

(12) **UK Patent Application** (19) **GB** (11) **2 349 189** (13) **A**

(43) Date of A Publication **25.10.2000**

(21) Application No **0003041.1**

(22) Date of Filing **11.02.2000**

(30) Priority Data

(31) **PP8638**

(32) **12.02.1999**

(33) **AU**

(71) Applicant(s)

**Mining Supplies Australia Pty Ltd
(Incorporated in Australia)
1086 South Road, Edwardstown, South Australia,
Australia**

(72) Inventor(s)

Lyle Gardner

(74) Agent and/or Address for Service

**Bailey, Walsh & Co
5 York Place, LEEDS, LS1 2SD, United Kingdom**

(51) INT CL⁷

F16L 23/032 // F16L 23/08

(52) UK CL (Edition R)

F2G G2C G2F G2J

(56) Documents Cited

EP 0291331 A2

WO 98/43010 A1

US 5380052 A

US 5018768 A

US 3964773 A

(58) Field of Search

UK CL (Edition R) **F2G G2A G2J G2Z G23**

INT CL⁷ **F16L 23/02 23/028 23/032 23/036 23/08 23/10**

Online: **WPI, EPODOC, JAPIO**

(54) Abstract Title

Pipe collar

(57) A pipe collar for attachment to the ends of two pipes 8,9 to form a sealed connection comprises a pair of arcuate sections (15, 20, fig 2). A projection 16 on a first end of one of the arcuate sections can be engaged by a bearing surface (22, fig 4) on a first end of the other arcuate section to hold the first ends together while allowing the arcuate sections to hinge from an open to a closed position. Connection means are provided at the second ends of the arcuate portions to clamp them together, such as a nut 24 and bolt (25, fig 2) or a toggle (35, fig 6). The arcuate sections may comprise a pair of spaced apart annuli that form a U-shaped section.

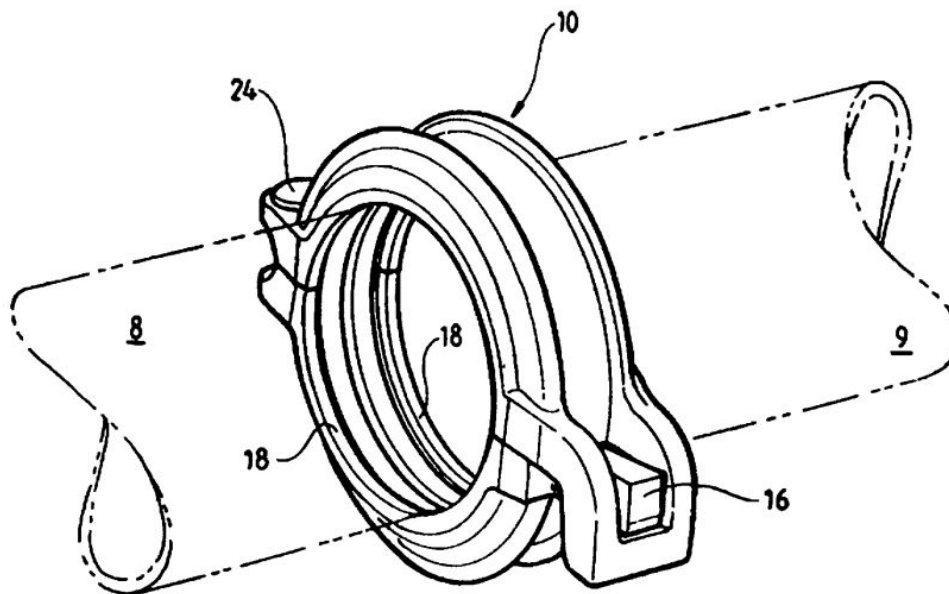
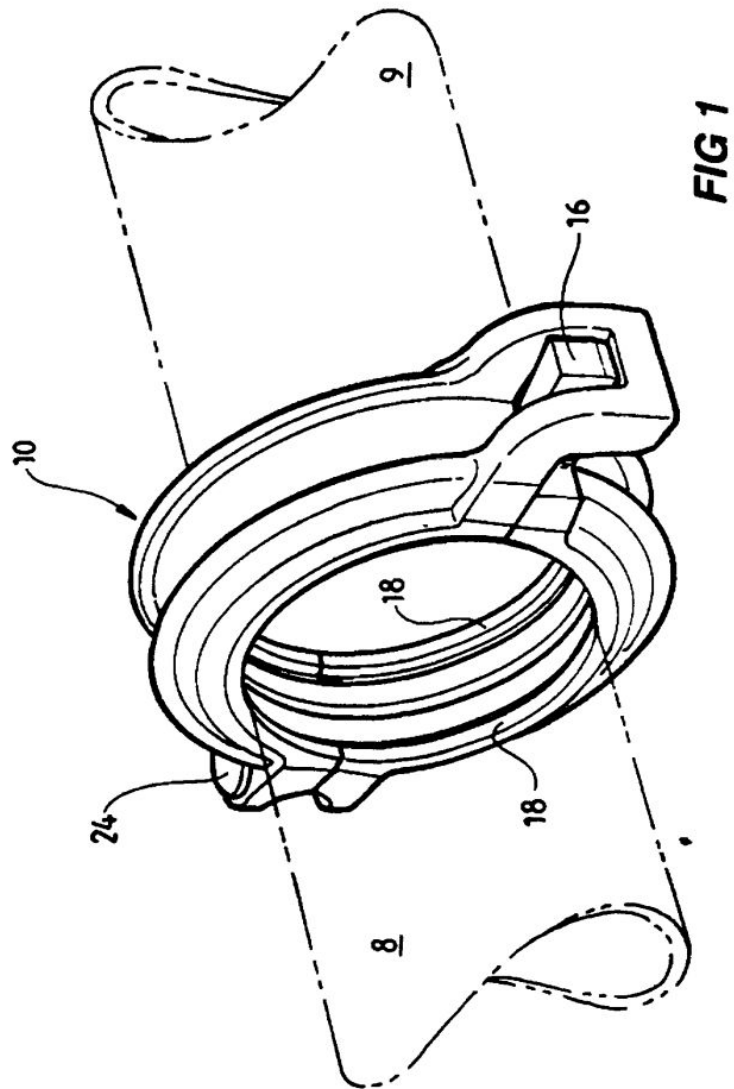


