

(12) UK Patent Application (19) GB (11) 2 161 882 A

(43) Application published 22 Jan 1986

(21) Application No 8418489

(22) Date of filing 19 Jul 1984

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(51) INT CL⁴
F16L 21/06

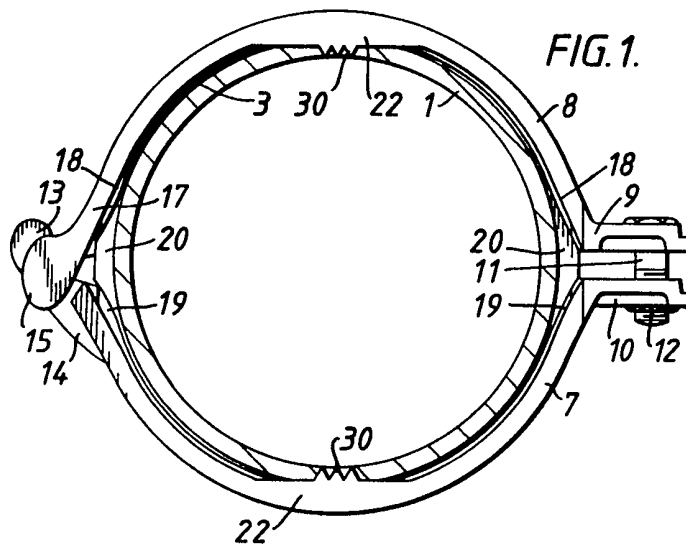
(52) Domestic classification
F2G 24B2 24B
U1S 1885 1886 F2G

(56) Documents cited
GB A 2098297

(58) Field of search
F2G

(54) Pipe couplings

(57) A pipe coupling for forming a joint between adjacent ends of two pipes located in coaxial end-to-end relationship; comprising an annular sealing member 3 located around the two adjacent pipe ends; and two clamp members 7, 8 each of generally semi-cylindrical configuration fitted around the pipe ends and the sealing member, the configuration of the clamping members adjacent their mutually attached side edges departing approximately tangentially at 18, 19 from their generally semi-cylindrical configuration, and the sealing member having a correspondingly thickened section 20 adjacent each of the secured side edges of the clamping members; and the clamping members being at least mainly of uniform internal and external diameters along their axial length. It is stated that local buckling of the gasket is prevented and sealing effect is enhanced as the clamps are tightened, e.g. by securing bolt 11 passing through flanges 9, 10 whilst a pivotal connection 13, 14 is formed at the opposite side of the pipe.



