

WELD SUPPORTING RING

The invention relates to a weld supporting ring for internally supporting the annular weld during welding together of two pipe ends of two pipes extending mutually in line, wherein ring pieces are mutually coupled by means of spring means which press the contact surfaces of the ring pieces against each other.

Such a weld supporting ring is known from US-A-4363954.

Said weld supporting ring has many ring pieces, each provided with spring means for pressing them against each other. This known weld supporting ring is more complicated when the number of ring pieces is greater. In case of a small number of ring pieces a relatively great amount of supporting material should be replaced in case of damage of a great ring piece.

The invention provides a weld supporting ring as indicated in claim 1. The supporting bodies are preferably made of ceramic or ceramic-like material. The ring piece may be well elastically deformable, although bodies of said ceramic material are not well elastically deformable. So the ring pieces having small ceramic supporting bodies may well adapt to the shape of the inner periphery of the weld.

Mentioned and other features according to the invention will be elucidated in the description following hereinbelow with reference to a drawing, wherein:

Figure 1 shows a weld supporting ring according to the invention arranged in two pipes for welding to one another;

Figures 2 and 3 each show a section along the lines II-II and III-III respectively from figure 1;

Figure 4 shows on a larger scale a perspective view of fraction IV of figure 2;

Figure 5 is a section along the line V-V of figure 4;

Figure 6 is a variant of the detail of figure 5; and

Figure 7 is a perspective view of another ring piece for a weld supporting ring according to the invention.

The weld supporting ring 1 of figures 1-5 comprises a core 2 which is rolled into position by means of rollers 3 inside two identical pipes 3 which are disposed mutually in line and against one another and which have to be joined together along a ring weld 5. For this purpose the pipe ends 26 are chamfered beforehand.

The weld supporting ring 1 comprises a crown 6 of ring pieces 7 distributed over the periphery which each comprise a supporting body 8 of ceramic or ceramic-like material bounding the outer periphery of the weld supporting ring 1. Each ring piece 7 is supported on the core 2 by means of radially extensible ring supports 9 formed by pneumatic or hydraulic cylinders which mutually communicate with conduits (not drawn) such that the pressure in all cylinders is the same. Situated on either side of crown 6 is a crown 10 of support elements 12 which grip by means of two rollers 13 onto the inner periphery 11 of a pipe 4 and which each support on the core 2 by means of radially extensible supports 14. These supports 14 of each crown consists of pneumatic or hydraulic cylinders which mutually communicate to effect a supporting pressure distributed uniformly over the periphery.

Each ring piece 7 comprises a base 15 and two clamping pieces 17 which are connected thereto on either

side by means of bolts 16 and which fixedly hold the supporting body 8 which is provided for this purpose with two side ribs 18 over which the adapted clamping jaws 19 grip.

5 Gripping round the piston rod 20 of support 9 is a spring support 21 round which is wound a spring 2, the one end 23 whereof grips onto this ring piece 7 while the other end 24 of this spring 22 grips onto a pin 25 of an adjoining ring piece 7.

10 The supporting bodies 8 adjoin each other along contact surfaces 27 which enclose an acute angle α with lengthwise planes 28 of the weld supporting ring 1.

 A least six ring pieces 7 are present, although preferably there are at least eight and more preferably an
15 even greater number.

 It is conceivable that with a different construction of the ring pieces 7 considerably more ceramic supporting bodies are present so that a supporting body is present for each 1 to 2 cm of the crown 6. The supporting
20 bodies are of ceramic or ceramic-like material which has low wear and high heat insulation, while it does not give off to the welding melt any substances adversely affecting the weld. This material is for instance fired or sintered material on a base of silicon oxide in which metal powder is
25 incorporated. This material may contain one or more substances, for example two substances with differing percentages of aluminium and/or titanium and possibly other elements.

 The ring piece 7 drawn in figure 6 is fixed via a
30 cardan hinge 29 to a piston rod 20 with a nut 30 such that it can turn about the radial axis 31 and a horizontal axis 32, thus enabling a still better adaptation of the supporting body 8 to any variations in the internal pipe surfaces 34.

35 Instead of a supporting body 8 in one piece the ring piece 7 of figure 7 has a considerable number of small rhombic supporting bodies 8 which are carried by a common

rhombic base 15 and which are clamped fixedly by means of clamping pieces 17. The metal portions of base 15 and clamping pieces 17 can then be slightly elastically deformable while the supporting bodies 8 still remain well pressed against each other. This enables an even better adaptation to diameter differences and unroundness.

Attention is directed to GB 91 23 021.9 from which the present right is divided. GB 91 23 021.9 describes and claims weld supporting ring 1 for internally supporting the annular weld during welding together of two pipe ends 25 of two pipes extending mutually in line, wherein ring pieces 7 are mutually coupled by means of spring means 22 which press the contact surfaces 27 of the ring pieces 7 against each other, each ring piece 7 having a spring support 21 connected thereto and wherein a spring 22 is wound round this spring support 21, wherein one end 23 of said spring 22 supported by a spring support 21 grips onto the ring piece 7 supported by the same spring support 21, while the other end 24 of this spring 22 grips onto an adjoining ring piece 7.



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CLAIMS:

1. Weld supporting ring for internally supporting the annular weld during welding together of two pipe ends of two pipes extending mutually in line, wherein ring pieces are mutually coupled by means of spring means which press the contact surfaces of the ring pieces against each other, wherein at least one ring piece comprises a plurality of supporting bodies which are held in a common holder.
2. Weld supporting ring as claimed in claim 1, characterised in that the ring pieces each comprise at least one supporting body or ceramic or ceramic-like material bounding the outer periphery of the weld supporting ring.
3. Weld supporting ring as claimed in any of the foregoing claims, characterised in that the weld supporting ring comprises a crown of ring pieces distributed over the periphery, which ring pieces are mutually adjoining along contact surfaces enclosing an acute angle with lengthwise surfaces of the weld supporting ring.
4. Weld supporting ring as claimed in any of the foregoing claims, characterised in that the ring pieces each support by means of radially extensible ring supports on a core to be arranged inside the pipes for welding to each other.
5. Weld supporting ring as claimed in any of the foregoing claims, characterised in that on either side of a crown of the ring pieces the weld supporting ring has a crown of support elements which grip on the inner periphery of a pipe and which support by means of radially extensible supports on a core to be arranged inside the pipes for welding to each other.



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6. Weld supporting ring as claimed in any of the foregoing claims, characterised in that the supporting bodies are rhombus-shaped.

7. Weld supporting ring as claimed in any of the foregoing claims, characterised in that each ring piece is supported relative to the core via a cardan hinge.