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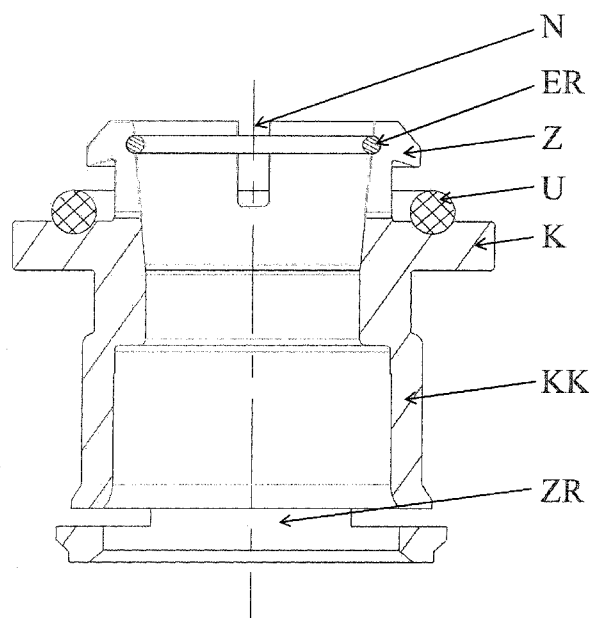


Fig. 1

- (57) Abstract: The connection pipe stub for a heat exchanger in the form of a body (KK) fitted with a pipe connection (ZR) of any type on one side, characterised in that its body (KK) has an in-driven end on the side of the assembly opening in the heat exchanger jacket (P).

Heat exchanger connection pipe stub

The invention concerns a heat exchanger connection pipe stub. It is used as an element enabling the connection of the inlet and/or outlet pipes supplying/ collecting one of the heat exchange agents to/ from the heat exchange chamber in heat exchangers of different types. In particular, it is intended for connecting water pipes to assembly openings in the jacket encasing the water chamber of fired heat exchangers used in condensing boilers, e.g. in domestic central heating installations.

In known embodiments, heat exchanger connection pipe stubs are in the form of a cylindrical body fitted on one end with a coupling for connecting it to the pipe feeding one of the heat exchange agents, water in particular, into the heat exchanger. On the other hand, the body of the connection pipe stub is permanently connected to the assembly opening in the heat exchanger jacket by welding. In other known embodiments, the structure of the pipe stub enables it to be severably connected to the heat exchanger with threaded connectors and sealings of various types used. In such embodiments an additional element, such as a threaded bushing or pin, is welded or heat-sealed to the assembly opening in the heat exchanger jacket and the pipe stub is connected thereto.

Known from European patent application No. EP2154447 is a structural solution of the inlet and outlet pipes in a heat exchanger, according to which the cylindrical body of the connection pipe stub is permanently connected to the heat exchanger jacket on the side of the jacket, and on the other side it has a connection unit for the pipe introduced into the pipe stub body, formed of a double flange on the outer surface of the pipe with an o-ring seal placed under the connection unit, and a wire buckle fitted in the sealing socket.

Also known is the embodiment disclosed in international PCT patent application published under number WO2008/143097, where the connection of two pipe elements is achieved by way of specially shaped and threaded ends of the connected pipes. Though the embodiment proposes a new way to connect two pipe elements to each other, it does not solve the problem of connecting a pipe element to the flat or cylindrical surface of the heat exchanger jacket.

A drawback of the known embodiments of connection pipe stubs is the need to use welding techniques in order to connect the pipe element with the heat exchanger jacket, which prolongs the assembly process and may cause disadvantageous changes in the material of welded elements.

The connection pipe stub according to the invention, in the form of a body fitted with pipe connection of any type on one side, is characterised in that its body has an in-driven end on the side of the assembly opening in the heat exchanger jacket.

Preferably, the pipe stub body is fitted with a flange below the in-driven end, where the top surface of the flange corresponds to the shape of the jacket surface.

There is a groove formed on the top surface of the flange to accommodate the seal.

In preferable embodiment, the pipe stub end is given the form of resilient hook-shaped fasteners obtained through notches in the flanged-out annular end of the body.

Most preferably, the expansion element is fitted along the inner circumference of the in-driven end.

In one variant of the pipe stub, the expansion element is given the form of a rigid bushing.

In another variant of the pipe stub, the expansion element is given the form of a resilient ring.

The advantage of the solution according to the invention consists in ensuring swift, effective and secure connection between the connection pipe stub and the assembly opening in the heat exchanger jacket, and in avoiding welding shrinkages which form when the connection element is welded to the heat exchanger jacket.

