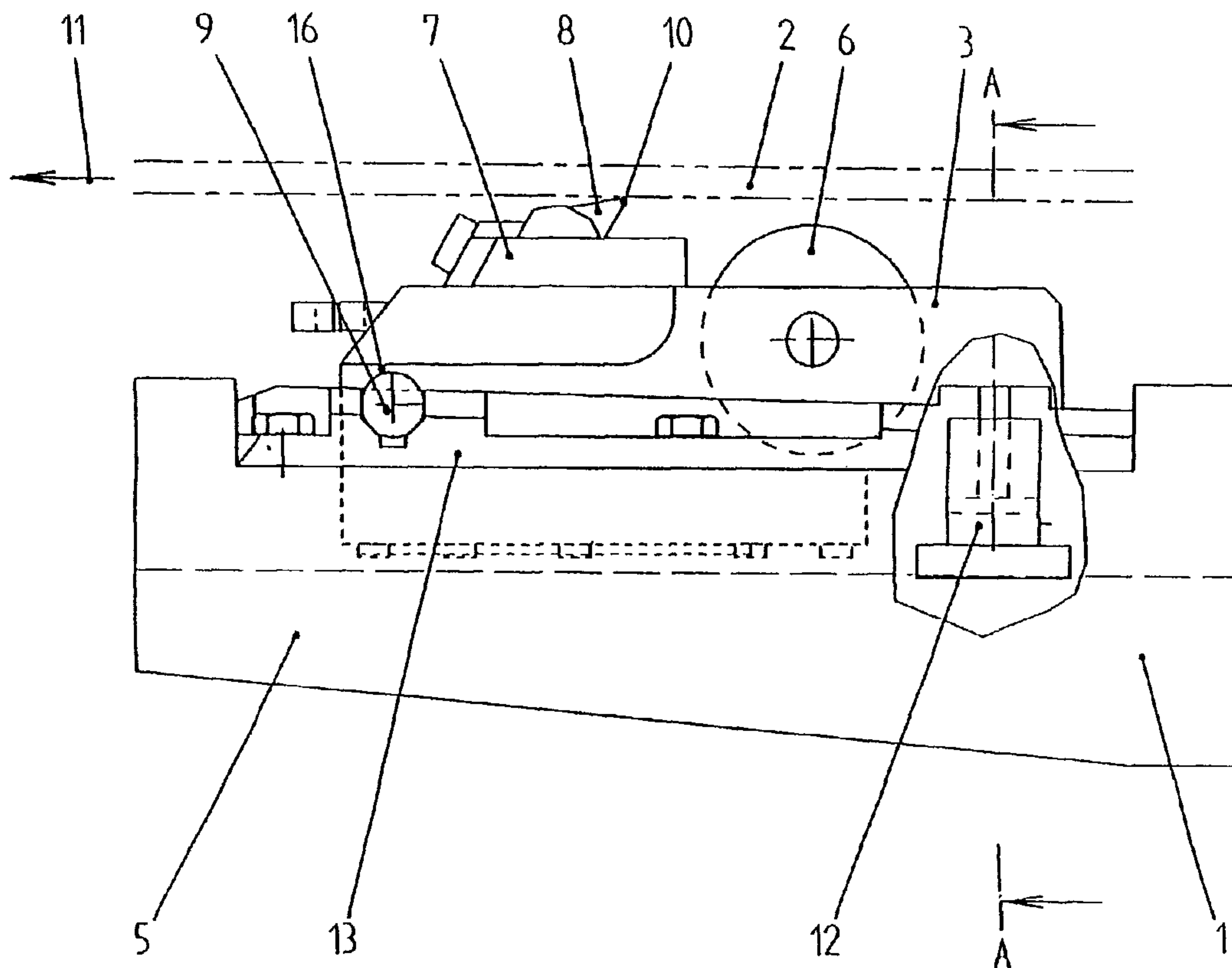




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(72) Inventeurs/Inventors:
WINKELS, JOERN, DE;
ENGLER, BERND, DE
(73) Propriétaire/Owner:
MANNESMANNROEHREN-WERKE AG, DE
(74) Agent: FETHERSTONHAUGH & CO.