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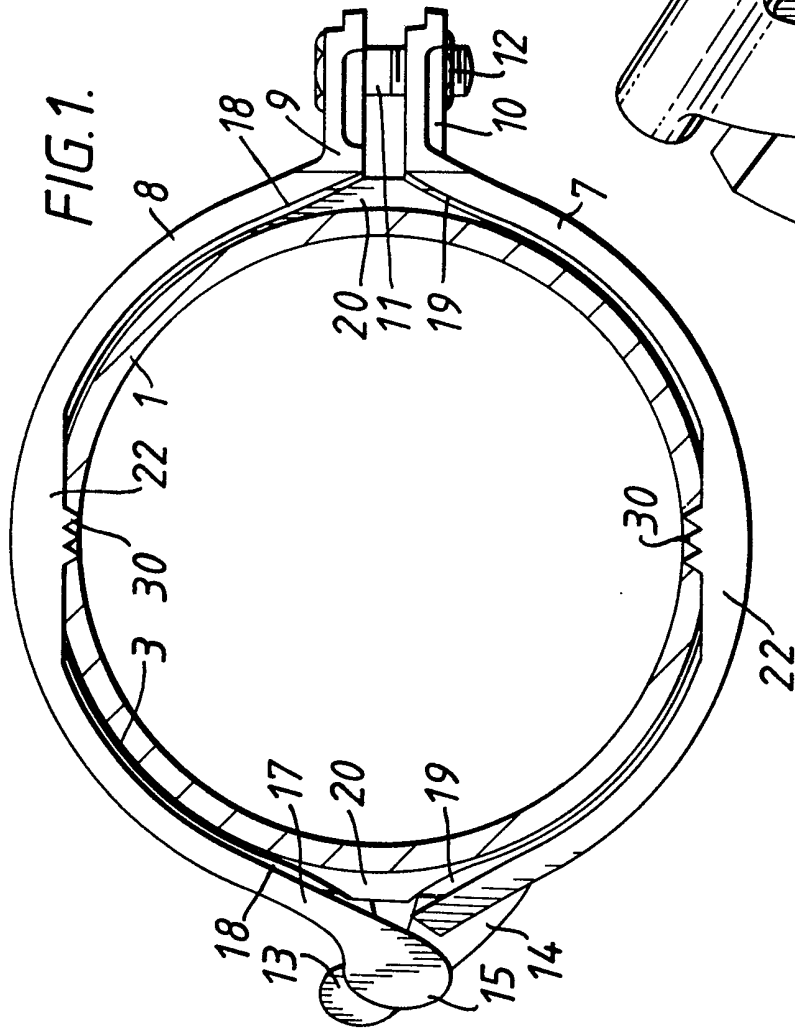
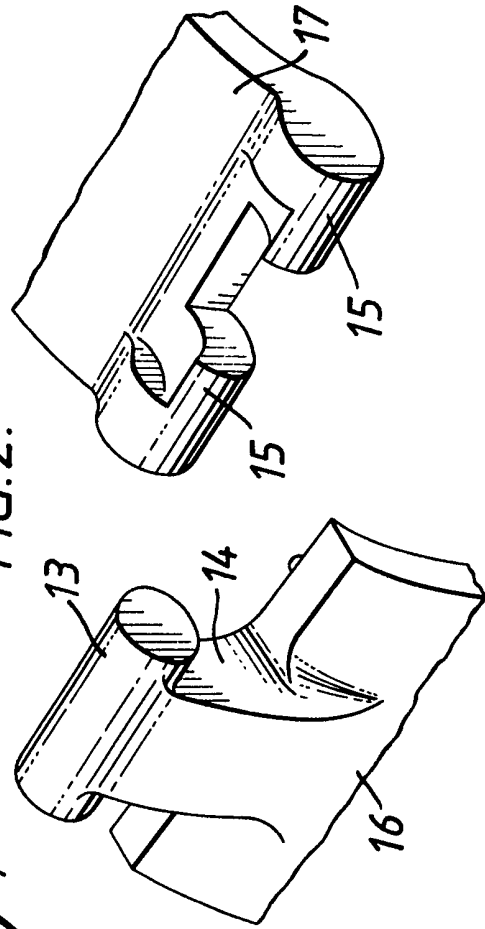


FIG. 2.



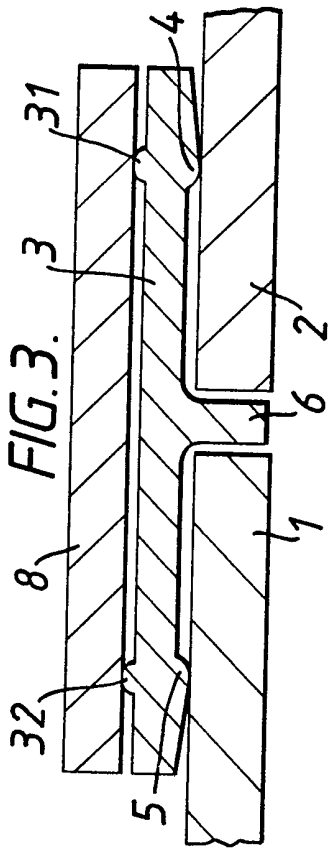


FIG. 4.

