Claims

1 A valve for use in an oil or gas well, the valve comprising a moveable member (5) configured to move between open and closed configurations of the valve to allow and resist flow of fluid through the valve in respective open and closed configurations, the valve having a sealing member (10) providing a seat for seating of the moveable member (5) when the moveable member (5) is in the closed configuration; the moveable member (5) having a cutting surface (6h) arranged to shear against an anvil member (15) when the moveable member (5) is moving between the open and closed configurations; wherein the valve has a sealing member displacement mechanism (20) configured to vary the spacing between the sealing member (10) and the movable member (5) when the moveable member (5) is moving between the open and the closed configurations.

2 A valve as claimed in claim 1, wherein the sealing member (10) moves away from the moveable member (5) during the stroke of the moveable member (5) between the open and closed configurations.

3 A valve as claimed in claim 1 or claim 2, wherein the sealing member (10) the sealing member (10) remains axially spaced from the movable member (5) until the cutting surface (6h) of the movable member (5) has moved past the seat of the sealing member (10), after which point the sealing member (10) is pressed against the movable member (5) to engage the movable member (5) on the seat of the sealing member (10).

4 A valve as claimed in any one of claims 1-3, wherein the valve has a bore with an axis, and wherein the sealing member (10) moves axially within the bore relative to the movable member (5).

5 A valve as claimed in any one of claims 1-4, wherein the valve is a ball valve having a ball (5) with a through bore and the movement of the valve between the open and closed configurations is a rotational movement to rotate a bore through

the ball (5) between an aligned and an unaligned configuration with respect to the through bore of the valve.

6 A valve as claimed in any one of claims 1-5, wherein the sealing member displacement mechanism comprises one or more cam devices (20) having a cam surface with a non-circular profile, and wherein the movement of the movable member (5) from the open configuration to the closed configuration rotates the or each cam device (20 and moves the non-circular cam surface over the sealing member (10) thereby increasing the displacement between the sealing member (10) and the moveable member (5) as the sealing member (10) moves along the non-circular cam surface.

7 A valve as claimed in claim 6, wherein the cam device (20) is configured to displace the sealing member (10) to a maximum separation from the movable member (5) at the point on the stroke of the moveable member (5) when the cutting surface (6h) is passing the anvil member (15).

8 A valve as claimed in any one of claims 6-7 wherein the or each cam surface comprises a non circular projection extending from the outer surface of the moveable member (5).

9 A valve as claimed in any one of claims 6-8, wherein the valve is a ball valve having a ball (5), and wherein the cam device (20) is arranged as a chord on the ball (5), on the outer surface of the ball (5) and spaced radially between the centre of the ball (5) and its outer surface.

10 A valve as claimed in any one of claims 6-9, wherein the or each cam device (20) is arranged on the movable member (5) out of alignment with the anvil member (15) whereby the movement of the cam device (20) to engage the or each cam device (20) with the sealing member (10) does not engage the or each cam device (20) with the anvil member (15).

11 A valve as claimed in any one of claims 6-10, wherein the non-circular cam surface of the or each cam device (20) comprises an outer bearing surface that slides against the sealing member (10), to push the sealing member (10) axially away from the moveable member (5) during the stroke of the moveable member (5) between the open and closed configurations.

12 A valve as claimed in claim 11, wherein the outer bearing surface of the or each cam device (20) is arranged on the movable member out of alignment with the seat on the sealing member (10), whereby the or each cam device (20) does not engage the seat of the sealing member (10) during the stroke of the movable member between the open and closed configurations.

13 A valve as claimed in any one of claims 1-12, wherein the anvil member (15) and the sealing member (10) are concentrically arranged, with the anvil member (15) located radially inwards of the sealing member (10), and the sealing member (10) surrounding the anvil member (15).

14 A valve as claimed in any one of claims 1-13, wherein the sealing member (10) is biased axially toward the moveable member (5) by a resilient device (11), and wherein the movement of the movable member (5) from the open to the closed configuration energises the resilient device (11).

