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(54) Benævnelse: **En indretning til at forbinde plastrør såvel som en fremgangsmåde til at arrangere en svejsering i et spor i et plastrør**

(56) Fremdragne publikationer:
EP-A1- 0 584 381
EP-A2- 1 201 403
WO-A1-87/07935
DE-A1- 2 854 618
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US-A- 2 977 994
US-A- 3 422 179

DESCRIPTION

[0001] The invention relates firstly to a device for connecting plastic pipes, consisting substantially of a welding ring having an inner extension hose with a cavity, a resistance wire being preferably wound spirally around the extension hose and being, in turn, enclosed by a plastic sheath which provides a firmly bonded joint of the abutting plastic pipes after melting.

[0002] From the state of art, of which no printed documents are presented, devices are known which are used for connecting sewage pipes of polypropylene (PP), the connection being permanently sealed, root resistant, resistant to tensile strength, and of friction type, the pipes being used for municipal and domestic drainage, industry and landfill construction. Such devices, also briefly known as welding rings, are inserted in the beads provided in the fittings of the pipes for receiving a rubber seal. For this purpose, the rubber seal is first removed and the welding ring is then inserted in the bead. However, because the bead arranged in the fitting as well as the welding ring have a larger diameter than the smallest diameter of the fitting, it is relatively problematic to insert the oversize welding ring into the fitting without damaging the welding ring, particularly in the area of the connecting wires, and to run the connecting wires neatly and in parallel out of the fitting.

[0003] In publication DE 2854618 A1 is disclosed a system for joining together by heat-welding two tubular elements of thermoplastic material and of mutually different diameters, subsequent to inserting one end of one said element into one end of the other to leave an annular gap therebetween, which system comprises a ring-shaped welding sleeve which is located in said gap and which is made of a meltable thermoplastic material, a recoverably deformed pressure-generating ring-shaped body made of a heat-recoverable plastic material inserted within the welding sleeve, and heat-generating means arranged to cooperate with said ring-shaped body in a manner such as to heat the same and to bring the welding sleeve and said mutually opposing wall surfaces to a fusible state.

[0004] In publication WO 87/07935 A1 is disclosed a method of joining first and second double-walled tubes, each having a mating end and a corrugated outer wall forming corrugation ribs and an inner wall joined to said outer wall between said ribs, both walls being made of a fusible plastic material, the outer wall of each tube having a diameter larger than the inner wall of the other tube, comprising the steps of: cutting each tube through a corrugation rib at the tube mating end to open an annular groove formed between the walls at said corrugation rib; positioning an annular body expandable when energy is supplied to it, in said annular groove of one of said tubes; putting the tube ends together to form a closed annular space with said body enclosed therein, such that one portion of the annular body is proximate said outer wall of said first tube, and another portion of the annular body is proximate said inner wall of said second tube; and heating said body to expand the body and to fuse the body to the first and second tubes.

[0005] In publication EP 1 201 403 A2 is disclosed an electrofusible unit having a length of

elastomeric material provided with a winding of electrically conductive wire to serve as a heating core and a plastics pipe spigot and socket connection comprising the electrofusion unit, which is cut to length, located in a recess in the inner wall of a pipe socket and compressed by a pipe end inserted into the socket.

[0006] In publication US 2 977 994 A is disclosed a method for sealing a leak in a pipe which comprises advancing into the pipe to the location of the leak a flexible, resilient, deformable sealing member having applied to its outer surface a sealing material, which sealing member normally assumes a ring shape conforming to the interior wall of the pipe, but which as it is advanced into the pipe is inwardly deformed from its normal ring shape to provide clearance permitting the member readily to be moved to the desired position, releasing said sealing member from its deformed condition and allowing the same to return to its normal ring shape whereby the sealing material on its outer surface is urged against the interior of the pipe covering said leak.

[0007] The aim of the invention is thus to provide a new device for connecting plastic pipes - briefly a welding ring - which can be fastened to the fitting of a plastic pipe in an easier and faster way, whereby damage of the welding ring should be eliminated.

