

The present invention relates to the locking of pipe joints. It is applied in particular to the locking of so-called automatic joints, that is, ones in which a male end is introduced into a socket while radially compressing packing material accommodated in the latter. In this case, sealing is produced independently of the locking, which is intended only to prevent uncoupling of the joints when the piping is conveying fluids under high pressure.

Nevertheless, the invention can also be applied to the locking of so-called mechanical joints, that is, ones in which sealing is produced simultaneously with locking by axial compression of packing material.

There is known, from the document DE-U-8311636, a locked joint between a pipe with a male end and a pipe with a socket, where a locking counter-flange is clamped on the socket by means of wedges inserted between the said counter-flange and the socket, thus functioning as packing. The disadvantage of this system is that it requires precise adjustment of the internal contours of the counter-flange to the external contours of the wedges and that it makes positioning of these wedges difficult, the more so when they have to be mounted in an inconvenient environment, such as for example at the bottom of a ditch of restricted dimensions.

There is also known, from the document FR-A-2540223, a locked joint according to which the locking device is applied only to pipes of large diameter and is in the form of a plurality of annular locking segments which bear directly behind the socket and are connected by means of bolts to a movable flange surrounding the male end.

The object of the invention is to provide a reliable and economic technique of locking pipe joints.

For this purpose, the subject of the present invention is a locked joint between pipe sections, of the type comprising an attached collar intended to be placed on an end bulge having a shape conjugate with one of said sections and to serve as support to a locking device of the joint, characterized in that the attached collar has on at least one part of its periphery an

L-shaped meridian half section, the concavity of the L facing radially inwards, and has on its outer convex side an inclined support surface on which there come to bear, in the locked position, support members of the locking device.

According to other characteristics of the invention:

- the branches of the L are oriented respectively radially and parallel to the axis of the collar;
- the inclined support surface extends towards the axis of the collar as far as opposite the radial branch of the L;
- the radial branch of the L is terminated by an internal cylindrical surface;
- the internal shape of the collar is conjugate with the external shape of the end bulge of the pipe section on which the collar is placed;

Said end bulge can be notably a socket and the unit itself can further comprise packing material adapted to be arranged in the socket, and a male end of a second pipe section adapted to be inserted into the socket while radially compressing the packing material, this male end carrying support means adapted to cooperate with the locking device.

In an embodiment of such a joint, the support means comprise a ring threaded onto the male end and a welded seam arranged on this male end, and/or the packing material is of the type having locking inserts.

Examples of embodiments of the invention will now be described with respect to the accompanying drawings, in which:

Figure 1 is a half view, in longitudinal section, of a joint for piping according to the invention;

Figure 2 is a plan view of the collar of this joint, in the disconnected state;

Figure 3 is a front view of a variant of this collar; and

Figure 4 shows another variant of the collar according to the invention.

Figure 1 shows an automatic locked joint made between a socket 1 constituting an end bulge of a first pipe section A, which is a pipe union or a pipe for example, and the male end 2

having an external cylindrical surface of a second pipe section B constituted by a pipe. The sections A and B are cast, for example, and produced by centrifuging. The joint further comprises packing material 3 with radial compression, an attached collar 4, a locking device 5, and means 6 by which the device 5 bear against the male end.

Internally, the socket 1 comprises a housing 7 for the packing material 3 and is delimited at its end by an internal radial wall 8. The latter defines an inlet opening 9 of the socket which allows the male end 2 to penetrate with perceptible radial play into the socket to radially compress the packing material 3 and thus ensure sealing of the joint, as shown in Figure 1. The wall 8 also defines a flat end segment 10 of the socket.

Externally, apart from its end segment 10, the socket has in succession a cylindrical surface 11 of large diameter, a radial surface 12, a cylindrical surface 13 of small diameter, a sloping portion 14 towards the axis of the joint, and a curved surface 15 having a progressively decreasing diameter.

The collar 4 is a split ring, of which the meridian half section is constant, and can be seen in Figure 1. This half section has a general L shape, with a branch 16 parallel to the axis of the joint and a radial branch 17. Thus this collar internally defines a cylindrical surface 18 of large diameter, and a radial surface 19 and a cylindrical surface 20 of small diameter, the whole of these three surfaces forming an S shape conjugate with that formed by the surfaces 11 to 13 of the socket. The collar is delimited towards the front by a flat end segment 21 connecting with the surface 18, and externally by a cylindrical surface 22 leaving the surface 21, and by a frustoconical rear surface 23 extending from the surface 22 to the surface 20. The connections between the surfaces 18 and 21, 21 and 22, 22 and 23, 23 and 20 are rounded.