15. A method of operating an oil or gas well valve, the valve comprising a moveable member (5) configured to move between open and closed configurations of the valve to allow flow of fluid through the valve when the valve is in the open configuration, and to resist flow of fluid through the valve when the valve is in the closed configuration, the valve having a sealing member (10)providing a seat for seating of the movable member (5) when the movable member (5) is in the closed configuration; the movable member (5) having a cutting surface (6h) arranged to shear against an anvil member (15) when the movable member (5) is moving between the open and closed configurations;

wherein the method includes varying the spacing between the sealing member (10)and the movable member (15) during the stroke of the moveable member (5) between the open configuration and the closed configuration.

16. The method of claim 15, wherein the valve includes a sealing member displacement mechanism for moving the sealing member (10 comprising a cam device (20) having a cam surface with a non-circular profile provided on the outer surface of the movable member (5) , and wherein the movement of the movable member (5) from the open configuration to the closed configuration moves the non-circular cam surface with respect to the sealing member (10);

-and wherein the method includes moving the non-circular cam surface relative to the sealing member (10 so that the sealing member (10) translates along the non-circular cam surface, thereby varying the displacement between the sealing member (10) and the moveable member (5) as the sealing member (10) moves along the non-circular cam surface during the stroke of the moveable member (5) between the open configuration and the closed configuration.

17. The method of claim 16, wherein the valve includes a resilient device that is arranged to urge the sealing member axially against the ball to seal against the passage of fluid through the valve and wherein the method includes energising the resilient device by rotation of the ball during the stroke of the ball between the open and closed configurations.

Claims

1 A valve for use in an oil or gas well, the valve having a throughbore T with an axis and comprising a moveable member (5) configured to move between open and closed configurations of the valve to allow and resist flow of fluid through the throughbore of the valve in respective open and closed configurations, the valve having a sealing member (10) in the form of a sealing sleeve (10) providing a seat for seating of the moveable member (5) when the moveable member (5) is in the closed configuration; the valve having an anvil member (15) axially fixed within the through bore T; the moveable member (5) having a cutting surface (6h) arranged to shear against a cutting surface (15h) of the axially fixed anvil member (15) when the moveable member (5) is moving between the open and closed configurations; characterised in that:

- the sealing sleeve (10) is axially movable within the throughbore T relative to the movable member;
- the axially fixed anvil member (15) and the axially movable sealing sleeve (10) are arranged with the axially fixed anvil member (15) disposed radially inside the axially movable sealing sleeve (10), and the axially movable sealing sleeve (10) surrounding the axially fixed anvil member (15) and wherein
- the valve has a sealing member displacement mechanism (20) configured to space the axially movable sealing sleeve (10) axially away from the movable member (5) when the moveable member (5) is moving between the open and the closed configurations.

2 A valve as claimed in claim 1, wherein the sealing member displacement mechanism (20) moves the sealing sleeve (10) out of contact with the moveable member (5) when the cutting surface (6h) engages the anvil member (15), and moves the sealing sleeve (10) back into contact with the moveable member (5) when the cutting surface (6h) has passed the sealing sleeve (10).

3 A valve as claimed in claim 1 or claim 2, wherein the sealing member (10) remains axially spaced from the movable member (5) until the cutting surface (6h) of the movable member (5) has moved past the seat of the sealing member (10), after which point the sealing member (10) is pressed against the movable member (5) to engage the movable member (5) on the seat of the sealing member (10).

4 A valve as claimed in any one of claims 1-3, wherein the sealing sleeve (10) has a sealing surface configured to match a sealing face on the moveable member, and wherein the sealing surface has a resilient seal configured to be compressed against the sealing face of the movable member (5) to create a seal denying fluid passage between the sealing surface of the sealing member (10) and the movable member (5).