FIG 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

GB 2 349 189 A



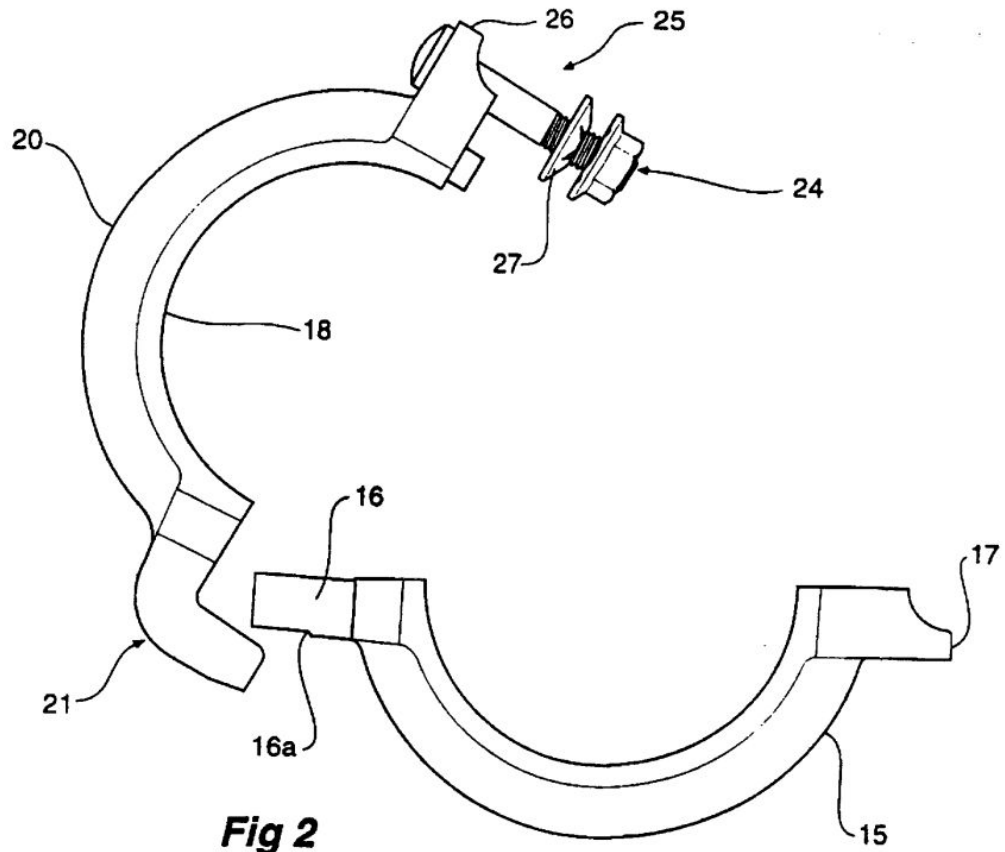


Fig 2

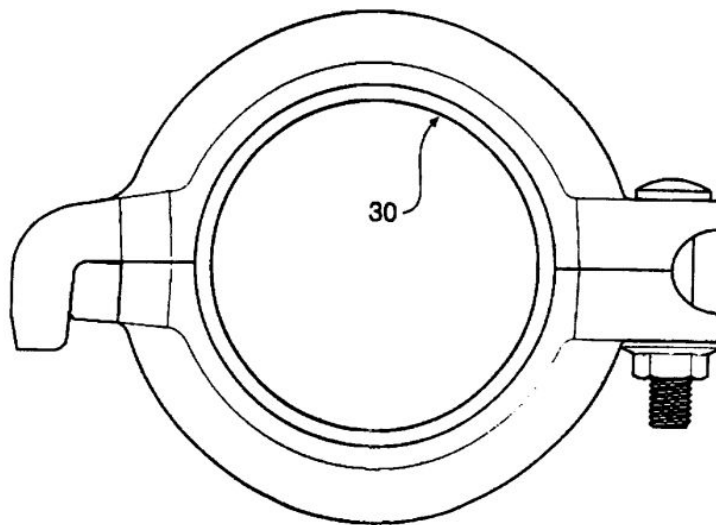