As shown in Figure 2, an axial pin 24 is attached to each end of the collar 4, on its rear surface. When the collar has been placed over the socket 1 in the manner of a clip, these two pins are joined by a tie such as an elastic band (not illustrated)

The locking device 5 comprises an annular flange 25, in one or more parts, having a spherical internal surface 26, and a series of support members 27, each passing through an axial opening 28 provided on the periphery of this flange. Each member 27 comprises a rod, one end of which has an eccentric enlargement 29 and the other end of which has a thread 30 on which is screwed a nut (not illustrated). The flange 25 has a flat end segment 31 on the side of the socket 1.

The support means 6 comprise on the one hand a circular welded seam 32, in one or more parts, arranged on the male end 2 and located on the outside of the socket when the joint is assembled, and on the other hand comprise a split ring 33 threaded onto the male end. On the side of the socket this ring has a flat support surface 34 on the seam 32, and on the other side has a spherical surface 35 conjugate with the surface 26 of the flange 25.

To obtain the locked joint of Figure 1, the device 5 and the ring 33 are first threaded onto the male end, beyond the welded seam 32, and the collar 4 is placed on the socket, this action positioning the surface 21 of the collar behind the end segment 10 of the socket. Next, the male end is inserted into the socket, in such a way that the two pipe sections are positioned definitively.

In order to lock the joint thus obtained, the members 27 are threaded into the openings 28 after being rotated 90° relative to the position shown in Figure 1, allowing the enlargement 29 to clear the collar 4.

Then the members 27 are turned, which brings them into their locking position as illustrated. Next, the nuts are screwed onto the threads 30, bringing the inclined support surface 36 of each enlargement 29 into contact with the conjugate surface 23 of the collar along the entire axial length of the latter, the surface 26 of the flange 25 simultaneously coming to bear against the surface 35, and the surface 34 of the ring 33 further coming to bear against the welded seam 32. This ensures locking of the joint and prevents its being uncoupled under the effect of the axial forces which develop when the piping is conveying a

pressurized fluid.

There are a number of advantages to using the attached collar 4:

- the socket 1 is less bulky than if it had itself to bear the support surface 23, reducing the problems of shrinkage in cast iron at the time of centrifuging;

- owing to the shape of the collar described above, the locking force is efficiently transmitted to the socket without risk of unbalancing the collar;

- the most suitable material can be selected for the collar, for example cast iron, steel or even plastics material, for moderate pressure, thus ensuring electrical insulation of the successive sections of the piping;

- identical pipe sections A can be manufactured to constitute the joints intended to be locked and those not intended to be locked. Considerable economy in casting the production unit is thus achieved.

As a variant, as shown in Figure 3, the collar 4A can be constituted by two halves, each fitted with a pin 24 at each end, these pins being connected two by two, by an elastic band for example, when the collar is in position on the socket. This variant is particularly suited to pipes of small diameter, those under 200 mm for example.

As another variant (Figure 4), the collar can be constituted by a certain number of sectors 4B connected by flexible elements such as rubber connectors 4C.

The packing material 3 can be of the type having locking inserts, such as described in FR-A-2 621 376 in the name of the Applicant.

CLAIMS:

1. Locked joint between pipe sections (A; B), of the type comprising an attached collar (4; 4A; 4B, 4C) intended to be placed on an end bulge (1) having a shape conjugate with one (A) of said sections and to serve as support to a locking device (5) of the joint, characterized in that the attached collar (4; 4A; 4B, 4C) has on at least one part of its periphery an L-shaped meridian half section, the concavity of the L facing radially inwards, and has on its outer convex side an inclined support surface (23) on which there come to bear, in the locked position, support members (27) of the locking device (5).
2. Locked joint according to Claim 1, characterized in that the branches (16, 17) of the L of the collar (4; 4A; 4B, 4C) are oriented respectively radially and parallel to the axis of the collar.
3. Locked joint according to Claim 3, characterized in that the inclined support surface (23) of the collar (4; 4A; 4B, 4C) extends towards the axis of the latter as far as opposite the radial branch (17) of the L.
4. Locked joint according to Claim 2 or 3, characterized in that the radial branch (17) of the L of the collar (4; 4A; 4B, 4C) is terminated by an internal cylindrical surface (20).
5. Locked joint according to any one of Claims 1 to 4, characterized in that the internal shape (18 to 20) of the collar (4; 4A; 4B) is conjugate with the external shape (11 to 13) of the end bulge (1) of the pipe section (A) on which said collar is placed.
6. Locked joint according to any one of Claims 1 to 5, in which said end bulge (1) is a socket, and further comprising packing material (3) adapted to be arranged in the socket, and a male end (2) of a second pipe section (B) adapted to be inserted into the



socket while radially compressing the packing material, this male end carrying support means (6) adapted to cooperate with the locking device (5).

7. Locked joint according to Claim 6, characterized in that the support means (6) comprise a ring (33) threaded onto the male end (2) and a welded seam (32) arranged on this male end.

8. Locked joint according to Claim 6 or 7, characterized in that the packing material is of the type having locking inserts.