An exemplary embodiment of the pipe stub according to the invention is shown in a drawing, where Fig. 1 presents longitudinal section of the pipe stub in the variant with the resilient ring, Fig. 2 shows longitudinal section of the pipe stub in the variant with the rigid bushing, and Fig. 3 depicts the connection between the pipe stub and the heat exchanger jacket.

In the exemplary embodiment, the connection pipe stub is given the form of a plastic cylindrical body KK with a pipe connection element ZR of any type fitted on one side to be connected to the pipe supplying water intended for heating the water chamber of the fired pipe heat exchanger. The connection may be of the flange, thread, quick-fit, or any other preferred type. The inner and outer diameters of the pipe stub can be equal along its whole length, or change either in steps or smoothly, depending on the need. In one of the embodiment variants, shown on Fig. 1 and Fig. 3, the inner diameter of the pipe stub increases smoothly towards the jacket on the side of the connection to the heat exchanger jacket P, thus resulting in a conical cross section. Along the external circumference of the pipe stub, on the side of the heat exchanger jacket P, there is an annular flange K formed in the pipe stub body KK, and above the flange the end of the body KK is flanged-out forming a ring, with its side wall inclined and four notches N incised along its circumference. In this way four hook-shaped fasteners Z are formed in between the notches, which make the in-driven end of the pipe stub. Along the inner circumference of the in-driven end of the body KK with fasteners Z there is an expansion element ER in the form of a resilient ring. The resilience of this pressing element is achieved by an excision in the closed annular element. In another variant of stub embodiment shown on Fig. 2 the inner diameter of the in-driven end is constant, and the expansion element ER is given the form of a rigid bushing inserted inside the in-driven end of the body KK. In both variants the flange K formed along the external circumference of the body KK below the fasteners Z has a groove on its top surface, accommodating an annular U seal of e.g. the o-ring type. The top surface of the flange K may be either flat or cylindrical, depending on whether the surface of the heat exchanger jacket P to which the pipe stub is to be fitted is flat or cylindrical. The end of the pipe stub on the side of the heat exchanger jacket P may be either cross-wise or

skew, depending on the needs and shape of the heat exchanger jacket P. Skew ending of the in-driven end of the pipe stub body KK is used particularly in heat exchangers with the conical jacket encasing the water chamber, or if the pipe stub is to be fitted at an angle instead of being horizontally positioned to the jacket P. Similarly, the lengths as well as inner and outer diameters of the pipe stub, the number of notches N, fasteners Z, their shapes in the in-driven end, and the materials they are made of may differ depending on the needs.

