CLAIMS

1. A sealing arrangement comprising an inner well casing and a seal for sealing an annulus in a well, the annulus being formed between an outer surface of the inner well casing and an outer well casing of the well wherein the inner well casing comprises:

a central longitudinal axis which extends along a longitudinal axis of the inner well casing; and

an outer clamping surface which is arranged to be secured and clamped by the outer well casing, the outer clamping surface being located at an initial radial distance from the central longitudinal axis of the inner well casing;

the seal comprising:

a flexible metal sealing lip which projects radially outwardly and away from the central longitudinal axis of the inner well casing, the metal sealing lip having a distal sealing surface for sealing against an inner surface of the outer well casing; and

wherein, in use, pressure within the annulus is arranged to urge the sealing surface towards the inner surface of the outer well casing~~.~~;

in which the sealing lip extends towards the side of the annulus to be sealed and a projection angle of the sealing lip is arranged to decrease as the sealing lip is flexed inwardly by the clamping force and wherein the projection angle is urged towards a greater projection angle as the sealing lip is energised by the pressure in the annulus.

2. ~~A~~ The sealing arrangement according to Claim 1 in which, prior to use, the sealing surface locates at an initial radial distance relative to the central longitudinal axis which is less than or equal to the initial radial distance of the outer clamping surface of the inner well casing.

3. ~~A~~ The sealing arrangement according to Claim 1 or Claim 2 in which the pressure within the annulus is arranged to energise the seal.

~~4. A sealing arrangement according to any preceding claim in which the sealing lip extends towards the side of the annulus to be sealed and a projection angle of the sealing lip is arranged to decrease as the sealing lip is flexed inwardly by the clamping force and wherein the projection angle is urged towards a greater projection angle as the sealing lip is energised by the pressure in the annulus.~~

~~5~~4. The~~A~~ sealing arrangement according to any preceding claim in which the sealing lip comprises a pressure containing surface which faces the annulus and pressure acting on the pressure containing surface is arranged to urge the sealing lip towards the inner surface of the outer well casing.

~~6~~5. The~~A~~ sealing arrangement according to any preceding claim in which the pressure in the annulus is arranged to increase the sealing strength of the seal.

~~7~~6. The~~A~~ sealing arrangement according to any preceding claim in which the sealing lip is arranged to flare outwardly by pressure of a fluid in the annulus.

~~8~~7. The~~A~~ sealing arrangement according to any preceding claim in which the clamping force of the outer member is arranged to flex the sealing lip to create a seal between the inner well casing and the outer well casing and wherein the clamping force is arranged to compress the inner well casing in a clamping zone and in which the seal is located in the clamping zone.

~~9~~8. The~~A~~ sealing arrangement according to any preceding claim in which the inner well casing comprises a hanger which is arranged, in use, to suspend a casing string and wherein the hanger is arranged to be clamped in a wellhead and for a casing string to be suspended below the wellhead.

~~10~~9. The~~A~~ sealing arrangement according to any preceding claim in which the outer clamping surface comprises a sealing surface and in which the outer clamping surface provides a metal-to-metal sealing surface.

~~11~~10. The~~A~~ sealing arrangement according to any preceding claim in which the

inner well casing comprises an upper seal and a lower seal and in which the upper seal is arranged to seal pressure from above the upper seal and the lower seal is arranged to seal pressure from below the lower seal.

~~12~~11. The~~A~~ sealing arrangement according to any preceding claim in which the sealing lip comprises a plastically deformable material.

~~13~~12. The~~A~~ sealing arrangement according to any preceding claim in which an inwardly directed clamping force is arranged to flex the sealing lip such that the sealing lip yields.

~~14~~13. The~~A~~ sealing arrangement according to any preceding claim in which the sealing lip extends radially outwardly from a base towards a sealing tip.

~~15~~14. The~~A~~ sealing arrangement according to any preceding claim in which the sealing lip extends radially to the same extent/distance as the outer clamping surface of the inner well casing and the sealing lip is arranged to move inwardly as the clamping surface of the inner well casing moves inwardly as the inner well casing is clamped within a clamping arrangement of the well.

