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DE-U1-202015 102 252
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US-A- 2 493 556

Description

[0001] The invention concerns a sleeve adapter in accordance with the preamble of claim 1.

[0002] Known from DE 20 2015 102 252 U1 is a generic sleeve adapter that incorporates toggle levers that are arranged at intervals around a tubing section to act as expanding elements to expand a seal radially outwards. Different expansion settings of the toggle levers that are arranged around the circumference enable the tubing section to be arranged off-centre inside a sleeve so as to enable, for example, the tubing section to join evenly bottom against bottom to a tube incorporating the sleeve.

[0003] Also known from either DE 23 17 752 A1 or US 2 226 067 A is a sleeve adapter with expanding elements, where the expanding elements are constructed as wedges that can be displaced in an axial direction along the tubing section.

[0004] The invention is based on the problem of improving a generic sleeve adapter so that the level of the bottom of such sleeve adapter can be optimally adapted to align with the level of the bottom of an adjoining tubing section and so that for this purpose also a lower expanding element referred to as a lifting element is easy to actuate.

[0005] This purpose is fulfilled by a sleeve adapter in accordance with claim 1. Advantageous embodiments are described in the sub-claims.

[0006] In other words the invention proposes a sleeve adapter in the lower circumferential section of which an expanding element can be actuated separately so that by means of this expanding element the level of the bottom of the sleeve adapter can be precisely adjusted and, for example, the bottom of the sleeve adapter evenly join to the bottom of the adjoining tubing section. It is for this reason that this separately actuable expanding element is described as a lifting element.

[0007] In a manner known in itself the lifting element is constructed as a toggle lever that extends with a first lever arm away from the tubing section and which at first rests against the tubing section by a second lever arm. When the first lever arm is actuated so that it moves nearer to the tubing section, the second lever arm is consequently moved away from the tubing section. As the second lever arm is located radially inside the seal, the seal is therefore expanded and its effective outside diameter increased. The toggle lever is mounted tiltably between these two lever arms.

[0008] In accordance with the proposal the lifting element is actuated by means of a clamp. The clamp fits right around the tubing section and incorporates a tension screw that is arranged in the upper circumferential half of the tubing section so that the tension screw is easily accessible and accordingly can be actuated problem-freely.

- [0009]** Further in accordance with the proposal the lifting element is constructed differently from the other toggle levers, namely, with a first lever arm that is constructed longer than on the other toggle levers. In this way the clamp to actuate the lifting element can extend outside the other toggle levers and cannot impair actuation of the other toggle levers.
- 5 **[0010]** It may in all variants of the sleeve adapter advantageously always be provided for for the tubing section of the sleeve adapter to have a maximum length of 50 cm. The sleeve adapter does not really serve to bridge longer lengths but merely to even out the diameter difference between two different tubing sections. A sleeve adapter that is constructed suitably short is accordingly very light and is therefore easier to handle.
- 10 **[0011]** A reliable seal between the two tubes, even to bridge very great diameter differences, can be advantageously enabled by making the several elements that can move outwards able to interlock at the point where they support the seal extending radially outside around the elements. The interlock ensures that the seal is supported as evenly as possible around the whole of its circumference. In this way leakiness is avoided that otherwise may
15 possibly not be prevented if the seal between two adjoining elements does not expand sufficiently from inside outwards and is pressed against one of the two tubes to be joined together. A correspondingly large gap between two elements might be the reason for this leakiness. The proposed interlock of the adjoining elements bridges a gap of this kind.
- [0012]** One embodiment of the invention is explained in greater detail below with the aid of
20 purely schematic illustrations. They show:
- fig. 1 a longitudinal section through an example embodiment of a sleeve adapter, and
- fig. 2 a perspective view of a section of an expanding element.
- 25 **[0013]** In Fig. 1 number 1 refers to a sleeve adapter as a whole that incorporates a tubing section 2, the tubing section 2 being shown over only a part of its total length. The maximum total length is, for example, 40 cm.
- [0014]** Arranged at one axial end of the tubing section 2 is a seal 3 made from an elastomer material, which seal sits by a first section 15 tightly against the outside of the tubing section 2
30 and which incorporates a second section 16 that extends at a distance from the tubing section 2.