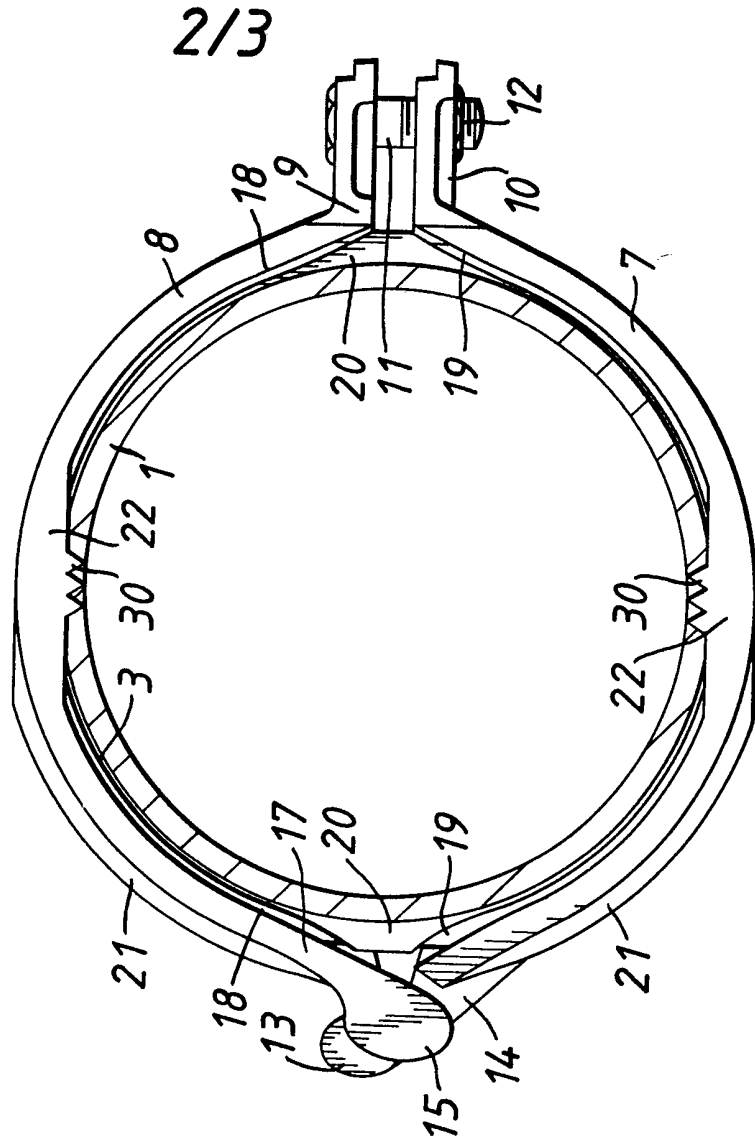
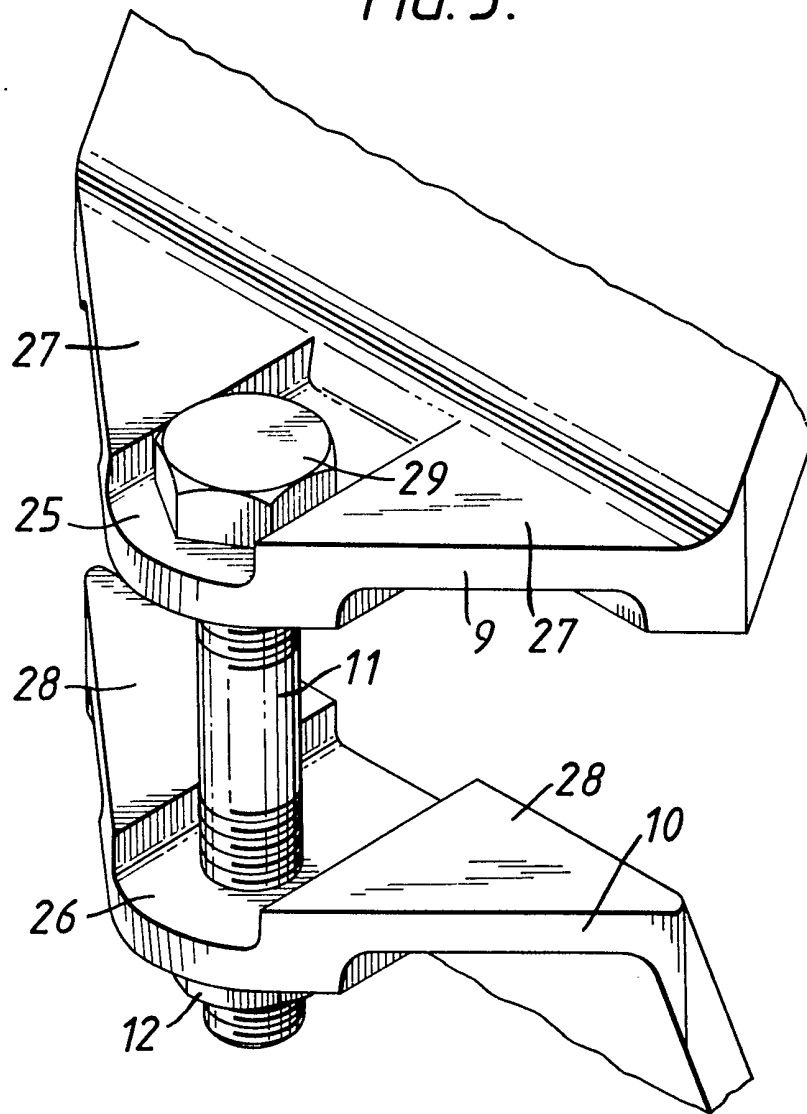


FIG. 5.



SPECIFICATION

Improvements in or relating to pipe couplings

5 This invention relates to pipe couplings and joints formed therewith and more particularly to pipe couplings for joints of the "butt" kind used for jointing in end to end butting relationships a number of pipes to form a continuous pipeline. Such pipelines are commonly used as service pipes such as, for example, soil pipes, drains, water mains or sewers.