[0008] This aim is achieved by the features of claim 1, particularly the features of the characterizing part.

[0009] The substantial advantage of the welding ring according to the invention lies in that it can be very easily inserted unilaterally in the bead of the fitting of the plastic pipe, whereby the welding ring can be fully anchored in the bead by pressing the inwards extending loop of the welding ring very quickly outwards. At the same time, the connecting wires can also be easily run neatly and in parallel out of the fitting.

[0010] In the invention, the welding ring is provided with a device for fastening the loop. In this way, the position of the inwards extending loop is advantageously prevented from being changed before the installation in the fitting of a plastic pipe.

[0011] To this end, the loop can be secured by a cable tie, a wire or a corresponding fastening device.

[0012] In an advantageous embodiment of the invention, the loop is arranged opposite to the connecting areas equipped with connecting wires and formed by abutting ends of the welding ring fastened to each other, wherein advantageously when forming the loop, the connecting area of the welding ring is not subjected to any forces which could damage the electrical contact.

[0013] Advantageously, the connecting wires can also be arranged outside of the connecting area, wherein a device for making an electrical contact between the opposite ends of the resistance wires is arranged in the area of the ends of the welding ring. This has the

advantageous effect that the risk of damaging the connecting wires is further reduced.

[0014] Preferably, in connection with the latter embodiment, the connecting wires could be arranged preferably at an angle of 90° with respect to the connecting area.

[0015] Further, the invention relates to a method for the arrangement of a welding ring in a groove of a plastic pipe.

[0016] On the basis of the above-mentioned state of the art as well as the above-mentioned aim, the solution lies in the following method steps:

- the welding ring is pressed inwards in order to form a loop and is equipped with a device for fastening the loop;
- the welding ring with the area opposite to the loop is then inserted in the groove of the pipe;
- the device for fastening the loop is then cut off and
- the loop area is also pressed into the groove.

[0017] The method according to the invention defined in claim 6 has the substantial advantage that the welding ring can be inserted in a bead of the fitting of a plastic pipe in a very simple and fast way without the risk of affecting the welding ring in its function.

[0018] In the method according to the invention, the welding ring is equipped with a device for fastening the loop. This ensures that the position of the inwards extending loop will not be changed before the installation.

[0019] Further advantages of the present invention will be disclosed in the following description of an example embodiment. In the drawings,

Fig. 1
shows a side view of a device for connecting plastic pipes, briefly a welding ring,
Fig. 2
shows a side view of a welding ring according to Fig. 1 with a loop,
Fig. 3
shows a side view of a welding ring according to Fig. 1 with a maximum loop, and
Figs. 4 to 7
show front views of a plastic pipe, illustrating different steps of installing a welding ring.

[0020] The drawings show a device for connecting plastic pipes, hereinafter called a welding ring, generally designated by the reference numeral 10.

[0021] The welding ring 10 consists, in a way not shown, of an inner extension hose having a cavity, a resistance wire 11 being preferably wound spirally around the extension hose and being encased in a plastic sheath 12. The plastic sheath 12 consists of a material that corresponds to the plastic material of the pipes to be connected. As weldable raw materials, polyethylene (PE), polyvinyl chloride (PVC) and polypropylene (PP) are often used.

[0022] Figure 1 shows a so-called slotted welding ring 10 with a slot 13. In the slot area, the plastic sheath 12 comprises a joint cover 14, also consisting of plastic, by which the actually slotted welding ring 10 is converted into a closed welding ring 10. In addition, both ends of the resistance wire 11 are electrically connected by a ferrule 15 arranged in the area of the slot 13. Finally, the welding ring 10 is provided with connecting wires 16 arranged at an angle of 90° with respect to the slot 13.

[0023] Figure 2 shows a welding ring according to Fig. 1, having an inwards extending loop 17 provided opposite to the slot 13, the position of the loop being secured by a cable tie18.