Fig 3

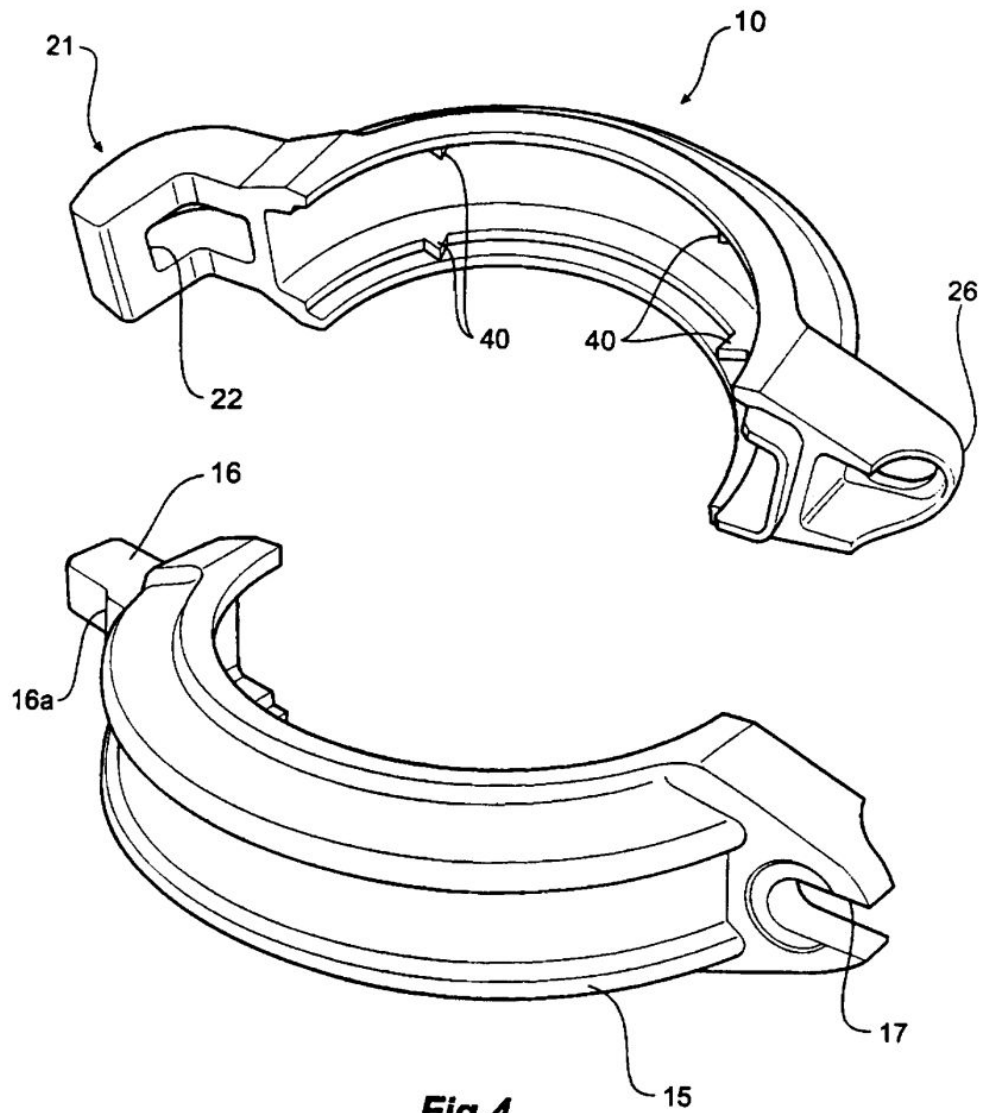
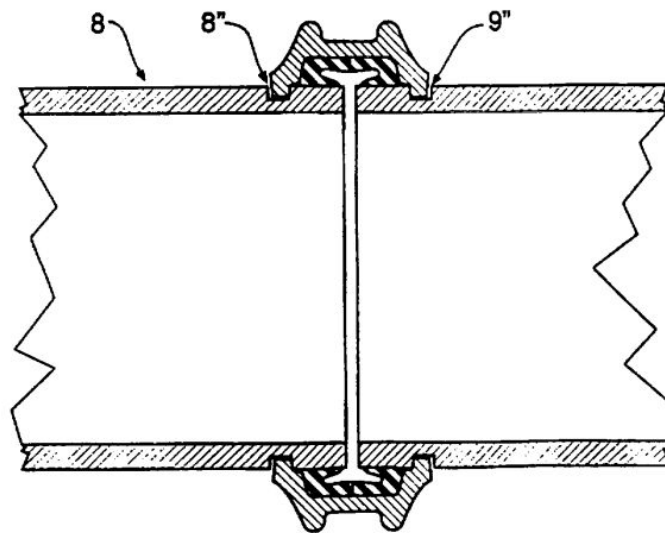
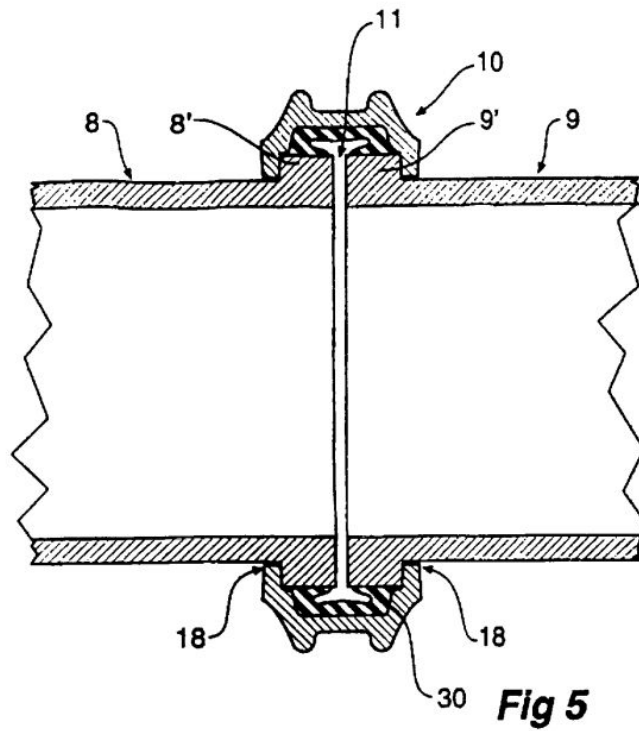