- [0015]** Expanding elements in the form of toggle levers 17 are arranged at intervals around the tubing section 2. Each of these toggle levers 17 incorporates a first lever arm 18 that extends away, that is, at an angle, from the tubing section 2 and a second lever arm 19 that sits against the tubing section 2 and extends underneath the second section 16 of the seal 3.
- 5 The toggle levers 17 are mounted tiltably on a bearing ring 4 that extends around the tubing section 2 in the middle section between the two lever arms 18 and 19.
- [0016]** A band clamp 5 is seated in a locking groove 6 at the end of the first lever arm 18 of the toggle levers 17, so that with the aid of this band clamp 5 all the expanding elements, that is, all the toggle levers 17, can be evenly clamped so as to expand with their respective
- 10 second lever arms 19 the circumferential seal 3 and push the circumferential seal 3 tightly from inside against a sleeve 7 of a tubing section, for example, a concrete pipe 8. The concrete pipe 8 incorporates in its interior at the lowest point the pipe bottom 32, and the bottom of the sleeve adapter is intended to join evenly to the pipe bottom 32.
- [0017]** For this purpose all the expanding elements, namely, all the toggle levers 17, are first
- 15 slightly pretensioned. Then the lowest toggle lever, which is constructed as a lifting element 9, is actuated separately from the other toggle levers 17 so as to lift the tubing section 2 until the bottom of the tubing section 2 is precisely level with the pipe bottom 32. For this purpose the lifting element 9 is constructed as a special toggle lever the first lever arm 18 of which is lengthened and protrudes over the locking groove 6 to create a through-hole 10 there through
- 20 which a clamp 11 extends. The clamp 11 extends around the tubing section 2 and incorporates in the upper circumferential half of the tubing section 2 - above the apex of the tubing section 2 in the example embodiment shown - a tension screw 12. When the tension screw 12 is actuated, the effective length of the band clamp 11 is shortened in a way known in itself, so pulling the first lever arm 18 of the lifting element 9 onto the tubing section 2, so that
- 25 the tubing section 2 of the sleeve adapter 1 is lifted relative to the concrete pipe 8 by the corresponding expansion of the seal 3 at the lowest point on the circumference of the sleeve adapter 1 and so that the bottom of the concrete pipe 8 and the bottom of sleeve adapter 1 can be evenly aligned.
- [0018]** The procedure for fitting the sleeve adapter 1 is as follows: First all the toggle levers
- 30 17 are actuated together, so that the seal 3 is expanded and sits against the sleeve 7 of the concrete pipe 8 with only very little contact or pretensioning force. Next the lifting element 9 is actuated separately and the level of the bottom of the sleeve adapter 1 adjusted as required. Then all the toggle levers 17 are again actuated together so as to fasten the sleeve adapter 1 securely inside the sleeve 7.

[0019] Fig. 2 shows an example embodiment of an expanding element, the expanding element in this example embodiment being marked 28. At the end by which the expanding elements 28 are arranged inside the second section 16 of the seal 3 the radially outer surface of the expanding elements 28 is provided with profiling 29. This profiling 29 serves to keep the seal 3 that extends outside around the expanding elements 28 from being displaced.

[0020] In the area by which the expanding elements 28 are located radially inside the section 16 of the seal each expanding element 28, viewed in a circumferential direction around the tubing section 2, is provided on both sides with an interlock 30. The interlocks 30 on the two opposing sides of the expanding element 28 are constructed complementarily to one another in so far as projections 33 on one side of the expanding element 28 are matched to recesses 34 on the other side of the same expanding element 28. The projections 33 of one expanding element 28 can therefore fit into the recesses 34 in an adjoining identical expanding element 28.

[0021] As can be seen from fig. 1, the second lever arms 19 of the toggle levers 17 can also be provided with projections 33 and recesses 34 of the same kind, so that adjoining toggle levers 17 interlock with one another in the area in which the toggle levers 17 extend underneath the section 16 of the seal 3.