(54) Titre : DISPOSITIF POUR EBAVURER L'INTERIEUR DE TUYAUX SOUDES PAR SOUDURE LONGITUDINALE ET
PROCEDURE POUR AJUSTER UN DISPOSITIF DE CE TYPE
(54) Title: DEVICE FOR DEBURRING THE INSIDE OF LONGITUDINAL SEAM WELDED PIPES, AND METHOD FOR
ADJUSTING A DEVICE OF THIS TYPE



(57) Abrégé/Abstract:

The invention relates to a method and a device for deburring the inside of longitudinally seam-welded pipes with a retention arm secured outside the pipe in the area of the pipe that is not yet closed and having an end zone which is located behind the welding



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

spot and has arranged therein a frame part which is tiltable in longitudinal direction of the pipe and provided with a scraping tool, and at least a rotatably supported follower roller as well as with an opening for chip removal. The tilt axis (9) of the frame part (3) is hereby located, as viewed in advancing direction, behind the scraping point (10) at the end of the frame part (3), and a means for adjusting the tilt angle is arranged on the forward end of the frame part (3).

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ABSTRACT

The invention relates to a method and a device for deburring the inside of longitudinally seam-welded pipes with a retention arm secured outside the pipe in the area of the pipe that is not yet closed and having an end zone which is located behind the welding spot and has arranged therein a frame part which is tiltable in longitudinal direction of the pipe and provided with a scraping tool, and at least a rotatably supported follower roller as well as with an opening for chip removal. The tilt axis (9) of the frame part (3) is hereby located, as viewed in advancing direction, behind the scraping point (10) at the end of the frame part (3), and a means for adjusting the tilt angle is arranged on the forward end of the frame part (3).

Hereto Fig. 1

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DEVICE FOR DEBURRING THE INSIDE OF LONGITUDINALLY
SEAM-WELDED PIPES, AND METHOD FOR ADJUSTING A DEVICE OF THIS
TYPE

5 Description

The invention relates to a device for deburring the inside of longitudinally seam-welded pipes, as well as to a method for adjusting a device of this type.

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DE 40 20 924 C1 discloses a device for generating short chips during deburring the inside of longitudinally seam-welded pipes. This known device includes a scraping tool disposed within a longitudinally seam-welded pipe behind the welding spot and fixed by means of a carrier frame and a forked guide rod which
15 is provided with a retention arm secured outside the pipe in front of the welding spot in the area of the pipe that is not yet closed.

Disposed in the upper part of the carrier frame are two rotatably supported follower rollers in front of and behind the scraping point. The carrier frame is
20 tiltably supported by means of lateral bearing bolts in recesses of lateral flanges of the guide rod, whereby the tilt axis extends between both follower rollers.

This arrangement is desirous to allow easy fixation of the carrier frame in a disposition in continuously parallel relationship to the pipe surface, when the
25 operating mode has been established and the follower rollers are pressed against the inner pipe side.

Practice has shown, however, that the scraping results were only partly satisfactory. Instable behavior has been observed and the knife height, i.e. the

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height by which the knife juts out beyond the circumference of the follower roller, cannot be adjusted, without shutting down the assembly.

It is an object of embodiments of the invention to
5 provide a device for deburring the inside of longitudinally seam-welded pipes, which allows a sensitive adjustment of the scraping knife in an optimum manner during operation, regardless of the length of the scraper arm, and to provide a method for adjusting a device of this type.

10 In accordance with one aspect of the present invention, there is provided a device for deburring the inside of a longitudinally seam-welded pipe with a retention arm secured outside the pipe in the area of the pipe that is not yet closed and having an end zone which is located
15 behind a welding spot and has arranged therein a frame part which is tiltable in longitudinal direction of the pipe and provided with a scraping tool, and at least one rotatably supported follower roller as well as with an opening for chip removal, wherein a tilt axis of the frame part is
20 located, as viewed in advancing direction, behind a scraping point at the end of the frame part, and a means for adjusting a tile angle is arranged on the forward end of the frame part.

In accordance with a second aspect of the present
25 invention, there is provided a method for adjusting a device for deburring the inside of longitudinally seam-welded pipes with a device described herein, wherein the retention arm and thus the scraping tool, connected with the frame part, is initially properly aligned, and the adjustment means is
30 then set to a mid-position in which the adjustment range includes plus and minus zones.

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In accordance with a third aspect of the present invention, there is provided a device for deburring the inside of a longitudinally seam-welded pipe, comprising: a retention arm secured outside the longitudinally seam-welded pipe in an area of the pipe that has not yet been closed, said retention arm having an end zone which is located behind a welding spot; a frame part arranged in the end zone of the retention arm and constructed for tilting longitudinally in direction of the pipe about a tilt axis by a tilt angle, an adjustment mechanism, arranged on a leading end of the frame part, for adjusting the tilt angle of the frame part; and a scraping tool supported by the frame part and bearing against an inside surface of the pipe at a scraping point, for removing burrs and discharge thereof via a chip removal slot in the frame part; wherein the tilt axis is located, as viewed in an advance direction of the pipe, behind the scraping point at a trailing end of the frame part.

