



(86) Date de dépôt PCT/PCT Filing Date: 2000/11/16

(87) Date publication PCT/PCT Publication Date: 2001/06/07

(85) Entrée phase nationale/National Entry: 2002/06/03

(86) N° demande PCT/PCT Application No.: EP 2000/011323

(87) N° publication PCT/PCT Publication No.: 2001/040696

(30) Priorités/Priorities: 1999/12/02 (199 58 102.9) DE;
2000/03/31 (100 16 312.2) DE

(51) Cl.Int.⁷/Int.Cl.⁷ F16L 13/14

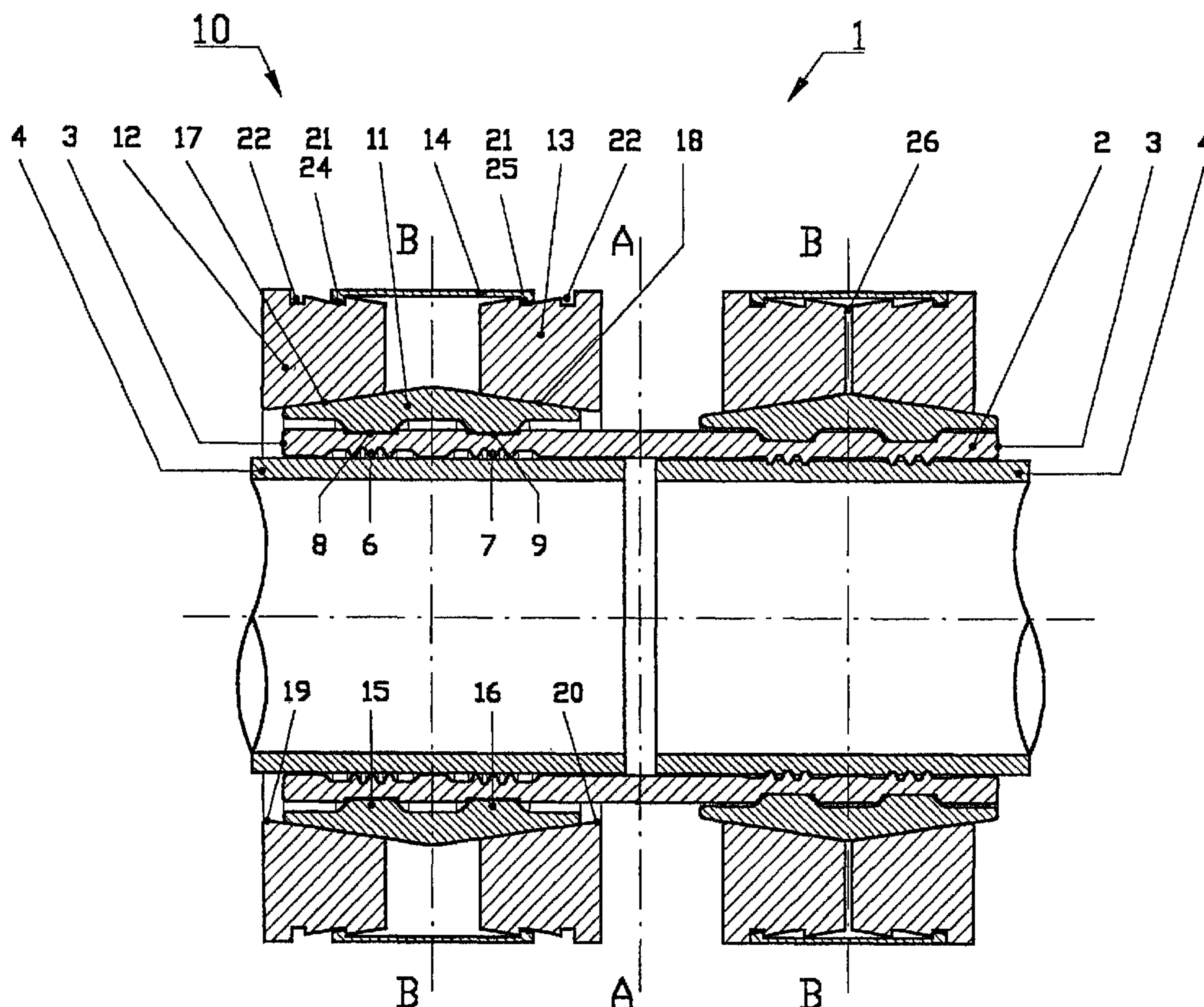
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(54) Titre : DISPOSITIF POUR REALISER LE RACCORDEMENT DE TUYAUX

(54) Title: DEVICE FOR PRODUCING A PIPE COUPLING



(57) Abrégé/Abstract:

