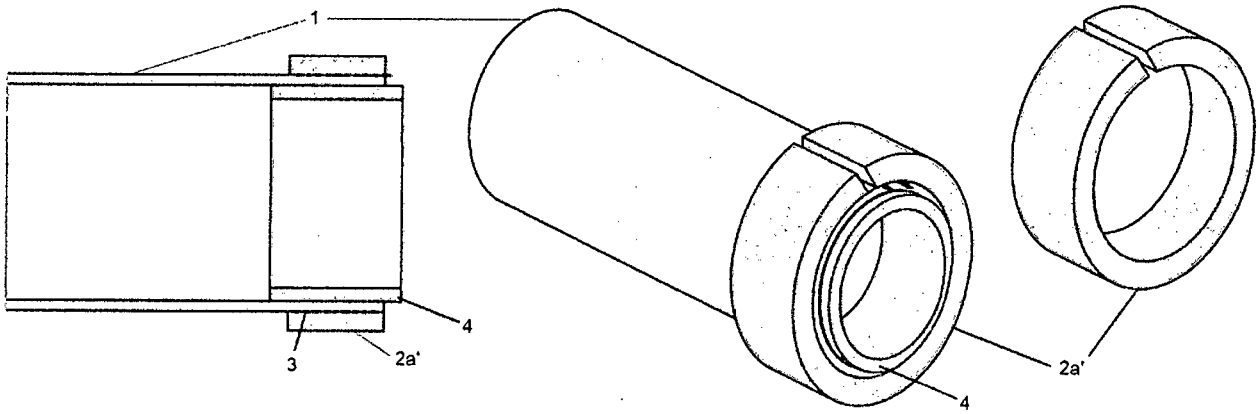

FIG. 3D

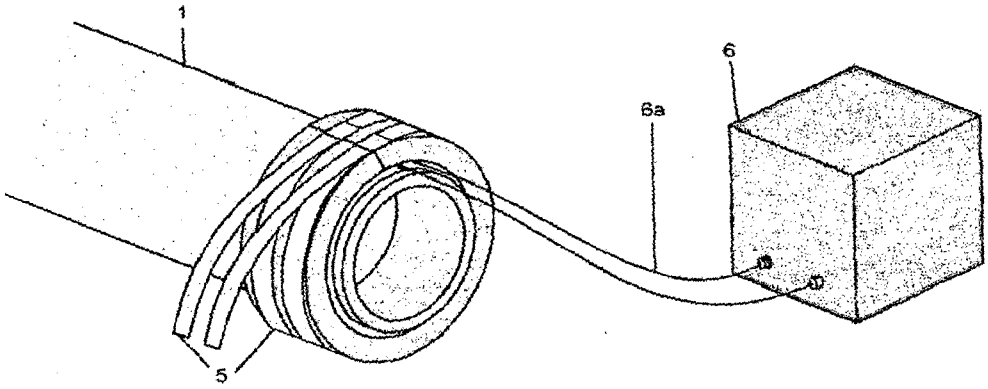

FIG. 3E

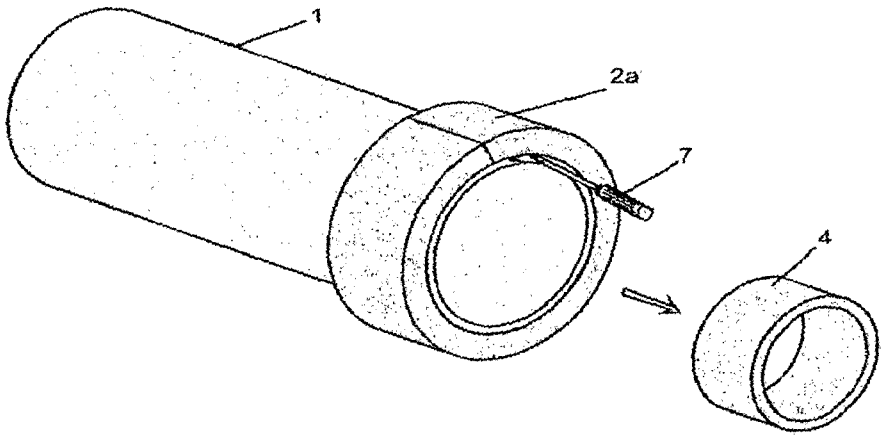

FIG. 3F

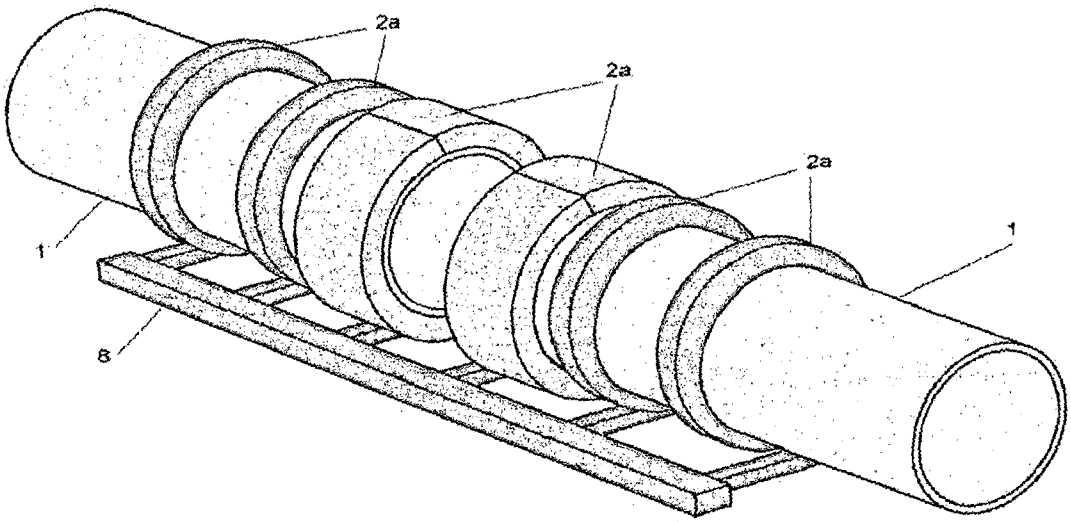

FIG. 3G

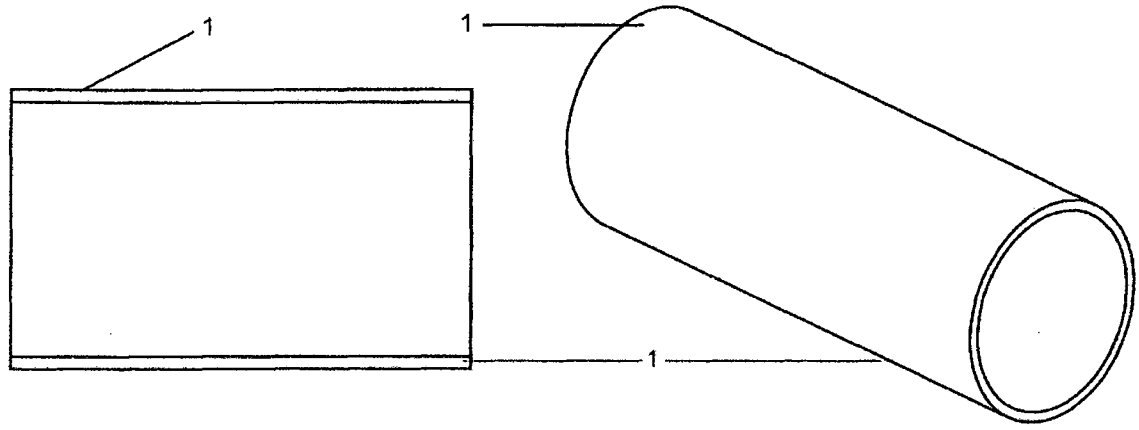

FIG. 4A

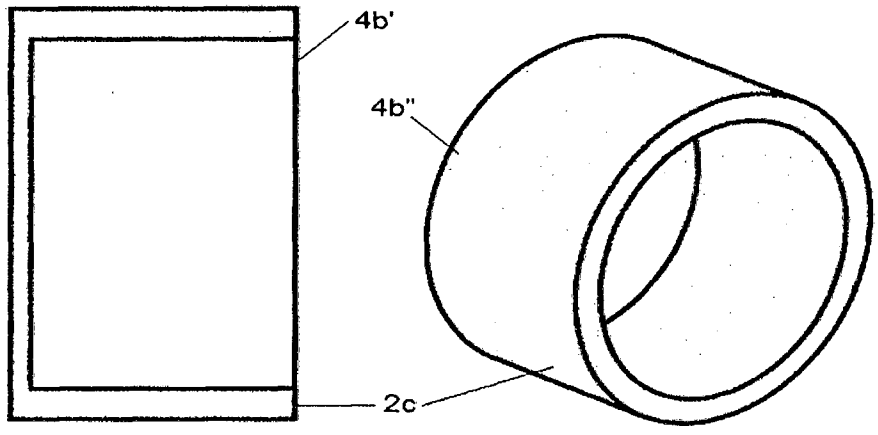

FIG. 4B