[0024] In addition, Fig. 3 shows a welding ring 10 with connecting wires 16 which come out of the welding ring 10 in the area of the slot 13. Moreover, in the area opposite to the slot 13, this welding ring 10 is provided with a maximally formed loop 17 which is also secured with a cable tie 18. Because the loop 17 has been formed clearly larger, the remaining diameter of the welding ring 10 with the loop according to Fig. 3 is smaller than in Fig. 2.

[0025] Figures 4 to 7 show the process of installing a welding ring 10 in a fitting 19 of a plastic pipe. Figure 4 shows the fitting 19 and also, with broken lines, the inner circumferential surface of a bead 20.

[0026] Figure 4 shows a welding ring 10 according to Fig. 2 having an inner loop 17 and being secured by a cable tie 18 partly inserted in the bead 20. Scissors 21, as indicated, are used to cut the cable tie 18, whereby - as shown in Figs. 5 to 7 - the loop 17 is released and can be thrown by a small force F away from the slot 13 so that the whole welding ring 10 is incorporated in the bead 20.

List of references

[0027]

10 welding ring

11 resistance wire

12 plastic sheath

13

slot

14
joint cover

15
ferrule

16
connecting wires

17
loop

18
cable tie

19
fitting

20
bead

21
scissors

F
force

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE2854618A1 **[0003]**
- WO8707935A1 **[0004]**
- EP1201403A2 **[0005]**
- US2977994A **[0006]**

Patentkrav:

1. Indretning til at forbinde plastrør, i det væsentlige bestående af en svejsering (10) omfattende en indre ekspansionsslange udstyret med et hulrum, en modstandstråd (11) som fortrinsvis er viklet i spiral omkring ekspansionsslangen og dernæst er omsluttet af et plasthylster (12), som - efter smeltning - tilvejebringer en sikker forbundet samling af de tilstødende plastrør, **kendetegnet ved at** svejseringen (10) omfatter mindst en indad strækkende løkke (17) før installationen, og at svejseringen (10) er udstyret med en indretning (18) til at tilspænde løkken (17).

2. Indretning ifølge krav 1, **kendetegnet ved at** løkken (17) er fastgjort med et kabelbånd, en ledning eller en lignende tilspændingsindretning (18).

3. Indretning ifølge krav 1, **kendetegnet ved at** løkken (17) er arrangeret overfor forbindelsesområdet, som er udstyret med forbindelsesledninger (16), og er dannet ved at tilstødende ender af svejseringen er fastgjort til hinanden.

4. Indretning ifølge krav 3, **kendetegnet ved at** forbindelsesledningerne (16) er arrangeret uden for forbindelsesområdet, og at en indretning til at skabe en elektrisk kontakt mellem modstandstrådenes (11) modsatte ender er arrangeret i området ved svejseringens ender.

5. Indretning ifølge krav 4, **kendetegnet ved at** forbindelsesledningerne (16) fortrinsvis er arrangeret i en vinkel på 90° i forhold til forbindelsesområdet.

6. Fremgangsmåde til anbringelse af en svejsering (10) af en indretning ifølge ethvert af kravene 1 - 5 i et spor i et plastrør, omfattende de følgende trin:
   - svejseringen (10) presses indad for at danne en løkke (17) og er udstyret med en indretning (18) til at tilspænde løkken (17),
   - derefter indsættes svejseringen (10) i rørets spor i området modsat løkken (17),
   - indretningen (18) til at tilspænde løkken (17) afskæres,
   - løkkeområdet presses også ind i sporet.