Fig 4



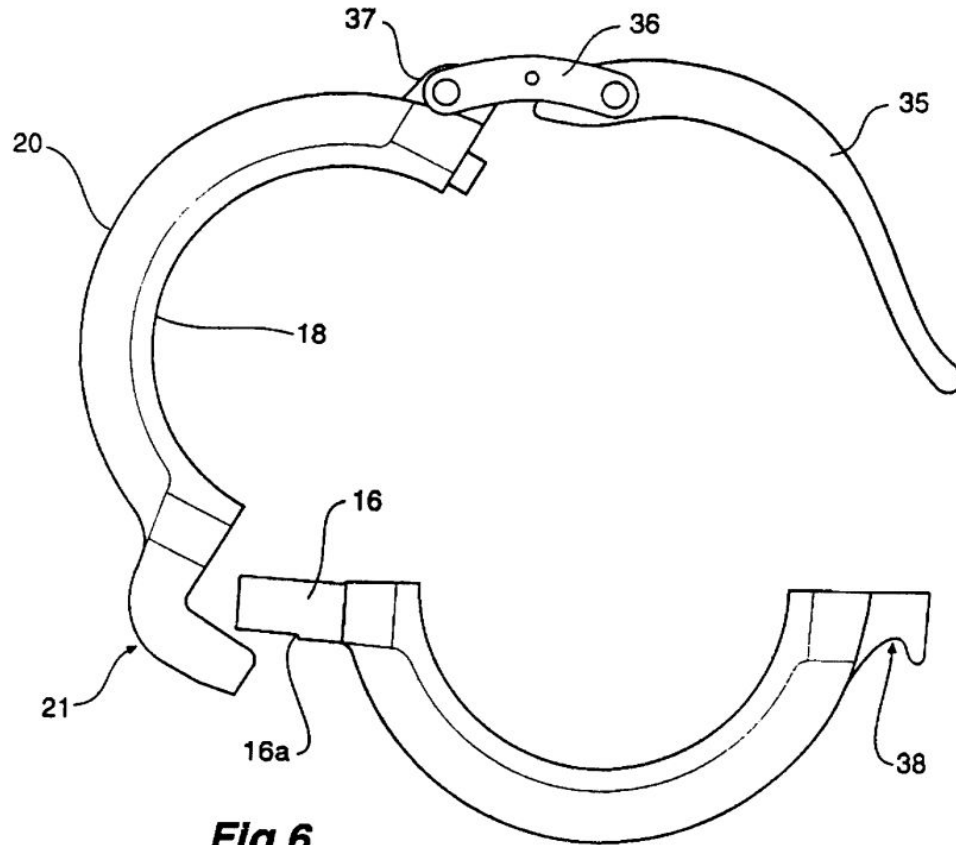


Fig 6

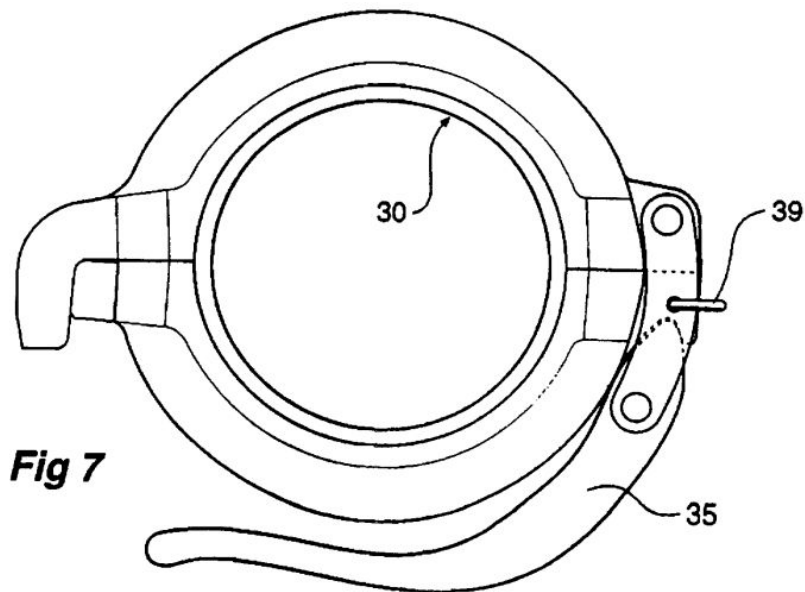


Fig 7

INTERLOCKING PIPE COUPLING

The present invention relates to pipe couplings and in particular to pipe collars of the clamp-on type.

