PIPE COUPLING

The present invention relates to pipe couplings, and in particular to a pipe coupling having a tensioning system for applying a radial force to pipes, and for tightening the coupling around the outer surface of the pipes.

A wide variety of pipe couplings for connecting together two pipe ends in a fluid tight manner are known. In order to enable the coupling to function for slightly undersized and slightly oversized pipes, a longitudinal gap between free ends of the casing of the pipe coupling is required.

One known example of a pipe coupling for connecting together two plain-ended pipes in a fluid-tight manner comprises a tubular casing formed with a longitudinal gap, a sealing gasket of resilient flexible material typically of rubber or synthetic rubber, arranged within the casing, and tensioning means for reducing the width of the longitudinal gap so as to tighten the casing around the gasket. In use, the sealing gasket is placed around the adjacent pipe ends and the tensioning means are tightened to clamp the gasket against the outer surfaces of the pipe ends to form a fluid-tight seal.

In use, the fluid pressure in a pipeline tends to deform the casing, and in particular deforms the casing in the region of the free ends on either side of the longitudinal gap. The deformation of the casing reduces the forces acting on the gasket in the region of the free ends. The reduction in forces acting on the gasket decreases the maximum rated fluid pressure for the pipe coupling. In known pipe couplings, additional reinforcing material, additional welding and large and relatively heavy trunnion bar mechanisms have been used to counteract the deformation of the casing and the resultant reduction in forces acting on the sealing gasket.

It would therefore be desirable to provide a novel pipe coupling having improved resistance to deformation in the region of the free ends of the casing, and thus improved resistance to fluid pressure. It would be particularly desirable to provide such a pipe coupling that is lighter, smaller and less expensive to manufacture than pipe couplings having equivalent fluid pressure ratings.

~~According to the present invention there is~~ According to the present invention, there is provided a pipe coupling comprising: a tubular casing, having a longitudinal gap between a first free end and a second free end, for fitting around a pipe; a tensioning system for tightening the casing around the outer surface of the pipe, the system comprising: a first pivoting member, extending radially from the first free end of the tubular casing; a second pivoting member, extending radially from the second free end of the tubular casing, having a projection located at a distal end of the second pivoting member and extending towards the first pivoting member; a bridge plate located inside the casing for spanning the longitudinal gap between the first free end and the second free end of the tubular casing; at least one fastener; and means for restraining

radially the projection of the second pivoting member relative to the first pivoting member, comprising: a slot and key arrangement, wherein the first pivoting member is provided with a slot having a main axis along the longitudinal direction and the projection of the second pivoting member having a key adapted to engage with the slot of the first pivoting member to substantially prevent relative radial movement between the first pivoting member and the second pivoting member, wherein, upon tightening the or each fastener, the first pivoting member and the second pivoting member pivot about the projection, and the first pivoting member and the second pivoting member resiliently bend about the first free end of the tubular casing and the second free end of the tubular casing respectively, such that each proximal end of the first pivoting member and the second pivoting member are drawn together to both tighten the casing around the outer surface of the pipe and to apply a radial force to the bridge plate.

There is also provided a pipe coupling comprising: a tubular casing, having a longitudinal gap between a first free end and a second free end, for fitting around a pipe; and a tensioning system for tightening the casing around the outer surface of the pipe, the system comprising: a first pivoting member, extending radially from the first free end of the tubular casing; a second pivoting member, extending radially from the second free end of the tubular casing, having a projection located at a distal end of the second pivoting member and extending towards the first pivoting member; a bridge plate located inside the casing for spanning the longitudinal gap between the first free end and the second free end of the tubular casing; at least one fastener; and means for restraining

second pivoting member. The projection from the first pivoting member is preferably integrally formed with the first pivoting member.

~~The~~ As mentioned in the above aspect, the restraining means ~~may further comprise~~comprises a slot and key arrangement. The first pivoting member is preferably provided with a slot having a main axis along the longitudinal direction of the pipe coupling and the projection of the second pivoting member has a key adapted to engage with the slot of the first pivoting member to substantially prevent relative radial movement between the first pivoting member and the second pivoting member. It is of course to be understood that the second pivoting member may be provided with the slot, and the first pivoting member provided with the key.

At least one of the first pivoting member and the second pivoting member may be convex, such that upon tightening the or each fastener the convex pivoting member is straightened. In one embodiment, both the first pivoting member and the second pivoting member are convex. The degree of curvature of the convex pivoting members is such that sufficient tension for coupling the pipes together has been applied to the fasteners when the pivoting members are substantially straight. Thus, a visual cue is provided as to when the pipe coupling is correctly installed. In this way, the present invention enables power tools, such as battery-operated screwdrivers, to be used to tighten the fasteners, and thus the time taken to install the pipe coupling may be reduced as compared to known pipe couplings. Furthermore, the need for torque wrenches to ensure sufficient torque has been applied to the fasteners is eliminated.

As used herein, the term 'convex' is used to describe the curvature of the pivoting members, wherein the convex form of the pivoting member means that each pivoting member curves away from the longitudinal gap between the free ends of the tubular casing.

The casing may be of generally U-shaped cross-section having a web portion with flanges projecting radially inwardly from the axial ends of the web portion to define an annular channel.

The pipe coupling may further comprise a tubular sealing gasket located inside the casing. In use of the pipe coupling, as the casing is tightened around the pipe ends, the casing presses the sealing gasket against the outer surfaces of the pipe ends to form seals. The first pivoting member and the second pivoting member press against the bridge plate, which in turn presses the sealing gasket against the outer surfaces of the pipe ends to form seals in the region of the longitudinal gap between the two free ends of the casing. Suitable sealing gaskets for use in a pipe coupling of this construction will be known to the skilled person, and may be made of resilient flexible material typically of rubber or synthetic rubber, or any other suitable material.

The first pivoting member and the second pivoting member are preferably plates extending along the longitudinal direction of the casing. The first pivoting member and the