~~16~~15. The~~A~~ sealing arrangement according to any preceding claim in which the wellhead casing is freely moveable through the clamping surface of the outer well casing when the clamping arrangement is inactive and there is no inwardly directed clamping force being applied by or to the outer well casing.

~~17~~16. The~~A~~ sealing arrangement according to any preceding claim in which the sealing lip projects from a support surface of the inner well casing and wherein the support surface is of a reduced diameter relative to the diameter of the clamping surface of the inner well casing.

~~18~~17. The~~A~~ sealing arrangement according to any preceding claim in which the sealing lip locates within a groove.

~~19~~18. The~~A~~ sealing arrangement according to Claim ~~18~~ 17 in which the groove locates within or adjacent to the outer clamping surface of the inner well casing.

~~20~~19. The~~A~~ sealing arrangement according to Claim ~~18~~ 17 or Claim ~~19~~ 18 in which the groove is arranged to protect the sealing lip and the groove prevents or inhibits the sealing lip from abutting any obstructions during axial movement of the inner well casing.

~~21~~20. The~~A~~ sealing arrangement according to any preceding claim in which the seal is provided on a sealing member.

~~22~~21. The~~A~~ sealing arrangement according Claim ~~21~~ 20 in which the sealing member is securable to the inner well casing.

~~23~~22. The~~A~~ sealing arrangement according to Claim ~~21~~ 20 or Claim ~~22~~ 21 in which the sealing member comprises a first seal and a second seal and wherein the first seal is arranged to seal the annulus from above and the second seal is arranged to seal the annulus from below.

~~24~~23. A well comprising an inner well casing, an outer well casing, a clamping arrangement and a seal for sealing an annulus in a well, the annulus being formed between an outer surface of the inner well casing and the outer well casing member of the well wherein the inner well casing comprises:

a central longitudinal axis which extends along a longitudinal axis of the inner well casing; and

an outer clamping surface which is arranged to be secured and clamped by the outer well casing, the outer clamping surface being located at an initial radial distance from the central longitudinal axis of the inner well casing;

the seal comprising:

a flexible metal sealing lip which projects radially outwardly and away from the central longitudinal axis of the inner well casing, the metal sealing lip having a

distal sealing surface for sealing against an inner surface of the outer well casing; and

wherein, in use, pressure within the annulus is arranged to urge the sealing surface towards the inner surface of the outer well casing~~.~~;

in which the sealing lip extends towards the side of the annulus to be sealed and a projection angle of the sealing lip is arranged to decrease as the sealing lip is flexed inwardly by the clamping force and wherein the projection angle is urged towards a greater projection angle as the sealing lip is energised by the pressure in the annulus.

~~25~~24. A method of sealing an annulus in a well, the annulus being formed between an outer surface of an inner well casing and an outer well casing of the well wherein the inner well casing comprises:

a central longitudinal axis which extends along a longitudinal axis of the inner well casing; and

an outer clamping surface which is arranged to be secured and clamped by the outer well casing, the outer clamping surface being located at an initial radial distance from the central longitudinal axis of the inner well casing;

the seal comprising:

a flexible metal sealing lip which projects radially outwardly and away from the central longitudinal axis of the inner well casing, the metal sealing lip having a distal sealing surface for sealing against an inner surface of the outer well casing;

wherein, in use, pressure within the annulus is arranged to urge the sealing surface towards the inner surface of the outer well casing;

in which the sealing lip extends towards the side of the annulus to be sealed and a projection angle of the sealing lip is arranged to decrease as the sealing lip is flexed inwardly by the clamping force and wherein the projection angle is urged towards a greater projection angle as the sealing lip is energised by the pressure in the annulus; and

the method comprising clamping the inner well casing in the outer well casing and compressing the inner well casing and flexing the sealing lip radially inwardly.