The invention relates to a device for producing a pipe coupling (1) at two pipe ends (4). The objective of the invention is to produce a pressure-tight pipe connection by applying axial pressure, thereby guaranteeing maximum universality regarding the specifications of the quality of the pipes that are to be connected. Said device for producing a pressure-tight pipe coupling with

(57) **Abrégé(suite)/Abstract(continued):**

at least one pipe end comprises a bushing-type, rotationally symmetric base body. The base body (2) is provided with at least one essentially cylindrical inner chamber, having toothed elements (6,7) in order to receive the pipe end. The toothed elements are displaced radially into the pipe end arranged in the inner chamber by means of a pressing device (6) which impinges upon the outer surface of the base body. A pressing device (10) consisting of a shaping ring and a corresponding pair of shaping rings (12,13) guarantee that the radial displacement potential is realized in the form of a radial displacement, resulting in significantly lower pressing power.

WO 01/40696

PCT/EP00/11323

Abstract

The invention relates to a device for producing a pipe coupling (1) at two pipe ends (4). The objective of the invention is to produce a pressure-tight pipe connection by applying axial pressure, thereby guaranteeing maximum universality regarding the specifications of the quality of the pipes that are to be connected. Said device for producing a pressure-tight pipe coupling with at least one pipe end comprises a bushing-type, rotationally symmetric base body. The base body (2) is provided with at least one essentially cylindrical inner chamber, having toothed elements (6,7) in order to receive the pipe end. The toothed elements are displaced radially into the pipe end arranged in the inner chamber by means of a pressing device (6) which impinges upon the outer surface of the base body. A pressing device (10) consisting of a shaping ring and a corresponding pair of shaping rings (12,13) guarantee that the radial displacement potential is realized in the form of a radial displacement, resulting in significantly lower pressing power.

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PCT/EP00/11323

A device for manufacturing a tube coupling

The invention relates to a device for manufacturing a tube coupling of two tube ends, and in particular a tube coupling which at least comprises a basic body enclosing the tube end, and a press means enclosing the basic body wherein the basic body is radially urged into the surface of the tube by axially shifting the press means.

Pipe connections using this principle are known from the patent specifications US 3,827,727, US 3,893,720, US 4,026,006, US 4,061,367, US 4,482,174 and US 5,110,163.

The disadvantage of these pipe connections is in that they are functionally restricted in use regarding the size of the tube diameter, claims of quality on the tube to be connected, and the amount of pressure of the medium. Moreover, the constructional design of the displacing potentials formed in these tube couplings provides in addition to the intended radial crowding being absolutely necessary to obtain a pressure sealed connection, an axial crowding which does not contribute to the pressure sealed connection but influences the forces of pressure to be applied from the outside such that the forces of pressure exceed the dimension required for the radial crowding. Thus, from the start follows an oversizing of both the press tool and single elements of the tube coupling.

The invention is based upon the object to provide a pressure sealed pipe connection by axially pressing which ensures highest universality regarding the requirements of quality of the tubes to be connected.

Another object of the invention is in that to make a sealed connection in the high pressure range as well by the use of normal commercially available tubes, e.g. welded tubes made of most different materials, and the thus permissible tolerances regarding the mechanical properties and length related dimensions.

Further, it is an object of the invention to minimize the forces required for axially pressing on the press elements, and thus the force to be applied for penetrating into the tube surface at maximum penetrating depth.

These objects will be solved by a device according to the features of the first claim.

The device for manufacturing a pressure sealed tube coupling having at least one tube end comprises a sleeve shaped, rotationally symmetrical basic body wherein the basic body at least includes one substantially cylindrical interior space provided with teeth means for receiving the tube end, and the teeth means are radially displaced into the surface of the tube end received by the interior space by means of press means acting upon the outer surface of the basic body.

The basic body comprises a hollow cylinder shaped coupling sleeve having a wall thickness substantially remaining the same wherein at least two radially surrounding indentations are located on the inside of the coupling sleeve which are spaced to one another and recessed in comparison with the inner diameter of the coupling sleeve. On the outside of the coupling sleeve are formed radially surrounding flat locating features opposite the respective indentation which have a width corresponding to the width of the indentation.

For it, a pressure ring concentrically slidable over the coupling sleeve is provided to cover the coupling sleeve in almost its total length wherein the pressure ring has radially surrounding projecting parts corresponding to the locating features on its inside, and an increasing cone shaped enlargement directed from each end of the pressure ring towards its centre, on its outside.

A press ring concentrically enclosing the pressure ring is associated to the pressure ring on each side, wherein each press ring on its inside has a cone shaped enlargement corresponding to the cone shaped enlargement of the pressure ring such that a radial displacement of the indentations into the surface of the tube received by the coupling sleeve by means of the projecting parts and the locating features corresponding to the projecting parts occurs during the axial shift of the press rings against each other from a spaced initial position into an almost final position without any distance.