DRAWINGS

Fig. 1

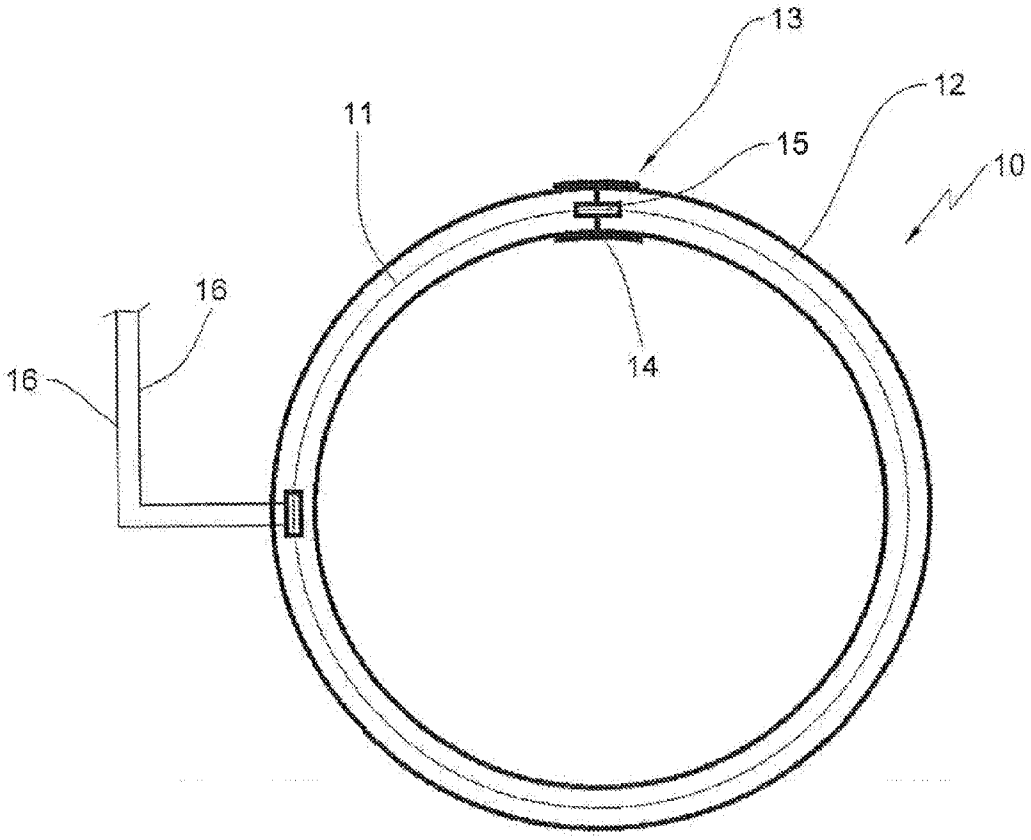

Fig. 2

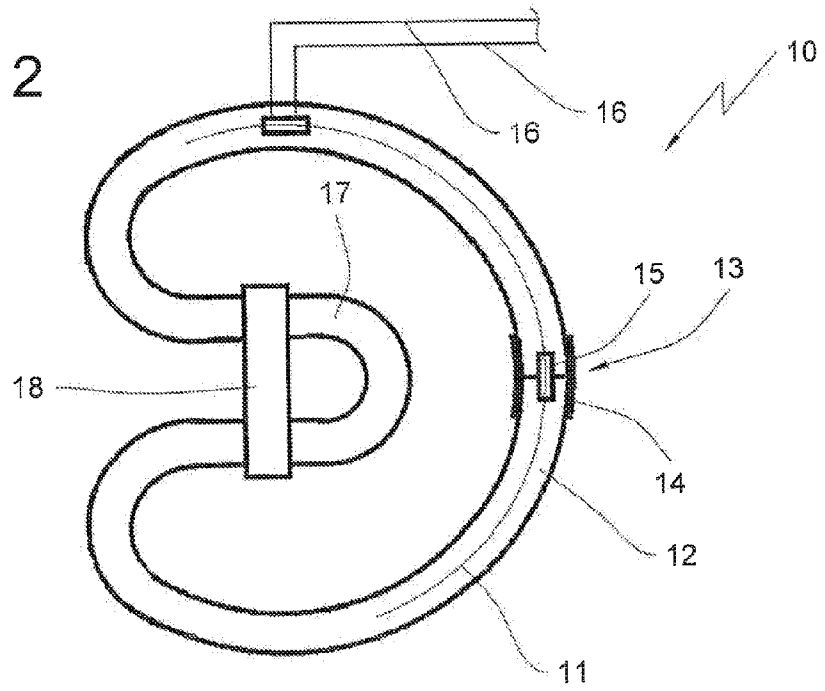