Pipe couplings are required for a broad range of applications and many different designs are known. Non-welded joints for pipes include many clamp-on type joints. These clamp-on joints are used in a wide range of industries including the mining, manufacturing and building services industries.

Two types of clamp-on coupling systems that both mechanically and hydraulically join pipes together are commonly used. These types are shouldered and grooved pipe coupling systems. With the shouldered systems, shoulders are provided on each of the two pipe ends to be joined (either integrally formed or added by welding a ring onto the pipe ends). With the groove system, the pipe ends to be joined are grooved (grooves can be either rolled or machined). In either case the shouldered or grooved pipe ends are held together by a clamp-on coupling.

One form of clamp-on coupling is a two-piece sleeve, split into two semi-circular parts, shaped such that it has a pair of spaced apart annuluses sized to engage the pipe shoulders/grooves to which it is to be applied. The clamp-on coupling typically includes a flexible seal that is retained over the joint between the pipes. The assembled clamp therefore provides both a fluid and a mechanical joint between the two pipes (shouldered or grooved).

The above described couplings are usually held together with bolts and nuts which need to be installed and tightened. In many installations it is difficult for a single operator to install the couplings without dropping the bolts and nuts required.

It is an object of the invention to provide a simple pipe coupling of few parts that is easily assembled quickly by a single person.

Broadly according to the invention, there is provided a pipe collar for attachment to the ends of two adjacent pipes that form a seal and connection between said pipes comprising:

- a pair of arcuate sections that connect to form said pipe collar;
- a projection on a first end of one of said arcuate sections;
- a bearing surface on a first end of the other of said arcuate sections that can be engaged by said projection to hold said first ends together while also allowing said arcuate sections to hinge from an open position where the second ends of each arcuate section are spaced to a closed position where said second ends are moved together; and

- connection means between each said second end that allow said second ends to be secured together and said arcuate sections to be clamped to said ends of said pipes.

Preferably said pipe collar is adapted to retain a seal over said join between said two pipes to thereby provide an assembled collar that both mechanically joins said two pipes and provides a fluid-tight seal between said two pipes.

The adaptation of said arcuate sections to form a said second connection means may be a pair of tabs, one extending radially from each of said halves, said tabs being adapted to receive a bolt to clamp them together. Alternatively, a quick release clamping means, such as a toggle, may be mounted on one of said halves, with the other of said halves having a projection engageable by said quick release clamping means.

Specific embodiments of the invention will now be described in some further detail with reference to and as illustrated by the accompanying Figures. These embodiments are illustrated and are not meant to be restrictive of the scope of the invention.

The embodiments are illustrated in the accompanying representations in which:

Fig. 1 shows a perspective view of a pipe coupling collar installed over a pipe joint;

Fig. 2 shows a side view of a partially assembled pipe coupling collar for use with pipes having shouldered ends;

Fig. 3 shows a side view of an assembled pipe coupling collar for use with pipes having shouldered ends;

Fig. 4 shows a perspective view of the two halves of the pipe collar shown in Figs. 2 and 3 prior to assembly.

Fig. 5 shows a longitudinal cross-sectional view of a pipe coupling collar installed over the shouldered ends of two pipes.

Fig. 6 shows a side view of a partially assembled pipe coupling collar for use with pipes having grooved ends;

Fig. 7 shows a side view of an assembled pipe coupling collar for use with pipes having grooved ends;

Fig. 8 shows a longitudinal cross-sectional view of a pipe coupling collar installed over the grooved ends of two pipes.

In a first embodiment of the invention shown in Figs. 1 to 4, there is provided a pipe coupling in the form of a pipe collar 10 for coaxially joining two pipes 8 and 9 comprising two semi-circular arcuate halves 15 and 20. When assembled, the pipe coupling 10 forms a sleeve over the join 11 between pipe 8 and pipe 9. As shown in Figs. 2 and 3, the arcuate halves 15 and 20 have interlocking projections 16 and 21 which form a connection means and the halves 15 and 20 have tabs 17 and 26 which are adapted to

receive a bolt and nut combination 24 and 25. Optionally, bolt 25 may be held in position by a retaining means such as a washer 27 (or a rubber ring).