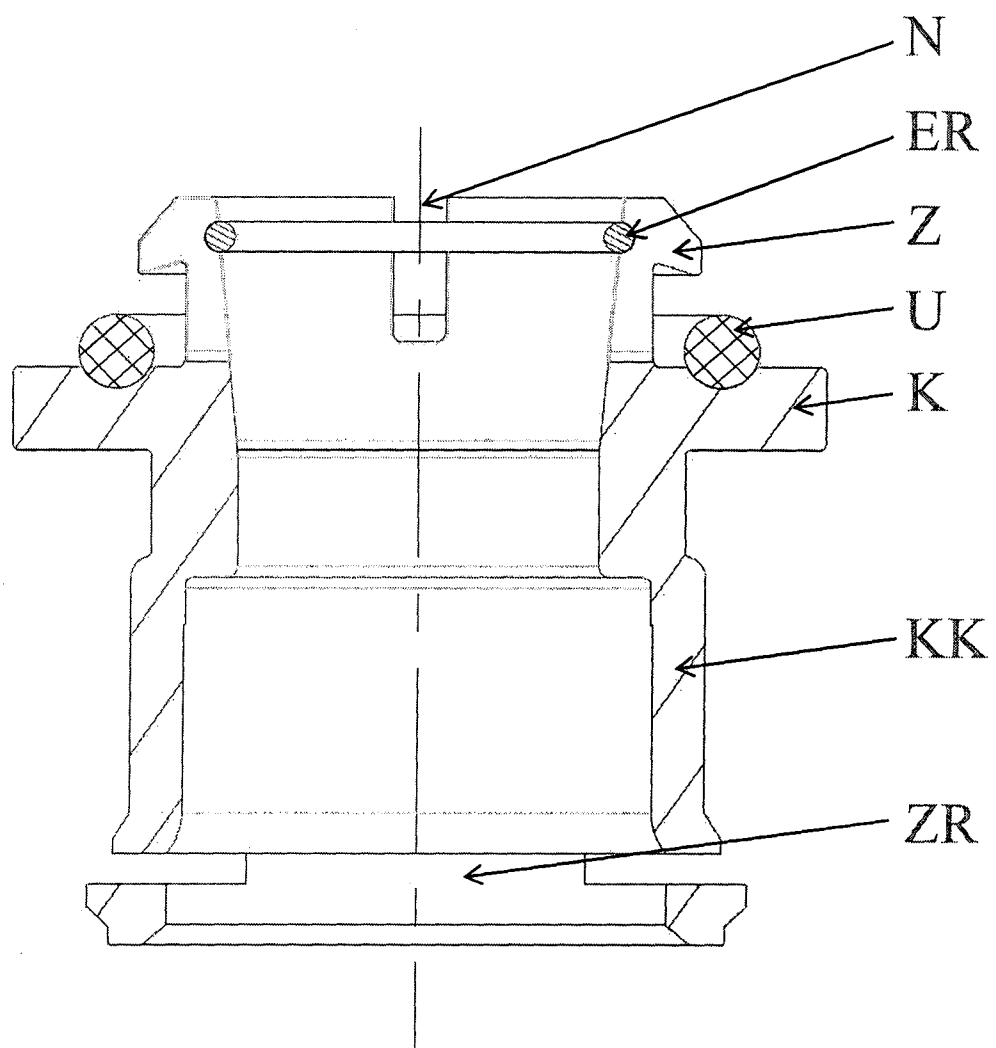
In order to connect the pipe stub to the heat exchanger jacket P the in-driven end of the pipe stub is inserted into the assembly opening in the heat exchanger jacket P, which makes the fasteners Z yield. Once the pipe stub end is fully driven, the fasteners spring back to their original position, thus preventing spontaneous detachment of the pipe stub from the jacket P. Then, the expansion element ER in the form of a resilient ring or rigid bushing is introduced. The element presses the fasteners Z to the sides preventing their slipping out of the assembly opening in the jacket P, thus additionally securing the connection. The tightness of the connection between the pipe stub and the heat exchanger jacket P is secured with a U-shape o-ring seal pressed to the jacket surface P with the flange K having a groove accommodating the U seal.

The examples described above do not exhaust the variant possibilities for the embodiment demonstrating the features of the presented invention.

Patent claims

1. Heat exchanger connection pipe stub in the form of a body fitted with a pipe connection of any type on one side characterised in that its body (KK) has an in-driven end on the side of the assembly opening in the heat exchanger jacket (P).
2. The pipe stub according to Claim 1 characterised in that the pipe stub body (KK) is fitted with a flange (K) below the in-driven end, where the top surface of the flange corresponds to the shape of the jacket surface (P).
3. The pipe stub according to Claim 2 characterised in that there is a groove formed on the top surface of the flange (K) to accommodate the seal (U).
4. The pipe stub according to Claims 1 or 2 or 3 characterised in that the pipe stub end is given the form of resilient hook-shaped fasteners (Z) obtained through notches (N) in the flanged-out annular end of the body (KK).
5. The pipe stub according to Claims 1 to 4 characterised in that an expansion element (ER) is fitted along the inner circumference of the in-driven end.
6. The pipe stub according to Claim 5 characterised in that the expansion element is given the form of a rigid bushing.
7. The pipe stub according to Claim 5 characterised in that the expansion element is given the form of a resilient ring.