Further features of the invention are cited in the dependent claims.

The invention will be explained in more detail according to an embodiment. In the associated drawings

Fig. 1 is a longitudinal section through a tube coupling according to the invention performed on both sides wherein on the left hand of the axis of symmetry A-A a pre-pressed half, and on the right hand of the axis of symmetry A-A a pressed half of the tube coupling are illustrated;

Fig. 2 is a longitudinal section through the tube coupling according to Fig. 1 having an inserted supporting sleeve;

Fig. 3 is a longitudinal section through the upper half of the tube coupling according to Fig. 1 wherein the opposite press rings are shifted against each other by screws;

Fig. 4 is a longitudinal section through the upper half of a pressure ring having a stepped cone shaped formation of the surface;

Fig. 5 are two views of a pressure ring segmented by slots;

Fig. 6 is a longitudinal section through the upper half of another embodiment of the tube connection;

Fig. 7 is a longitudinal section through a tube coupling according to the invention in another embodiment which is performed on both sides;

Fig. 8 is a longitudinal section through a tube coupling according to Fig. 7 in which the pressure ring is divided;

Fig. 9 is a longitudinal section through the tube coupling according to the invention in another embodiment.

Fig. 1 shows a longitudinal section through a tube coupling 1 according to the invention performed on both sides wherein on the left hand of the axis of symmetry A-A a pre-pressed and on the right hand of the axis of symmetry A-A a pressed half of the tube coupling 1 are illustrated.

The tube coupling 1 comprises a hollow cylinder shaped coupling sleeve 2 having axially opposite entering ends 3 into which the ends of the tubes 4 to be connected are inserted. The tube coupling 1 is constructed symmetrically with respect to the axis A-A, that is the subsequently described coupling elements and acting relations always relate to one half of the

coupling sleeve 2. In the present embodiment in which two tubes 4 having the same diameter are to be connected in a pressure sealed manner the constructional formation of the coupling elements on the one half of the coupling sleeve 2 is in symmetry to the axis A-A with that of the other half of the sleeve. Therefore, in the present case the structure and action of the tube coupling 1 will be described for one side only.

The coupling sleeve 2 is generally fabricated from a material which is identical with the material of the tubes 4.

The coupling sleeve 2 is a hollow cylinder the wall thickness of which substantially remains constant over the length of the coupling sleeve 2, and which is in relation to the outer diameter of the tube 4 und the wall thickness thereof.

The inside of the coupling sleeve 2 comprises radially surrounding indentations wherein one indentation 6 is located spaced in the proximity of the entering end 3 of the coupling sleeve 2, and the second indentation 7 is located spaced to the first indentation 6 towards the axis A-A. In the present embodiment, the indentation 6, 7 comprises three juxtaposed teeth which are recessed in comparison with the inner diameter of the coupling sleeve 2 in the way such that the diameter measured in the area of the tooth tips equals the inner diameter or is greater than the inner diameter of the coupling sleeve 2. As a result, it is avoided that the tooth tips are damaged with inserting the tube 4 into the interior space of the coupling sleeve 2.

The tooth tips of the indentations 6, 7 are allowed to be differently formed according to the case of application. Thus, it is conceivable to flatten or round the tooth tip in order

to thus influence the penetrating behaviour of the indentation 6, 7 into the surface of the tube 4.

On the outside of the coupling sleeve 2 there are located locating features which represent as radially surrounding, flat grooves 8, 9 opposite the respective indentations 6, 7. The function of these grooves 8, 9 will be dealt with in a later connection.

In a particular case of application, in the area of the axis of symmetry A-A, thus in the area wherein in the coupling position the ends of the tubes 4 are oppositely located the coupling sleeve 2 can be realized with an inner stepped neck portion which causes limiting the inserting depth of the inserted tube 4. When the coupling sleeve 2 is not necked inside as in the present embodiment, thus it can be used as a shifting sleeve.

On the coupling sleeve 2 is located a pressing set 10 coaxially located therewith which comprises a pressure ring 11, two press rings 12, 13 and a covering sleeve 14 as the case may be.

The pressure ring 11 is a rotationally symmetrical hollow cylinder which on the inside comprises locating features for fixing on the coupling sleeve 2. These locating features represent radially surrounding projecting parts 15, 16 which are realized such that they correspond to the grooves 8, 9 on the outside of the coupling sleeve 2. The axial position of the pressure ring 11 on the coupling sleeve 2 will be defined by the respective combination of the groove 8, 9 / projecting part 15, 16. The diameters of the groove basic, on the one hand, and of the projecting part, on the other hand, will be selected such that between the two structural members a pre-