In accordance with a fourth aspect of the present invention, there is provided a method for adjusting a device described herein for deburring the inside of a longitudinally seam-welded pipe, comprising the steps of: adjusting the retention arm and thus the scraping tool mounted on the frame part; and aligning the adjustment means to a mid-position at an adjustment in a plus and minus range.

According to the teaching of embodiments of the invention, the tilt axis of the frame part is positioned, as viewed in advancing direction, behind the scraping point at the end of the frame part, and a means for changing the tilt angle is arranged at the forward end of the frame part. Preferably, the adjustment means is a hydraulically controllable adjusting cylinder. In this way, it is

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possible to reproducibly change the position of the scraping knife by about 0.1 mm. Such a fine graduation is not possible by the slanted disposition of the scraper arm according to the known state of the art.

5 According to a further feature of the invention, the end zone of the retention arm is configured as fork, and the tiltable frame part is arranged between both parallel fork pieces of the retention arm.

10 To realize a tilting, the frame part includes two pins, one extending to the right and one extending to the left, which can be supported on a frame attachment disposed on the top side of the fork pieces of the retention arm.

15 The frame part may selectively be provided with two or one follower roller. In case of arrangement of only one follower roller, it is disposed, preferably, between cutting tool and adjustment means.

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Adjustment of the tilt angle is realized by shifting the adjustment means to assume a mid-position, after proper alignment of the retention arm and thus the scraping tool that is connected with the frame part, wherein the adjustment range includes plus and minus zones. The adjustment relates hereby to a correction of
5 the previously adjusted position of the scraping tool in the longitudinal plane, wherein the alignment also includes the positional adjustment in the transverse plane and about the own longitudinal axis in dependence on the ratio of wall thickness to diameter of the pipe being welded. In other words: a change of the tilt angle of the frame part is accompanied by a change of the engagement state
10 of the fixed scraping knife to realize a best possible scraping result on the inside of the pipe. Not only is hereby the height, by which the scraping knife juts out beyond the follower roller, slightly changed but also a significant change of the cutting angle is realized.

15 The proposed device for deburring the inside of pipes is also applicable when one or more support rollers are arranged on the underside of the retention arm.

Further features, advantages and details of the invention are set forth in the following description with respect to an exemplary embodiment depicted in the
20 drawing, in which:

Fig. 1 shows a longitudinal view of the configuration of the cutting tool zone in accordance with the invention,

25 Fig. 2 shows a cross section in direction A – A in Fig. 1.

Fig. 1 shows a longitudinal view, partly broken away, and Fig. 2 a cross section of the configuration of the cutting tool zone in accordance with the invention. A frame part 3 is arranged to a retention arm 1, shown here only partially and
30 secured outside the pipe in the area of the pipe that is not yet closed, and is

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tiltable in longitudinal direction of the pipe 2. The end zone of the retention arm 1 is configured in the form of a fork located behind the welding spot.

According to the illustration in Fig. 2, the fork includes two parallel fork pieces 5, 5' between which the tiltable frame part 3 is positioned. The tiltable frame part 3 includes a rotatably supported follower roller 6 and a holding device 7 for the scraping knife 8. The tilt axis 9 of the frame part 3 is located, as viewed in advancing direction, behind the scraping point 10 at the end of the frame part 3. The transport direction of the pipe 2 is made clearer by the bold arrow 11 drawn in the Figure.

In order to be able to sensitively change the tilt angle of the frame part 3 in accordance with the invention, a hydraulically controllable adjusting cylinder 12 is disposed in the forward end zone of the frame part 3. Details of this adjusting cylinder 12 are secondary here since the mode of operation of such adjusting cylinders is generally known. As an alternative to the adjusting cylinder 12, it is also possible to modify the tilt angle by arranging a toothed rack, an adjusting spindle, or the like.

Fig. 2 shows the securement of a frame attachment 13 by means of screws 14 upon the surface of the flanges 5, 5'. The frame part 3 is provided on its longitudinal sides with pins 15, 15' which extend respectively to the right and to the left. These pins 15, 15' are insertable in a groove 16 of the frame attachment 13 so that the pins 15, 15' are able to rotate within the groove 16.

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The embodiment illustrated in Figs. 1 and 2 can be modified by arranging two follower rollers, i.e., one follower roller in front of and one behind the scraping point, as well as a retention arm which has an underside additionally provided with one or more support rollers.