[0022] When the expanding elements 28 or second sections 16 of the toggle levers 17 are moved radially outwards, increasingly larger gap widths result between adjoining expanding elements 28 or two adjoining second sections 16 of the toggle levers 17 as the expanding movement increases. In the area of the interlocks 30, however, continuous support of section 16 of the seal 3 is enabled around the whole circumference of the sleeve adapter 1, so that around the whole of its outer circumference the seal 3 is pressed evenly against the respective tube section in which the sleeve adapter 1 is located.

25

[0023] Reference list

- | | | |
|----|---|-----------------|
| | 1 | Sleeve adapter |
| | 2 | Tubing section |
| | 3 | Seal |
| 30 | 4 | Bearing ring |
| | 5 | Band clamp |
| | 6 | Locking groove |
| | 7 | Sleeve |
| | 8 | Concrete pipe |
| 35 | 9 | Lifting element |

	10	Through-hole
	11	Clamp
	12	Tension screw
	14	–
5	15	First section
	16	Second section
	17	Toggle lever
	18	First lever arm
	19	Second lever arm
10	20	–
	21	–
	22	–
	23	–
	24	–
15	25	–
	26	–
	27	–
	28	Expanding element
	29	Profiling
20	30	Interlock
	31	–
	32	Pipe bottom
	33	Projection
	34	Recess
25		

P A T E N T K R A V

1. Muffeadapter (1),

- 5
- med et cylindrisk rørafsnit (2),
 - en tætning (3) af et elastisk deformerbart materiale, som omgiver rørafsnittet (2) perifert udvendigt,
- 10 hvor tætningen (3) omfatter et første afsnit (15), hvormed den støder tæt op til rørafsnittet (2), samt et andet afsnit (16), som er bevægeligt radiale udad i forhold til rørafsnittet (2),
- og med flere udvidelseselementer, som er anbragt fordelt mellem rørafsnittet (2) og det andet afsnit (16) af tætningen (3) omkring rørafsnittets (2) omkreds,
- 15 og som er bevægelige radiale udad på en sådan måde, at tætningens (3) udvendige diameter er foranderlig i afhængighed af udvidelseselementernes respektive stilling,
- 20 hvor der i muffeadapterens (1) nedre omkredsafsnit er anbragt et som løfteelement (9) betegnet udvidelseselement, som kan aktiveres separat på en sådan måde, at muffeadapterens (1) bundhøjde kan indstilles ved hjælp af løfteelementet (9),
- 25 og som er udformet som knæled (17), som omfatter en første vippearms (18), som er bevægelig fra en fra rørafsnittet (2) radiale mere fjern hvilestilling til en i forhold til rørafsnittet (2) radiale nærmere spændestilling, samt omfatter en anden vippearms (19), som ligger an mod det andet afsnit (16) af tætningen (3) radiale indefra, og som er bevægelig fra en i forhold til rørafsnittet (2) nærmere hvilestilling til en fra rørafsnittet (2) radiale mere fjern udvidelsesstilling, hvori tætningen (3) har en forholdsvis større udvendig diameter,
- 30 hvor knæleddet (17) i sit midterste område er lejret vippebevægeligt mellem de to vippearms (18, 19), og løfteelementet (9) kan aktiveres ved hjælp af en spændebøjle (11), som forløber rundt om rørafsnittet (2), hvor en spændeanordning (12) i spændebøjlen (11) er anbragt i den øvre omkredshalvdel af rørafsnittet (2),
- 35 **kendetegnet ved,**
at løfteelementet (9) omfatter en første vippearms (18), som er udformet længere end de første vippearms (18) på de øvrige, ligeledes som knæled (17), udformede udvidelseselementer.

2. Muffeadapter ifølge krav 1,

kendetegnet ved,

at rørafsnittet (2) har en længde på højst 50 cm.

3. Muffeadapter ifølge et af de foregående krav

5 **kendetegnet ved,**
at udvidelselementerne (28) dér, hvor de støtter tætningen (3), hvert især lateralt er fortandet med de to hosliggende udvidelselementer (28).

