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GB 1557855
GB 1357682
GB 1305677
GB 1286485
GB 1180622
GB 1148430
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GB 0438790
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GB 0430592
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(54) Method for the continuous forming of butted pipe from flat material

(57) The invention relates to the continuous forming, independent of dimensions, of flat material to a butted tube, normally with a forming length of at least 20 × the diameter of the finished pipe. In order to shorten the forming train and to obtain a butted tube without undulations for the welding process, the invention provides for the forming of the first stage to take place up to in front of a first guide stand (6) steadily to a cross-section, as shown, in stands having vertically adjustable rolls 2 and horizontally and vertically adjustable edge guiding rolls 1, 3.

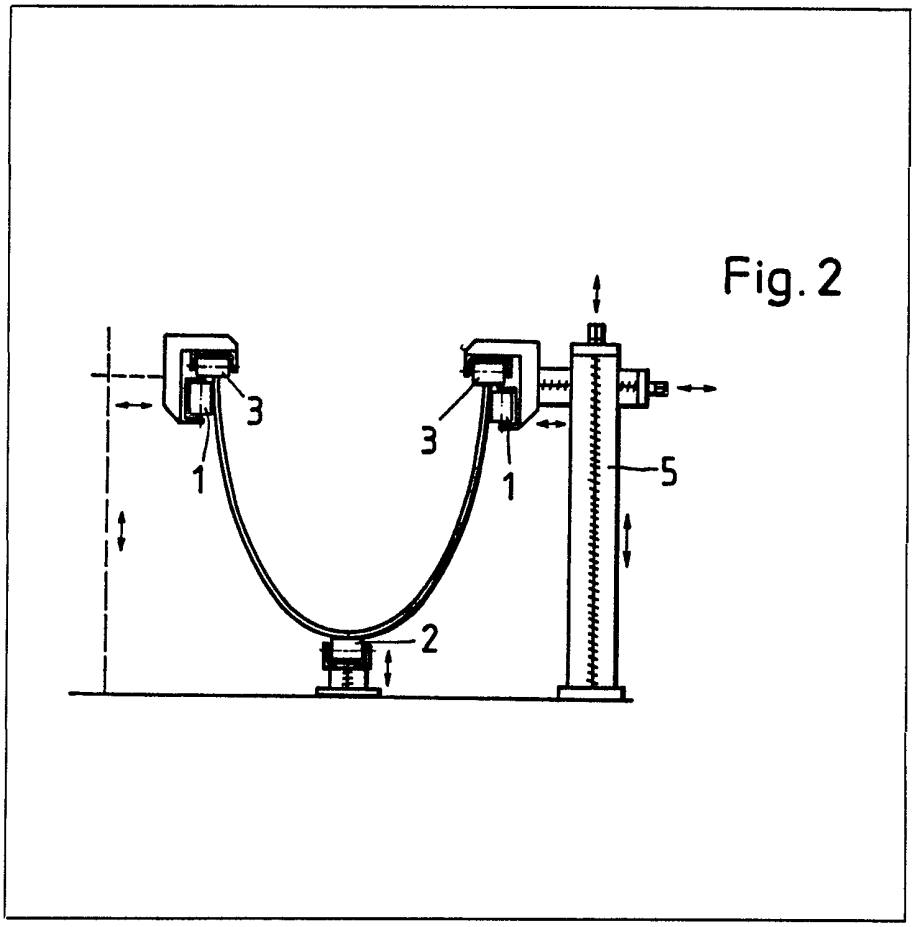

Fig. 2

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Fig.1

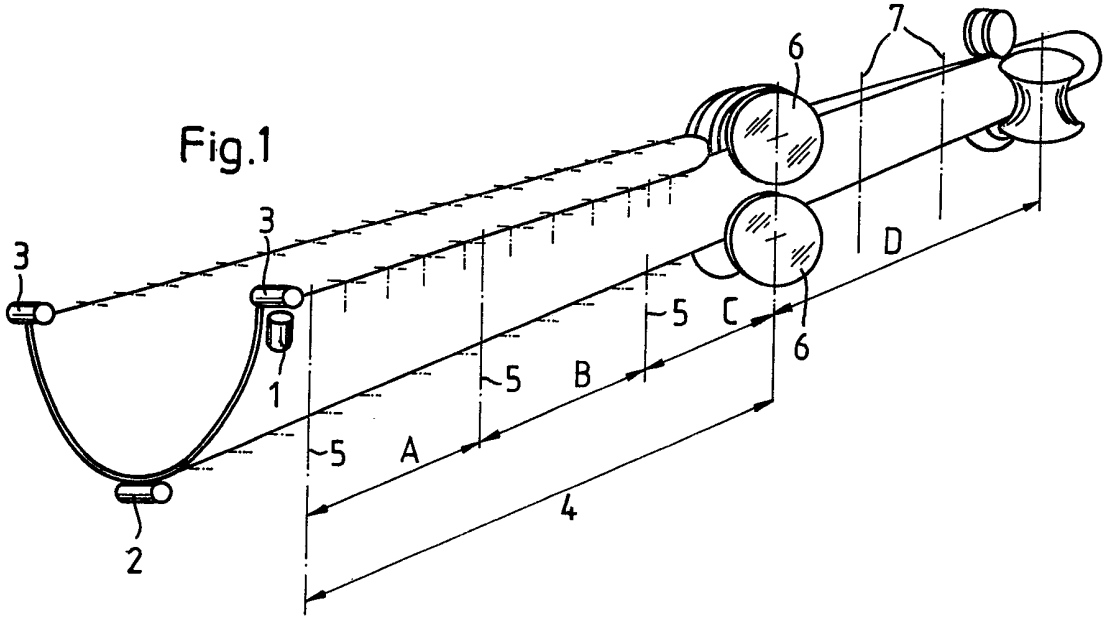


Fig. 2

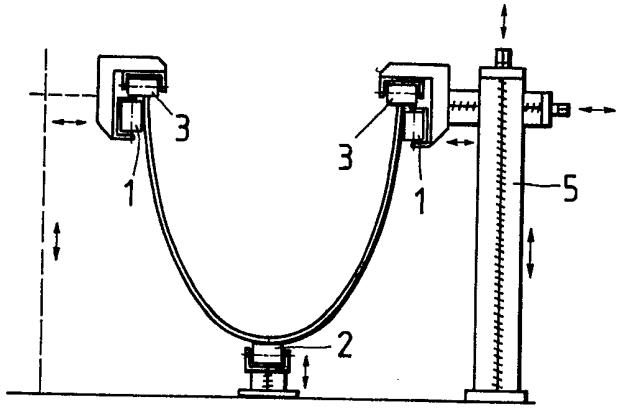
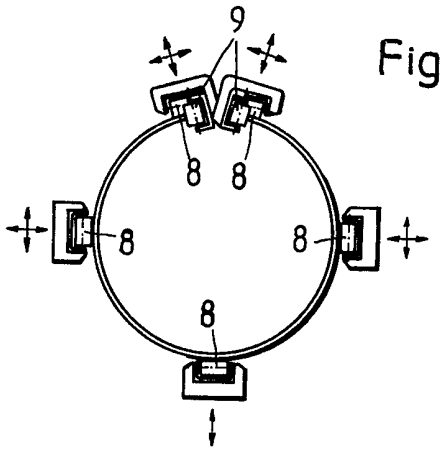


Fig. 3



SPECIFICATION

Method for the continuous forming of butted pipe from flat material

The invention relates to the continuous forming, independent of dimensions, of butted tube from flat material. It is particularly suited to formation methods with a forming length of at least 20 × the diameter of the finished pipe, with or without internal tools.

Formations using internal tools, strip edge bending and a shaping pass are known from for example German Patent Specification Nos: 10 16 675 and 27 16 940. The disadvantage in these and other known methods lies in the conventional long forming train, the poor adjustability and the dependence on dimensions of these systems, which automatically leads to a large expenditure on tool equipment and long periods for conversion.

The present invention seeks to create a method and apparatus for the continuous forming of butted tube from flat material, adaptable to a forming length of at least 20 × the diameter of the finished pipe, with or without internal tools. A method according to the invention includes a first stage forming step which is carried out up to a first blade stand steadily to a pear-shaped cross-section. Normally, the angle of the pear-shaped cross-section is no more than 6° greater than that of the sword butted tube forming.

