The tubular element may be a drill pipe or sub.

According to a third aspect of the invention we provide a valve member, collar and nut assembly comprising a rod having a longitudinal axis, a support part, a resilient biasing element, and a nut, the nut being mounted on a screw thread around the rod, the assembly further comprising a locking collar which is mounted around the rod such that the biasing element extends between the support part and the locking collar, characterized by the locking collar having a first locking formation which engages with a corresponding locking formation of the rod to substantially prevent rotation of the locking collar around the rod, the biasing element pushing the locking collar into engagement with the nut so that at least one locking formation on the nut engages with a second locking formation on the locking collar, and, as a result, the locking collar substantially prevents further rotation of the nut about the rod.

The locking formation of the nut may comprise two or more teeth or castellations extending from the nut generally parallel to the longitudinal axis of the rod.

The locking formation of the rod may comprise a slot extending along an end of the rod generally parallel to its longitudinal axis, whilst the first locking formation of the collar comprises a protruberance or tab which extends radially inwardly of the locking collar into the slot.

The first and second locking formations of the locking collar may be integrally formed in a single part of the locking collar. They may, for example, both be a part of the tab.

The biasing element may comprise a helical spring.

According to a fourth aspect of the invention we provide a valve assembly comprising a valve seat and a valve member which is movable into and out of engagement with the valve seat to open or close the valve assembly, and a

valve member, collar and nut assembly according to the third aspect of the invention and having any feature or combination of features of the assembly according to the third aspect of the invention, wherein the valve member comprises the rod, the support part is fixed relative to the valve seat, and the biasing element biases the valve member into or out of engagement with the valve seat.

Preferably the valve member is biased into engagement with the valve seat by means of the resilient biasing element.

The valve member may further comprise a disc which is mounted on one end of the rod so that the rod extends centrally from and generally normal to the disc. In this case, the valve assembly may be configured such that it is the disc that engages with the valve seat when the valve member is engaged with the valve seat.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying figures of which

FIGURE 1 shows an exploded perspective illustration of a valve assembly according to the invention,

FIGURE 2 shows a perspective view of a longitudinal cross-section through the valve assembly illustrated in Figure 1 when assembled,

FIGURE 3 shows a longitudinal cross-section through a portion of drill pipe including the valve assembly shown in Figures 1 and 2,

FIGURE 4a shows a perspective illustration of one embodiment of valve member suitable for use in the valve assembly illustrated in Figures 1, 2 and 3,

FIGURE 4b shows a perspective illustration of one embodiment of collar suitable for use with the valve member illustrated in Figure 4a,

Claims

1. A valve member, collar and nut assembly comprising a rod (20a) having a longitudinal axis, a support part (24), a resilient biasing element (26), and a nut (29), the nut (29) being mounted on a screw thread around the rod (20a) , the assembly further comprising a locking collar (28) which is mounted around the rod (20a) such that the biasing element (26) extends between the support part (24) and the locking collar (28), **characterized by** the locking collar (28) having a first locking formation (28a) which engages with a corresponding locking formation (21) of the rod (20a) to substantially prevent rotation of the locking collar (28) around the rod (20a), the biasing element (29) pushing the locking collar (28) into engagement with the nut (29) so that at least one locking formation (29a) on the nut (29) engages with a second locking formation (28a) on the locking collar (28), and, as a result, the locking collar (28) substantially prevents further rotation of the nut (29) about the rod (20a).

2. A valve member, collar and nut assembly according to claim 1 wherein the locking formation (29a) of the nut (29) comprise two or more teeth or castellations extending from the nut (29) generally parallel to the longitudinal axis of the rod (20a).

3. A valve member, collar and nut assembly according to claim 1 or 2 wherein the locking formation (21) of the rod (20a) comprises a slot (21) extending along an end of the rod (20a) generally parallel to its longitudinal axis, whilst the first locking formation (28a) of the locking collar (28) comprises a protruberance or tab which extends radially inwardly of the locking collar (28) into the slot (21).

4. A valve member, collar and nut assembly according to claim 1, 2 or 3 wherein the first and second locking formations (28a) of the locking collar (28) are integrally formed in a single part of the locking collar (28).

5. A valve member, collar and nut assembly according to any one of claims 1 to 4 wherein the biasing element (26) comprises a helical spring.

6. A valve assembly (10) comprising a valve seat (14) and a valve member (20) which is movable into and out of engagement with the valve seat (14) to open or close the valve assembly (10), and a valve member, collar and nut assembly according to any one of claims 1 to 5 wherein the valve member (20) comprises the rod (20a), the support part (24) is fixed relative to the valve seat (14), and the biasing element (26) biases the valve member (20) into or out of engagement with the valve seat (14).

7. A valve assembly (10) according to claim 6 wherein the valve member (20) is biased into engagement with the valve seat (14) by means of the resilient biasing element (26).

8. A valve assembly (10) according to claim 6 or 7 wherein the valve member (20) further comprises a disc (20b) which is mounted on one end of the rod (20a) so that the rod (20a) extends centrally from and generally normal to the disc (20b).

9. A valve assembly (10) according to claim 8 wherein the valve assembly (10) is configured such that it is the disc (20b) that engages with the valve seat (14) when the valve member (20) is engaged with the valve seat (14).