10 One common form of such joint comprises the ends of two pipes located in end to end relationship and a coupling comprising an annular resilient sealing member surrounding the abutment between the ends of the two pipes, with a clamp arrangement fitted around the pipes to hold the sealing member in sealing engagement with the pipe ends.

15 It is understood that by the word 'pipes' as used herein is included any pipe-like members such as pipes, tubes and hoses, and hollow pipe fittings used in pipework such as elbows and 'T' junction members. It is an object of the present invention to provide an effective and satisfactory pipe joint of the kind mentioned hereinabove.

20 According to the invention there is provided a pipe coupling adapted for forming a pipe joint between adjacent ends of two pipes located in coaxial end to end relationship; comprising an annular sealing member located around the two adjacent pipe ends; and two clamp members each of generally semi-cylindrical configuration fitted around the pipe ends and the sealing member with their adjacent axially extended side edges secured together; the configuration of the clamping members adjacent their mutually attached side edges departing approximately tangentially from their generally semi-cylindrical configuration, and the sealing member having a correspondingly thickened section adjacent each of the secured side edges of the clamping members; and the clamping members being at least mainly of uniform internal and external diameters along their axial length.

25 In one embodiment of the invention, the clamping members are secured together on one side by adjacent side edges of that side being provided with a pivotal connection, whilst the other pair of adjacent side edges are provided with flanges. Securing means such as nuts and bolts may be arranged to secure between the two flanges. The pivotal connection between the two side edges may be by means of a hinge connection but preferably by means of a hooked engagement arrangement. Thus, for example, one of the associated side edges may be provided with a yoke extending parallel to the side edge from a centrally disposed support, whilst the associated edge of the other clamping member is

provided with one or more hooks arranged to engage over the yoke.

30 The hook and yoke arrangement enables the coupling to be positioned with the hook and yoke engaged on one side of a pipe joint and then closed over the pipe joint before securing by means of the clamping members.

35 The invention provides amongst other things a coupling and joint which significantly overcomes the problems of securing together a joint on juxtaposed pipe members where there is significant tolerance levels between the sizes of the pipe and the associated coupling.

40 Thus, with the kind of coupling herein described, the sealing member of the junction between the two clamping members tends to wedge beneath each flanged butting edge of the clamping members which creates a radial inward reaction thereby preventing buckling of the sealing members. At the same time, due to the increased separation from the pipe ends of the clamping members adjacent their mutually abutting edges, there is considerable resistance to the entrapment of the sealing member between adjacent side edges of the clamping members.

45 In addition, the invention, by providing that the clamping members are at least mainly of uniform internal and external diameters along their axial length, ensures that the maximum flexibility possible is obtained with the coupling and joint. This ensures that the coupling can be utilised with quite substantial tolerance differences between pipes and the clamping members. In practice this is of considerable technical benefit when forming joints in the field since it is found that it is possible to form a joint which is secured and sealed even where dimensions are considerably different between the clamping members and the pipes.

50 Both major surfaces of the clamping members may, in effect, be "flat" in any axial section, but the radially outer surfaces may, particularly with larger size coupling members, be provided with strengthening and stiffening ribs on the side thereof extending from the hinged clamping end. Such ribs may extend partially around the curved configuration of the pipes in a circumferential direction.

55 Small lips may be provided at each side edge of the clamping members at approximately their mid-points between their two clamping ends to assist in the securing of the sealing member within the clamping members when assembled.

60 In order that the invention may be more readily understood, two embodiments thereof will now be described by way of example with reference to the accompanying drawings in which:-

65 *Figure 1* is a front sectional end elevation of a coupling according to the invention and a completed pipe joint formed therewith;

Figure 2 is an exploded scrap isometric view of a pivotal part of the coupling of Fig. 1;

Figure 3 is a sectional side elevation of part 5 of the joint of Fig. 1;

Figure 4 is a front sectional elevation of another form of coupling according to the invention and a joint formed therewith; and

Figure 5 is a scrap isometric view of an interconnected part of the coupling of Fig. 1.

Referring now to Figs. 1 to 3 and 5 it will be seen that the joint comprises two juxtaposed pipe ends 1 and 2 around which is located an annular sealing gasket 3 of resilient material. The sealing gasket may have a generally planar interior surface, or may be provided with ribs 4, 5 and 31, 32 adjacent each axial end thereof for increased sealing effect in use, and may be provided with a central stop 6 to separate the two pipe ends to be joined.

Surrounding the annular sealing gasket are two clamping members 7 and 8 which are generally but not completely of semi-cylindrical configuration.