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LIST OF REFERENCE CHARACTERS

No.	Term
1	retention arm
5 2	pipe (closed)
3	frame part
5, 5'	fork piece of retention arm
6	follower roller
7	holding device
10 8	scraping knife
9	tilt axis
10	scraping point
11	transport direction pipe
12	hydraulic adjusting cylinder
15 13	frame attachment
14	screw
15, 15'	pin
16	groove

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CLAIMS:

1. A device for deburring the inside of a longitudinally seam-welded pipe with a retention arm secured outside the pipe in the area of the pipe that is not yet
5 closed and having an end zone which is located behind a welding spot and has arranged therein a frame part which is tiltable in longitudinal direction of the pipe and provided with a scraping tool, and at least one rotatably supported follower roller as well as with an opening for chip removal,
10 wherein a tilt axis of the frame part is located, as viewed in advancing direction, behind a scraping point at the end of the frame part, and a means for adjusting a tilt angle is arranged on the forward end of the frame part.

2. A device according to claim 1, wherein the end
15 zone of the retention arm, located behind the welding spot, is configured as fork, and the tiltable frame part is arranged between two parallel fork pieces of the retention arm and includes pins respectively extending in the tilt axis to the right and to the left and supportable on the top
20 surface of the two fork pieces.

3. A device according to claim 1 or 2, wherein the frame part is provided with two follower rollers, with one being arranged in front of the scraping point and one being arranged behind the scraping point.

25 4. A device according to claim 1 or 2, wherein the frame part is provided with one follower roller.

5. A device according to claim 4, wherein the follower roller is disposed between scraping tool and adjustment means.

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6. A device according to any one of claims 1 to 5, wherein the adjustment means is a hydraulically controllable adjusting cylinder.

7. A device according to any one of claims 1 to 6, wherein the fine graduation of the adjustment range is about 0.1 mm with respect to the scraping tool.

8. A method for adjusting a device for deburring the inside of longitudinally seam-welded pipes with a device according to any one of claims 1 to 7, wherein the retention arm and thus the scraping tool, connected with the frame part, is initially properly aligned, and the adjustment means is then set to a mid-position in which the adjustment range includes plus and minus zones.

9. A method according to claim 8, wherein the alignment of the retention arm and thus of the scraping tool that is connected with the frame part includes a positional adjustment in the longitudinal plane, in the transverse plane, and about the own longitudinal axis in dependence on the ratio of wall thickness to diameter of the pipe being welded.

10. A method according to claim 8 or 9, wherein the sensitive adjustment by means of the adjustment means is used to correct the preset position of the scraping tool in the longitudinal plane.

11. A device for deburring the inside of a longitudinally seam-welded pipe, comprising:

a retention arm secured outside the longitudinally seam-welded pipe in an area of the pipe that has not yet been closed, said retention arm having an end zone which is located behind a welding spot;

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a frame part arranged in the end zone of the retention arm and constructed for tilting longitudinally in direction of the pipe about a tilt axis by a tilt angle, an adjustment mechanism, arranged on a leading end of the frame
5 part, for adjusting the tilt angle of the frame part; and

a scraping tool supported by the frame part and bearing against an inside surface of the pipe at a scraping point, for removing burrs and discharge thereof via a chip removal slot in the frame part;

10 wherein the tilt axis is located, as viewed in an advance direction of the pipe, behind the scraping point at a trailing end of the frame part.

12. The device of claim 11, wherein the end zone of the retention arm is configured as fork having a pair of
15 parallel prongs, with the frame part arranged between the prongs and having opposite longitudinal sides, with each longitudinal sides having a pin extending in the tilt axis, wherein the pin of one longitudinal side is rotatably supported on a top surface of one of the prongs, and the pin
20 of the other one of the longitudinal sides is rotatably supported on a top surface of the other one of the prongs.

13. The device of claim 11, and further comprising a follower roller rotatably supported by the frame part in front of the scraping point, as viewed in advancing
25 direction.

14. The device of claim 13, wherein the follower roller is disposed between the scraping tool and the adjustment means.

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15. The device of claim 11, wherein the adjustment means includes a hydraulically controllable adjusting cylinder.

16. The device of claim 11, wherein the adjustment
5 means is constructed to realize an adjustment of the scraping tool by about 0.1 mm.

17. A method for adjusting a device of claim 11 for deburring the inside of a longitudinally seam-welded pipe, comprising the steps of:

10 adjusting the retention arm and thus the scraping tool mounted on the frame part; and

 aligning the adjustment means to a mid-position at an adjustment in a plus and minus range.