The arcuate half 15 has a finger-like projection 16 which extends radially from one of its ends as shown in Figs. 1 and 2. In Fig. 4 shoulder 16a on finger-like projection 16 is shown. The other half 20 has a bearing surface (in the form of an edge 22) on the end of arm 21 adapted to receive the finger-like radial projection 16 to form an interlocking hinge. In use, this edge 22 bears against the radially extending projection 16 within shoulder 16a thereby providing a hinge joint having an axis parallel to the pipes' common axes.

A seal 30 shown in Figs. 3 and 5 is contained within the assembled pipe coupling 10. When installed over a joint between two pipes as shown in Fig. 5, seal 30 provides a flexible fluid seal between two pipes 8 and 9.

While the preferred embodiment of the invention has a single finger-like projection 16, other embodiments of the invention may have a plurality of such projections.

Assembly of pipe coupling collar 10 over two coaxial pipe ends to provide a fluid and a mechanical seal between them will now be described. Pipes 8 and 9 having shoulders 8' and 9' are first aligned coaxially with their ends abutting as shown in Fig. 1. The two arcuate halves 15 and 20 are interlocked by insertion of radial projection (finger) 16 through the gap between arms 21 and edge 22, until shoulder 16a abuts edge 22, to form a partially assembled pipe coupling 10 as shown in Fig. 2. The now partially assembled pipe coupling 10 is placed over the two adjacent pipe shoulders 8' and 9' as shown in Fig. 1. Bolt 25 projects through flange 26 and flange

17 and nut 24 can now be tightened to secure the pipe coupling in place. An alternative way of assembling pipe coupling 10 over pipes 8 and 9 is to first position arcuate half 20 over seal 30 and shoulders 8' and 9' and then to bring arcuate half 15 into interlocking engagement with arcuate half 20 by insertion of projection 16 into the gap between arms 21 and edge 22. Once this has been done, arcuate half 15 can be pivoted about its radial projection 16, shoulder 16a bearing against edge 22 until flange 17 is positioned adjacent flange 26 thereby allowing bolt 25 to secure flanges 17 and 26 together using nut 24.

The assembled pipe coupling is shown in cross-section in Fig. 5. From this Figure it can be seen that the pipe coupling 10 provides a fluid seal by enclosing seal 30 over the join between pipes 8 and 9, and a mechanical seal by the positioning of annuluses 18 over shoulders 8' and 9' to thereby prevent substantial axial movement of pipes 8 and 9 away from each other. Arcuate halves 15 and 20 are sized so that their respective pairs of annulus 18 and 23 are sufficiently axially spaced to allow pipes 8 and 9 a small degree of axial movement within the assembled pipe coupling collar 10 as shown in Figs. 1 and 4. This small degree of movement allows for some deflection at the joints which assist in pipe laying where levels vary or where settlement occurs. This degree of axial freedom also allows the couplings to accept some linear expansion and contraction thereby relieving limited pipe line stresses without costly expansion joints.

Where a locking action is required (and where the joint is not required to allow relative movement of the pipes being joined), gripping lugs can be cast into the coupling halves. Such lugs 40 are shown in Fig. 4. These gripping lugs 40 fill out the engagement areas within the grooves or shoulders in the pipes thereby providing a locking action and eliminating flexing at the joint. By having

pointed ends, the gripping lugs 40 grip the pipes and thereby prevent their relative rotation.

The pipe couplings collars 10 described above are easily assembled by one person. The pipe couplings 10 are also easily removed and can be re-used.

In an alternative embodiment of the invention the pipe coupling collar 10 has annulus pairs 18 and 23 of a smaller diameter to engage grooved pipes. In this embodiment grooves 8" and 9" are provided close to the ends of pipes 8 and 9 respectively as shown most clearly in the sectional view shown in Fig. 8. The grooves 8" and 9" need not be as deep as comparable threaded pipe and therefore the pressure rating of the pipe is largely retained.