Fig. 3

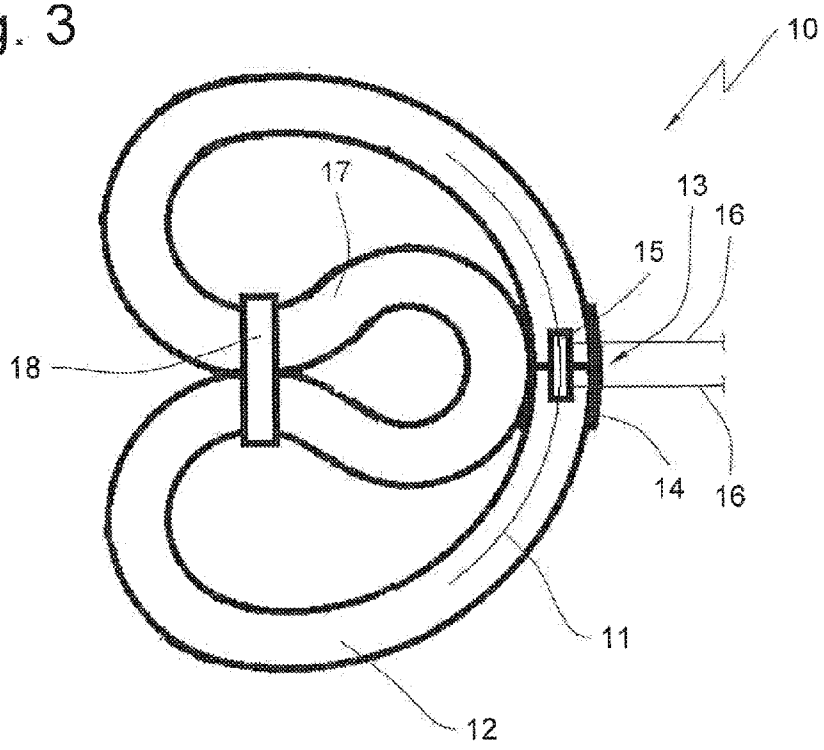

Fig. 4

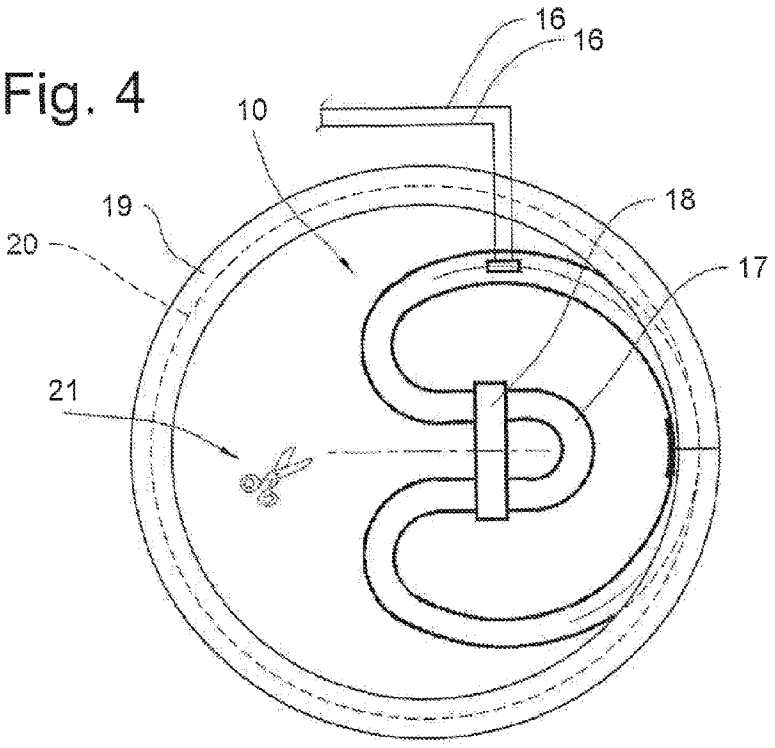