18. The method of claim 17, wherein the adjustment of
15 the retention arm includes a positional adjustment in a longitudinal plane, in a transverse plane, and about a longitudinal axis of the retention arm, in dependence on a ratio of wall thickness to diameter of the pipe being welded.

20 19. The method of claim 18, wherein the aligning step is realized to correct a preset position of the scraping tool in the longitudinal plane.

FETHERSTONHAUGH & CO.
OTTAWA, CANADA

PATENT AGENTS

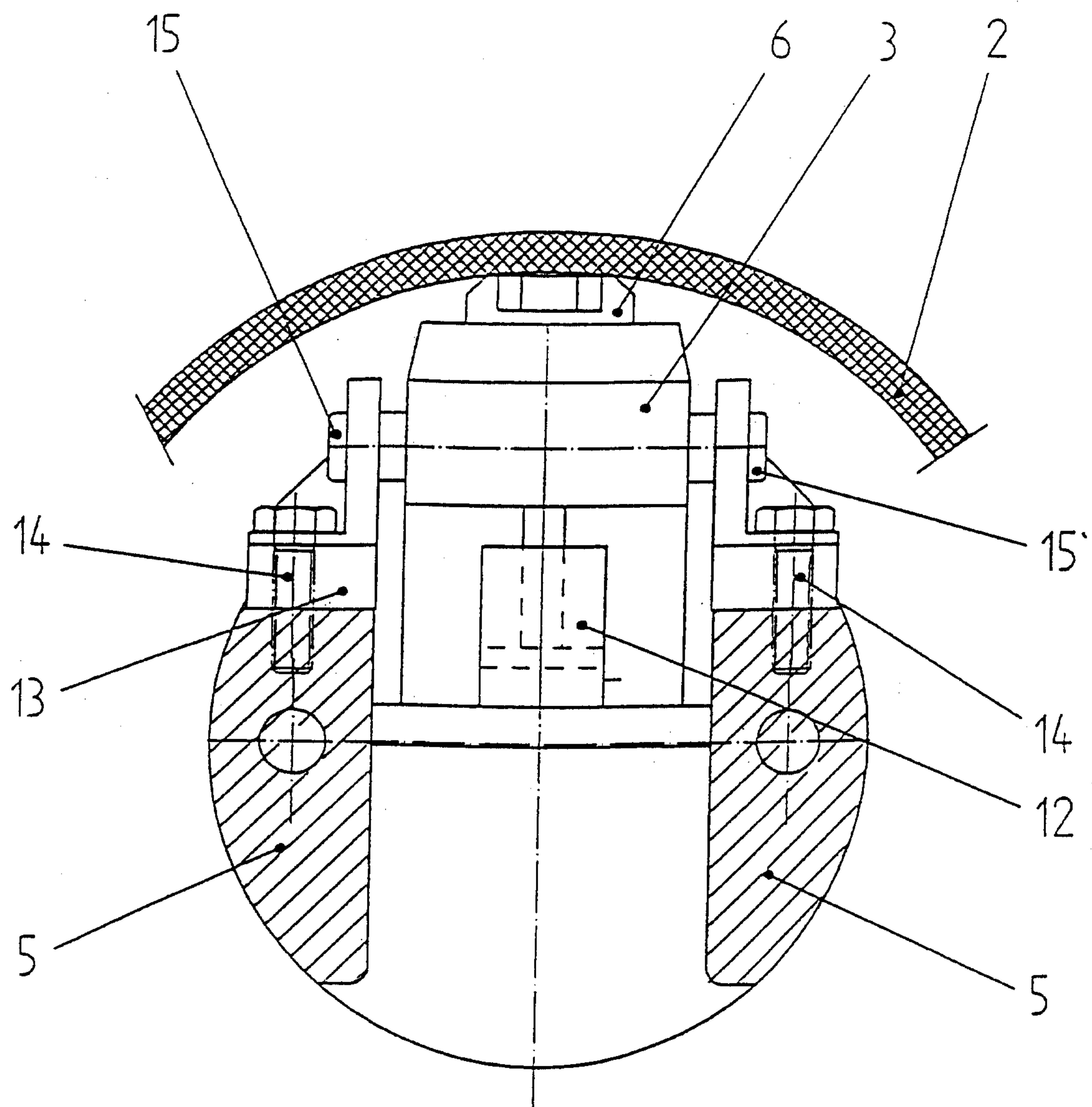


Fig. 2