FIG.1

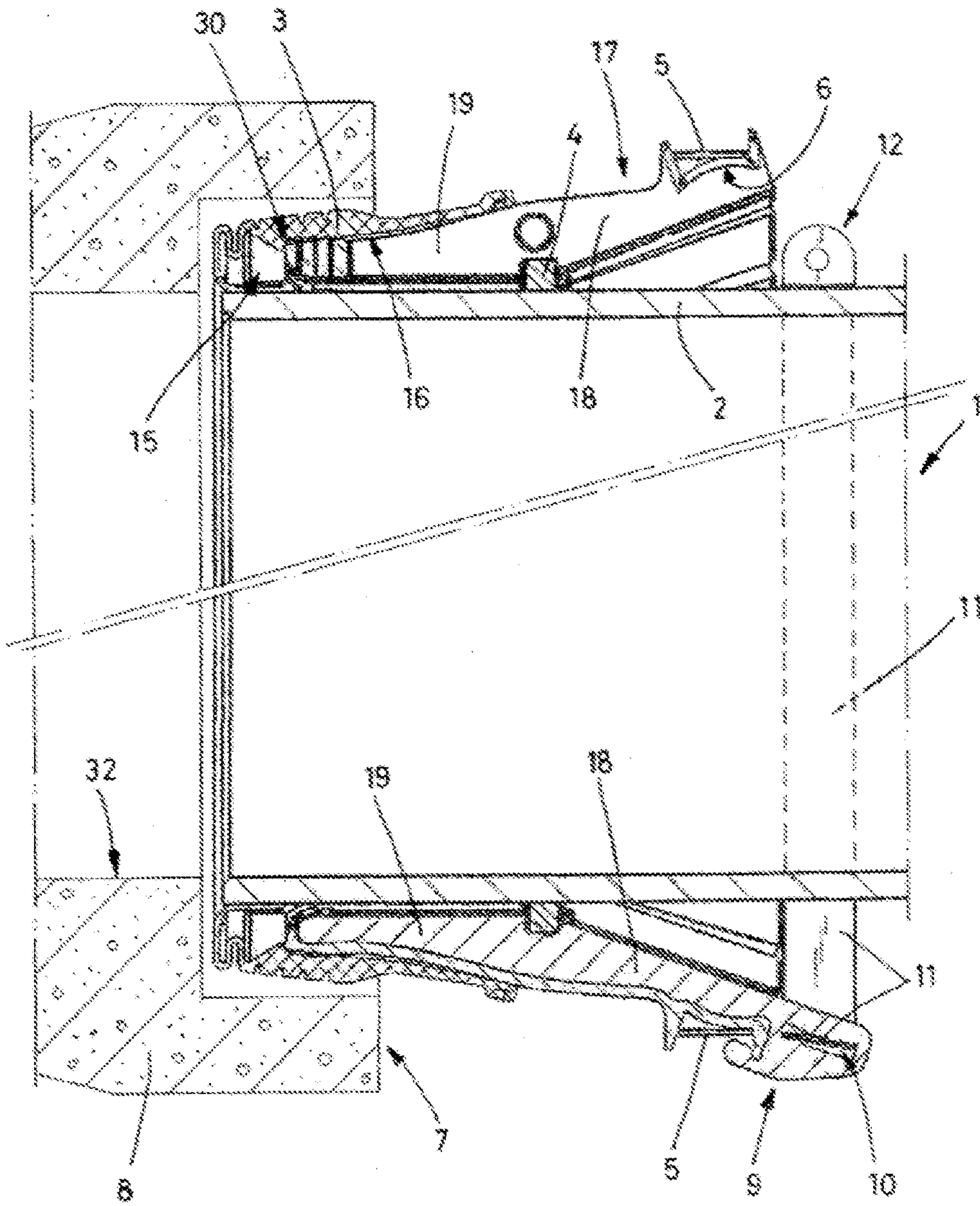


FIG. 2