Fig. 5

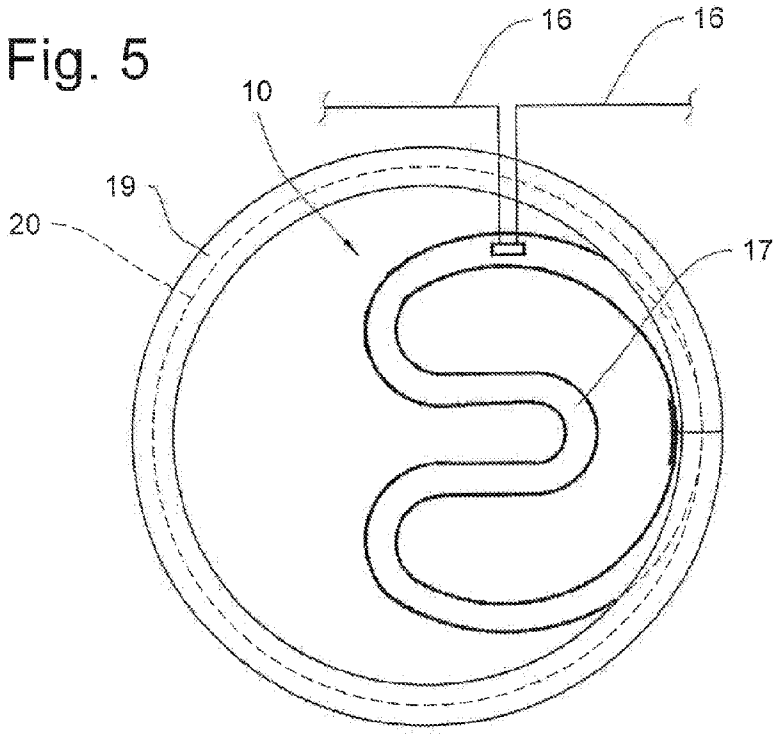

Fig. 6

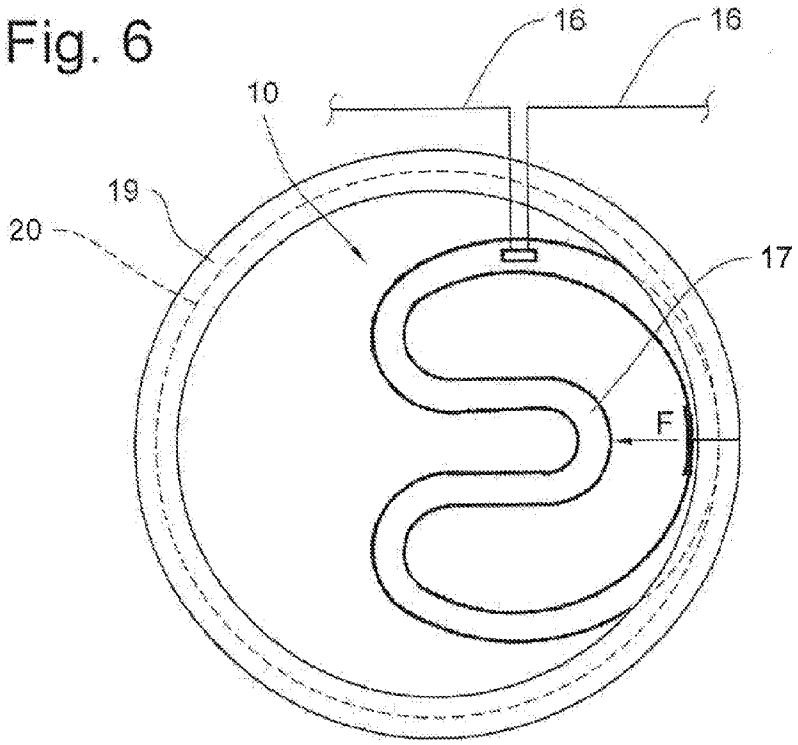

Fig. 7