According to the invention, in a substantially shortened forming train, the initial strip, without strip edge bending, can be formed into a butted pipe without undulations, for the subsequent welding process. In the first forming stage of preferred embodiments of the method an arrangement of rolling support is applied tangentially in the region of the strip edges and the strip edge centre from the outside, and pressure is applied at right-angles to the strip edge, whereby the shaping of the strip takes place without reduction.

The invention also provides apparatus for forming butted pipe from flat material having first and second forming stages of which the first comprises a gravity-roller conveyor divided into three sections, the conveyor having adjustable strip edge guiding and bending rollers, strip edge pressure rollers and strip centre guiding rollers. The strip edge rollers may be either simultaneously or independently adjustable in the individual sections.

The invention offers a high degree of production reliability and economy with modest technical resources. The costs for tools equipment are considerably reduced and the periods for conversion are substatially decreased.

The invention will now be described by way of example and with reference to the accompanying diagrammatic drawings wherein:–

Figure 1 shows a perspective system sketch of the gravity-roller conveyor forming train;

Figure 2 shows a cross-section in the region 5A–C of Fig. 1; and

Figure 3 shows a diagrammatic representation of a butted tube guiding stand.

In Fig. 1, the arrangement and ranges of adjustment of the gravity-roller conveyors are drawn in perspective. The strip edge guiding rollers 1 are pivotably supported and adjustable horizontally and vertically. The edge pressure rollers 3 are situated on the structure of the strip edge guiding roller tracks 1 or are able to be set separately. The strip centre guiding rollers 2 are vertically adjustable. The first forming step is subdivided into three sections 5A, 5B, 5C. In these sections the rollers (1 or 3) are preferably able to be aligned jointly.

The installation length 4 of the forming stage 5A, 5B and 5C amounts to at least 10 × the finished pipe diameter, whereby a large proportion of the vertical forming forces are produced through the moment of resistance of the profile and in this way the edge pressure rollers 3 are substantially relieved.

In Fig. 2 the profile which is to be bent is supported by the rollers 2 and is held or bent by the rollers 1 and 3, which are able to be adjusted horizontally and vertically via an adjustment device 5.

Fig. 3 shows a possible embodiment of a butted tube guiding stand 7 with seven rollers. The guiding rollers 8 arranged on the circumference of the butted tube are set in synchronism to the circumference of the butted tube. The profiled strip holding rollers 9 are likewise horizontally and vertically adjustable to adapt to the respective pass diameter.

CLAIMS

1. A method of continuously forming butted pipe from flat material, including a first stage forming step which is carried out up to a first blade stand steadily to a pear-shaped cross-section.

2. A method according to Claim 1 wherein the angle of the pear-shaped cross-section is no more than 6° greater than that of the sword butted tube forming.

3. A method according to Claim 1 or Claim 2 wherein, in the first forming stage, an arrangement of rolling support is applied tangentially in the region of the strip edges and the strip edge centre from the outside, and pressure is applied at right-angles to the strip edge, whereby the shaping of the strip takes place without reduction.

4. A method according to any preceding Claim wherein deformation to a butted tube takes place on transition from the first to a second forming stage, after which the butted tube is adjustably guided, independent of dimension.

5. A method of continuously forming butted pipe from flat material substantially as described herein with reference to the accom-

panying drawing.

6. Apparatus for forming butted pipe from flat material having first and second forming stages of which the first comprises a gravity-roller conveyor divided into three sections, the conveyor having adjustable strip edge guiding and bending rollers, strip edge pressure rollers adn strip centre guiding rollers.

7. Apparatus according to Claim 6 wherein the strip edge rollers are simultaneously adjustable in the individual sections.

8. Apparatus according to Claim 6 wherein the strip edge pressure rollers are arranged separately from the strip edge guiding rollers.

9. Apparatus according to any of Claims 6 to 8 wherein the second forming stage comprises a first single blade pass stand with two or four surrounding rolls, any subsequent stage comprising a butted tube guiding stand, independent of dimension.

10. Apparatus for forming butted pipe from flat material substantially as described herein with reference to the accompanying drawing.

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