The adjacent axially extended side edges at one side of each of the clamping members are provided with flanges 9, 10 having bores through which a securing bolt 11 may be passed carrying an appropriate nut 12.

It is to be noted that the flanges 9 and 10 are provided with recesses 25 and 26 and shoulders 27 and 28 to reduce weight whilst at the same time providing a secure and positive location for the head 29 of the bolt 11.

The other axially extending side edges of the clamping members are provided with a pivotal connection arrangement comprising a yoke 13 carried by a support 14 extending from one side edge 16 and a pair of hooks 15 extending from the other side edge 17.

As mentioned above, it is to be observed that although each clamping member is over the majority of its surface of a semi-cylindrical cross section, adjacent each side edge thereof it diverges tangentially as shown at 18 and 19 thereby creating a somewhat wedge-shaped region adjacent the side edges of the clamping members with the external surfaces of the juxtaposed pipes.

The sealing gasket 3 is similarly wedge-shaped adjacent to each of the side edges of the clamping members as shown at 20. Such wedge-shape may be throughout the width of the gasket in the axial direction thereof, or may only be at the axial edges thereof.

Each clamping member is provided on each side mid-way between its edges with a lip 22 to retain the gasket in position. These lips 22 may be provided with teeth 30 which upon jointing, contact the external surface of the juxtaposed pipes thereby ensuring electrical continuity between the pipes.

In accordance with one of the advantages

of this particular form of joint, it is to be noted that the matching tangential portions 18, 19 of the clamping members constrain the gasket 3 and prevent it from being trapped between the side edges of the clamping members 1, 2. Local buckling of the gasket is prevented by the inward reaction of the clamping members and by the locally increased thickness of the gasket in the wedge-shaped portions 20 sealing the areas between the two clamping members and is enhanced by the inclined plane effect of the clamping members 1 and 2 as they are drawn together. This forces the gasket 3 inwards and tends to equalise the gasket compression around the circumference of the joint.

The provision of the clamping members with major surfaces which are, in their axial direction mainly "straight" or "flat", provides, particularly when the clamping members are formed of ductile iron, a very high degree of flexibility of the members on securing together by means of the nut and bolt, the appropriate flange ends 9 and 10. As shown in Fig. 4, with large couplings (of 150 mm internal diameter and greater for example) one or two peripheral ribs 21 may be provided on the portion of the clamping members extending from the yoke 13 and pivotable connection approximately half-way to flanges 18 and 19.

The effect of these ribs is to inhibit slightly flexure over these parts of the clamping members during tightening of the nut and bolt so that flexure is concentrated on the flange side of the clamping members which thereby draw the encircled pipe into the side of the connected clamping members adjacent the yoke and pivotal connection.

We believe that by means of the provision of the joint of the present invention wide tolerance ranges between pipes and clamping members can be accommodated to considerable technical and commercial advantage.

CLAIMS

1. A pipe coupling adapted for forming a pipe joint between adjacent ends of two pipes located in coaxial end to end relationship; comprising an annular sealing member located around the two adjacent pipe ends; and two clamp members each of generally semi-cylindrical configuration fitted around the pipe ends and the sealing member with their adjacent axially extended side edges secured together; the configuration of the clamping members adjacent their mutually attached side edges departing approximately tangentially from their generally semi-cylindrical configuration, and the sealing member having a correspondingly thickened section adjacent each of the secured side edges of the clamping members; and the clamping members being at least mainly of uniform internal and external diameters along their axial length.

2. A pipe coupling according to Claim 1 wherein the clamping members are secured together on one side by adjacent side edges of that side being provided with a pivotal correction, whilst the other pair of adjacent side edges are provided with flanges securable together by nuts and bolts.
3. A pipe coupling according to Claim 2 wherein one of the associated side edges at the pivotally corrected side edges is provided with a yoke extending parallel to the side edge from a support extending therefrom, and the associated edge of the other clamping member is provided with one or more hooks arranged to engage over the yoke.
4. A pipe coupling according to claim 2 or 3 wherein the radially outer surfaces of the clamping members are provided with stiffening ribs on the sides thereof extending from the pivotally connected edges.
5. A pipe coupling according to Claim 4 wherein the ribs extend partially around the clamping members in a circumferential direction.
6. A pipe coupling according to any one of the preceding claims wherein small lips are provided at each side edge of the clamping members at approximately their mid-points between their two clamping ends to assist in the securing of the sealing members within the clamping members when assembled.
7. A pipe coupling substantially as shown in and as hereinbefore described with reference to the accompanying drawings.