5 A valve as claimed in any one of claims 1-4, wherein the valve is a ball valve having a ball (5) with a through bore and the movement of the valve between the open and closed configurations is a rotational movement to rotate a bore through the ball (5) between an aligned and an unaligned configuration with respect to the through bore of the valve.

6 A valve as claimed in any one of claims 1-5, wherein the sealing member displacement mechanism comprises one or more cam devices (20) having a cam surface with a non-circular profile, and wherein the movement of the movable member (5) from the open configuration to the closed configuration rotates the or each cam device (20 and moves the non-circular cam surface over the sealing member (10) thereby increasing the displacement between the sealing member (10) and the moveable member (5) as the sealing member (10) moves along the non-circular cam surface.

7 A valve as claimed in claim 6, wherein the cam device (20) is configured to displace the sealing member (10) to a maximum separation from the movable member (5) at the point on the stroke of the moveable member (5) when the cutting surface (6h) is passing the anvil member (15).

8 A valve as claimed in any one of claims 6-7 wherein the or each cam surface comprises a non circular projection extending from the outer surface of the moveable member (5).

9 A valve as claimed in any one of claims 6-8, wherein the valve is a ball valve having a ball (5), and wherein the cam device (20) is arranged as a chord on the ball (5), on the outer surface of the ball (5) and spaced radially between the centre of the ball (5) and its outer surface.

10 A valve as claimed in any one of claims 6-9, wherein the or each cam device (20) is arranged on the movable member (5) out of alignment with the anvil member (15) whereby the movement of the cam device (20) to engage the or each cam device (20) with the sealing member (10) does not engage the or each cam device (20) with the anvil member (15).

11 A valve as claimed in any one of claims 6-10, wherein the non-circular cam surface of the or each cam device (20) comprises an outer bearing surface that slides against the sealing member (10), to push the sealing member (10) axially away from the moveable member (5) during the stroke of the moveable member (5) between the open and closed configurations.

12 A valve as claimed in claim 11, wherein the outer bearing surface of the or each cam device (20) is arranged on the movable member out of alignment with the seat on the sealing member (10), whereby the or each cam device (20) does not engage the seat of the sealing member (10) during the stroke of the movable member between the open and closed configurations.

13 A valve as claimed in any one of claims 1-12, wherein the anvil member (15) and the sealing member (10) are concentrically arranged, with the anvil member (15) located radially inwards of the sealing member (10), and the sealing member (10) surrounding the anvil member (15).

14 A valve as claimed in any one of claims 1-13, wherein the sealing member (10) is biased axially toward the moveable member (5) by a resilient device (11), and wherein the movement of the movable member (5) from the open to the closed configuration energises the resilient device (11).

15. A method of operating an oil or gas well valve, the valve having a throughbore T with an axis and comprising a moveable member (5) configured to move between open and closed configurations of the valve to allow flow of fluid through the valve when the valve is in the open configuration, and to resist flow of fluid through the throughbore of the valve when the valve is in the closed configuration, the valve having a sealing member (10) in the form of a sealing sleeve (10) providing a seat for seating of the movable member (5) when the movable member (5) is in the closed configuration; the valve having an anvil member (15) axially fixed within the through bore T; the movable member (5) having a cutting surface (6h) arranged to shear against a cutting surface (15h) of the axially fixed anvil member (15) when the movable member (5) is moving between the open and closed configurations; characterised in that:

- the sealing sleeve (10) is axially movable within the throughbore T relative to the movable member;
- the axially fixed anvil member (15) and the axially movable sealing sleeve (10) are arranged with the axially fixed anvil member (15) disposed radially inside the axially movable sealing sleeve (10), and the axially movable sealing sleeve (10) surrounding the axially fixed anvil member (15);

wherein the valve has a sealing member displacement mechanism (20) configured to vary the spacing between the sealing member (10) and the movable member (.5) and wherein the method includes operating the sealing member displacement mechanism (20) to move the sealing member (10) axially away from the movable member (5) during the stroke of the moveable member (5) between the open configuration and the closed configuration.