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*Fig. 1*

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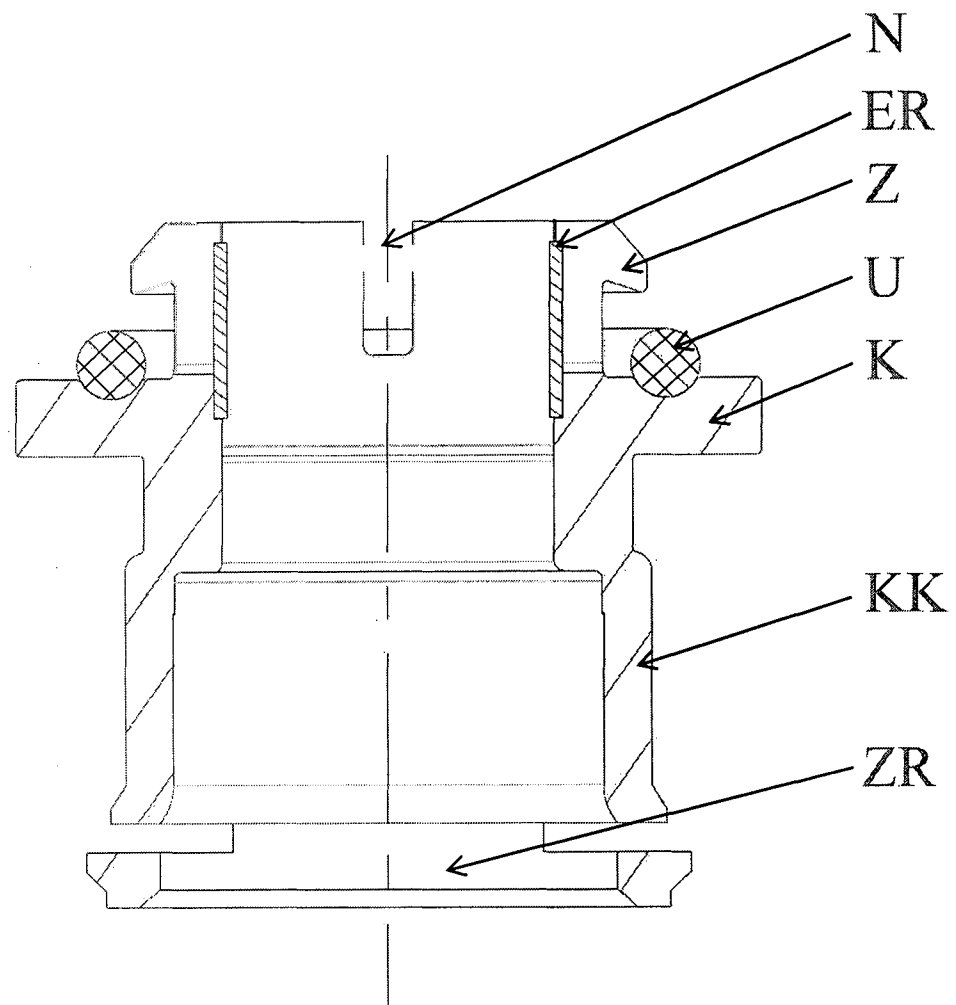


Fig. 2

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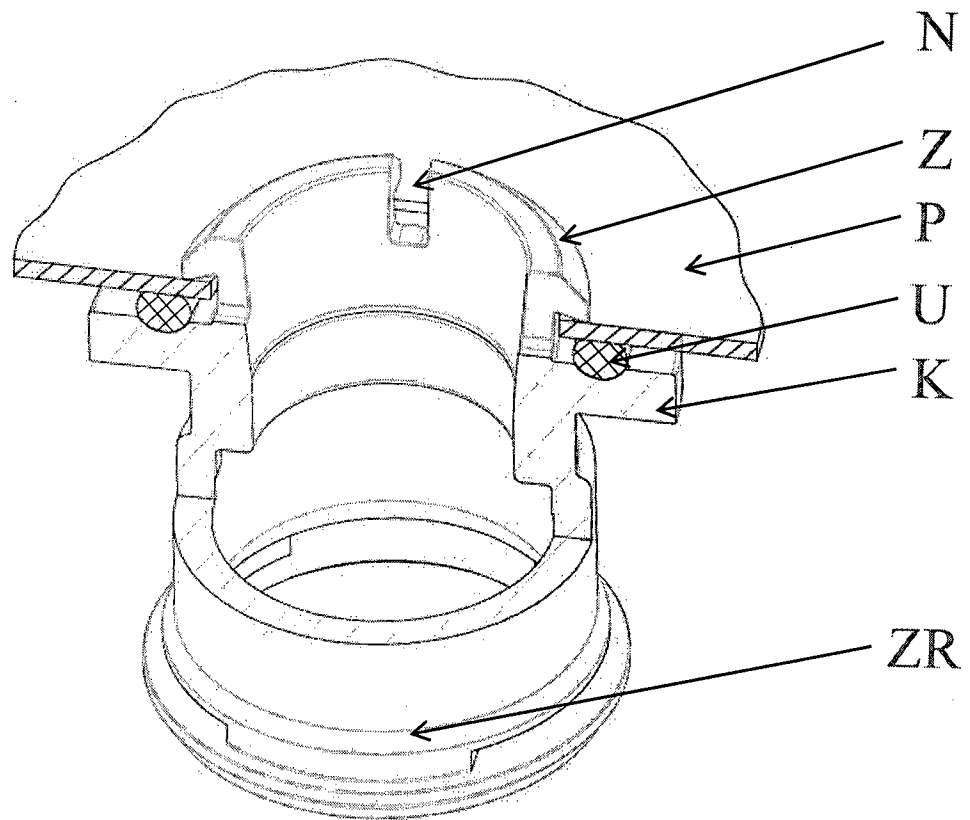


Fig. 3