The bolted connection, which provides the second connection means between the two arcuate halves 15 and 20, may be replaced by a quick release type clamping means such as a toggle coupling as shown in Figs. 5 and 6. The quick-release toggle replaces bolt 25, nut 24 and their respective flanges 26 and 17, with lever arm 35, pivot arm 36, mounting up-stand 37 and recess 38. The long lever arm 35 allows a large clamping force to be generated by hand and the over-centre geometry of the pivot and recess positioning provides a positive locking position as shown in Fig. 6. A safety pin 39 is provided to ensure that the toggle is not inadvertently released.

The above-described pipe couplings may be made in a variety of sizes being particularly suitable for pipes of nominal diameters 1 inch to 14 inches.

While the present invention has been described in terms of preferred embodiments in order to facilitate better understanding of

the invention, it should be appreciated that various modifications can be made without departing from the principles of the invention. Therefore the invention should be understood to include all such modifications within its scope.

CLAIMS

1. a pipe collar for attachment to the ends of two adjacent pipes that forms a seal and connection between said pipes comprising:
 - a pair of arcuate sections that connect to form said pipe collar;
 - a projection on a first end of one of said arcuate sections;
 - a bearing surface on a first end of the other of said arcuate sections that can be engaged by said projection to hold said first ends together while also allowing said arcuate sections to hinge from an open position where the second ends of each arcuate section are spaced to a closed position where said second ends are moved together; and
 - connection means between each said second end that allow said second ends to be secured together and said arcuate sections to be clamped to said ends of said pipes.
2. A pipe collar according to claim 1 wherein said arcuate sections each comprise a pair of spaced apart half annuli, joined to form a U-shaped seal receiving section, when assembled, able to retain a seal over said join between said two pipes and thereby provide a fluid-tight seal between said two pipes.
3. a pipe collar according to either of claims 1 or 2 wherein said bearing surface is an edge and said projection has a shoulder that, in use, abuts said edge to provide a hinge joint.
4. a pipe collar according to either of claims 1, 2 or 3 wherein said other ends each have a radially extending tab, said tabs being adapted to receive a bolt to clamp them together and thereby form said second connection means.
5. A pipe collar, separable into two semi-circular arcuate halves, for coaxially joining two pipes, comprising:

a first half having a first pair of spaced apart half annuli joined so as to form a U-shaped seal receiving section, terminating at a first end with a radially extending finger and terminating at a second end with a first bolt receiving tab; and

a second half, having a second pair of spaced apart half annuli joined so as to form a U-shaped seal receiving section, terminating at a first end with a radially extending member having a bearing surface adapted to bear against said finger and terminating in a second end with a second bolt receiving tab;

wherein, in use, said finger interlocks with said surface to form a hinge joint.

6. A pipe collar according to claim 5 wherein said bearing surface is an edge and said finger has a shoulder that, in use, abuts said edge to provide an axis location for said hinge joint, said axis being parallel to said pipes' common axes.

7. A pipe collar according to either of claims 5 or 6 further comprising a means for aligning said first and second halves adjacent said bolt receiving projections.

8. A pipe collar according to claim 7 wherein said means comprises a co-operable projection and projection receiving recess pair.

9. A pipe collar substantially as hereinbefore described with reference to and as illustrated in the accompanying Figures 1 to 4.

10. A pipe collar substantially as hereinbefore described with reference to and as illustrated in the accompanying Figures 6 and 7.



Application No: GB 0003041.1
Claims searched: 1 to 10

Examiner: Gareth Prothero
Date of search: 14 August 2000

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): F2G (G2A, G2J, G2Z, G23)

Int Cl (Ed.7): F16L 23/02, 23/028, 23/032, 23/036, 23/08, 23/10

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 0291331 A2 (DORBYL LIGHT) see especially fig 1.	1 to 6
X	WO 98/43010 A1 (ETABLISSEMENTS CAILLAU) see abstract and figs.	1 to 6
X	US 5380052 A (HENDRICKSON) see whole document.	1 to 6
X	US 5018768 A (PALATCHY) see especially figs 1 to 3.	1 to 6
X	US 3964773 A (STADE et al.) see figs.	1 to 6

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

An Executive Agency of the Department of Trade and Industry