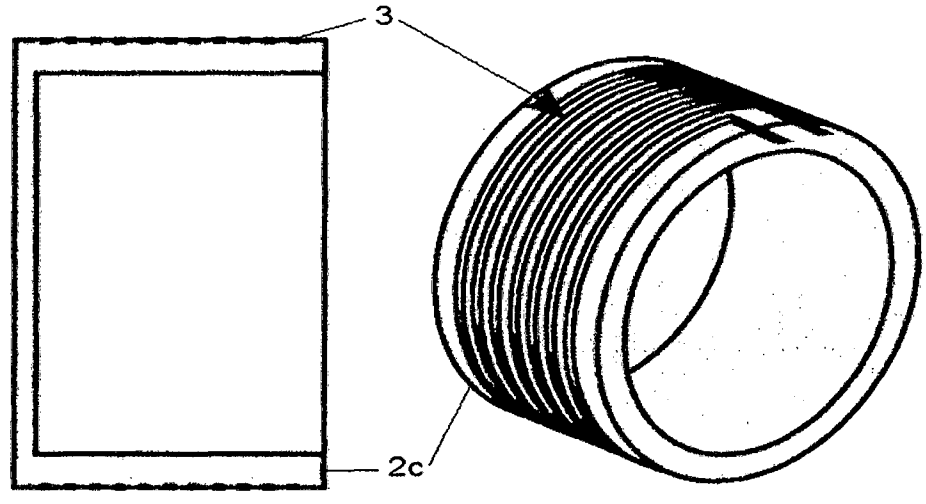

FIG. 4C

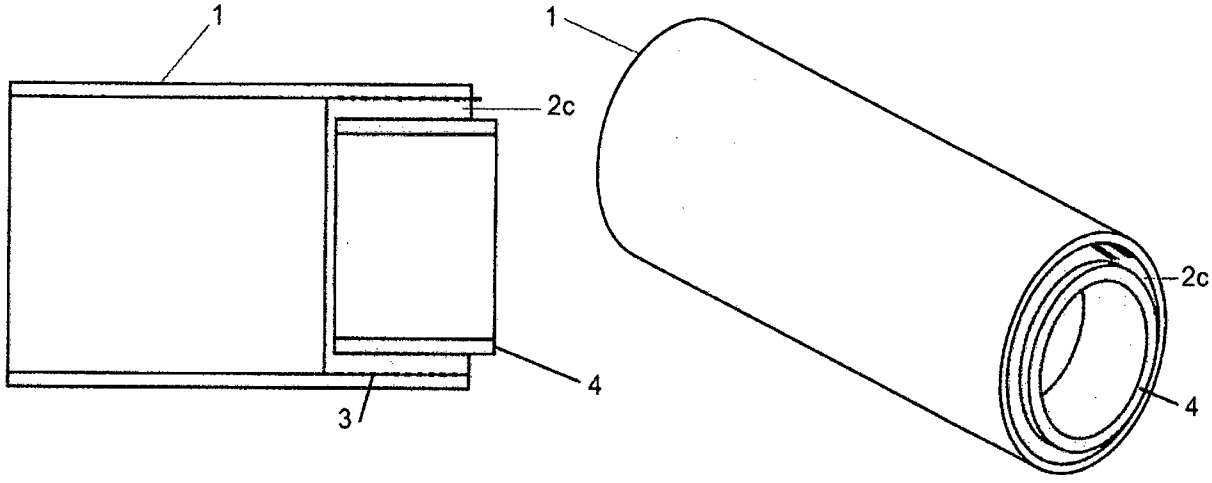

FIG. 4D

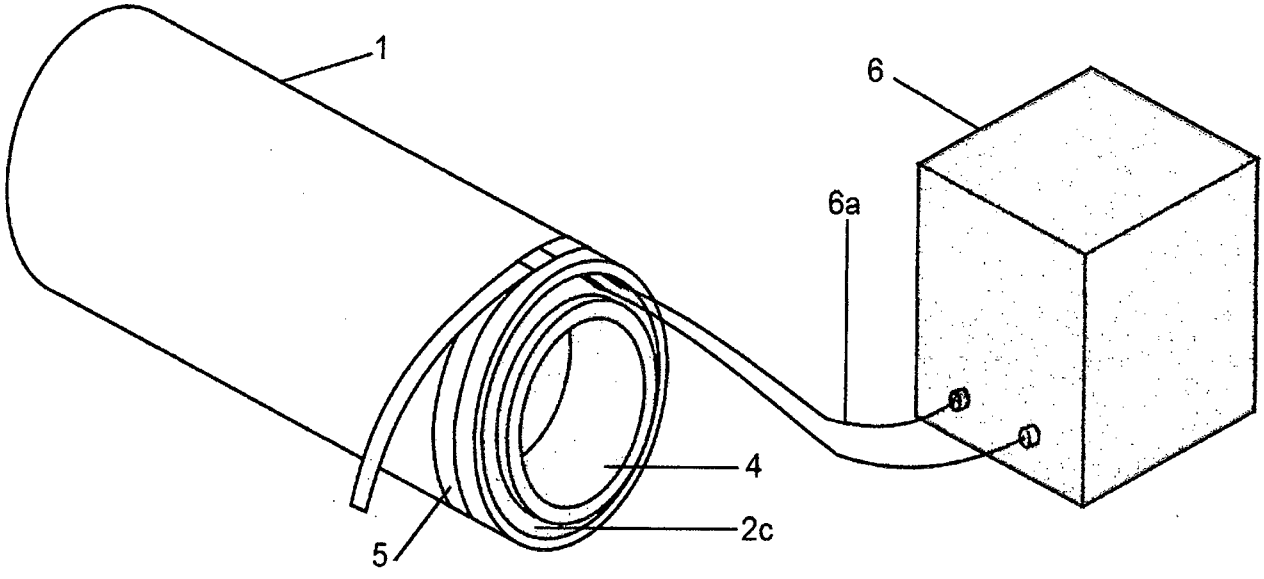

FIG. 4E

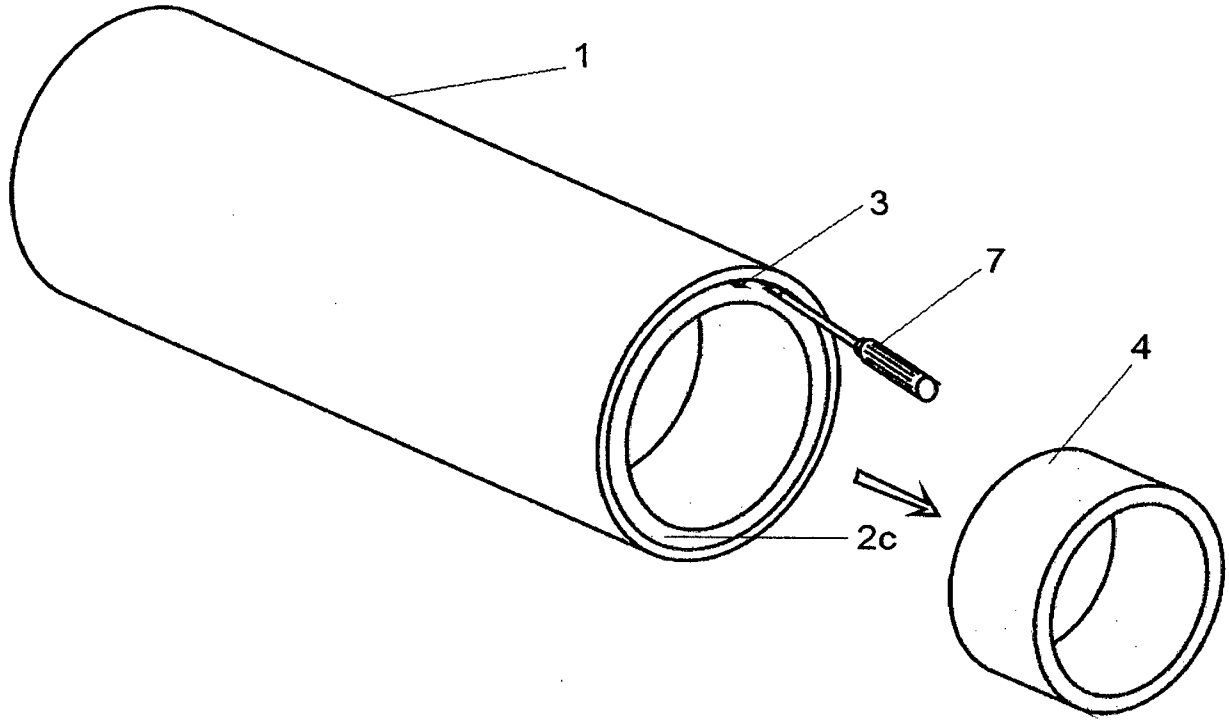

FIG. 4F

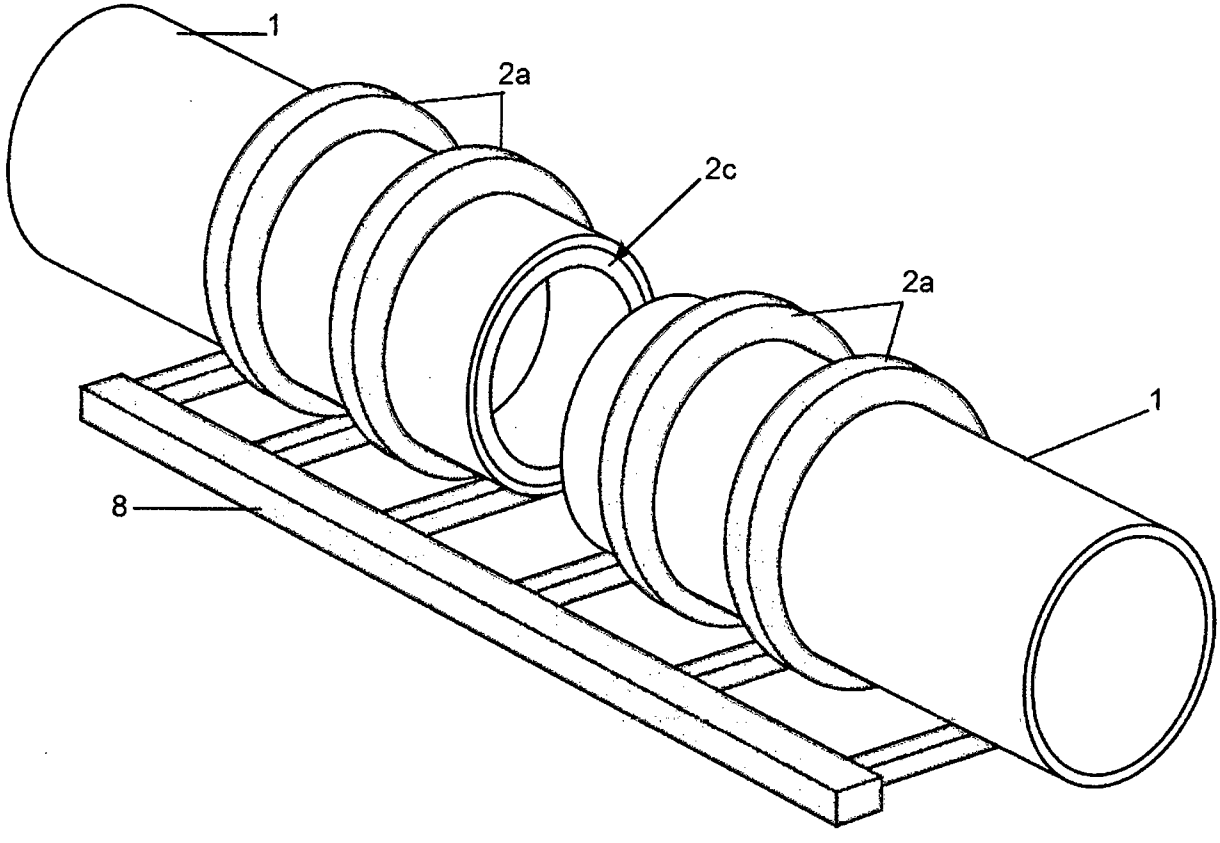

FIG. 4G

INTERNATIONAL SEARCH REPORT

International application No
PCT/ID2015/000002

A. CLASSIFICATION OF SUBJECT MATTER
INV. B29C65/34 B29C65/20 B29C65/72
ADD. B29L23/00

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)
B29C F16L

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/080552 A1 (GENONI MASSIMO [IT]) 1 May 2003 (2003-05-01) paragraphs [0015], [0018]; figures -----	1-8
A	GB 2 388 879 A (LATTICE INTELLECTUAL PROPERTY [GB]) 26 November 2003 (2003-11-26) figures -----	1-8

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 November 2015	19/11/2015

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Carré, Jérôme

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/ID2015/000002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003080552 A1	01-05-2003	IT MI20012257 A1	28-04-2003
		US 2003080552 A1	01-05-2003
GB 2388879 A	26-11-2003	AR 039852 A1	02-03-2005
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		GB 2388879 A	26-11-2003
		WO 03100310 A1	04-12-2003