WHAT IS CLAIMED IS:

1. A ram blowout preventer (16) for sealing a well (10), the ram blowout preventer (16) comprising:

a body (16) having a cavity with a recess;

a ram block (20) configured to move inside the cavity;

a top seat (26) disposed in the recess and configured to seal the well (10) when in contact with the ram block (20);

a movable lock ring (34) extending inside a groove (36) of the body (16) and a corresponding groove (38) of the top seat (26) and configured to move inside the groove (38) of the body (16), along a direction substantially parallel to the well (10);

a first seal (40) extending inside a groove of the top seat (26) and configured to contact the body (16) and the top seat (26); and

a second seal (31) extending inside a groove of the ram block (20) and configured to contact the ram block (20) and the top seat (26), wherein

a width (w1)) of the groove (36) of the body (16) is larger than a width (w3) of the lock ring (34) by a predetermined value, which is larger than normal tolerances, and

a distance (D1) from a centerline (19) of the well (10) to the first seal (40) is larger than a distance (D2) from the centerline (19) of the well (10) to the second seal (31).

2. The ram blowout preventer of Claim 1, wherein the predetermined value is between 1 and 6 mm.

3. The ram blowout preventer of Claim 1, wherein an upper surface of the top seat (26), between the first seal (40) and a face of the top seat (26) facing the well (10) is larger than a lower surface (62) of the top seat (26), opposite to the upper surface, and extending between the second seal (31) and the face facing the well (10) such that

when a pressure (P) is applied from above the top seat (26), a net force generated by the applied pressure on the top seat (26) is pressing the top seat (26) against the ram block (20) when the ram block (20) is closed.

4. The ram blowout preventer of Claim 1, wherein the top seat (26) moves integrally with the lock ring (34).

5. The ram blowout preventer of Claim 1, wherein the width (w1) of the groove (36) of the body (16) is larger than a width (w2) of the corresponding groove (38) of the top seat (26) by the predetermined value.

6. The ram blowout preventer of Claim 1, wherein normal tolerances are in a range between one tenth and one thousandth of a centimeter.

7. The ram blowout preventer of Claim 1, wherein the top seat (26) and the ram block (20) seal the well (10) when pressure is applied either from above or from below the ram blowout preventer (16).

8. A method for assembling a ram blowout preventer (16) that is configured to seal a well (10) when a pressure is applied either from above or below of the ram blowout preventer, the method comprising:

placing a ram block (20) in a cavity of a body (16) of the ram blowout preventer (16), the cavity having a recess;

disposing a top seat (26) in the recess such that the top seat (26) is configured to seal the well (10) when in contact with the ram block (20);

inserting a lock ring (34) inside a groove (36) of the body (16) and a corresponding groove (38) of the top seat (26), wherein the lock ring (34) is configured to move inside the groove (36) of the body (16), along a direction substantially parallel to the well (10);

providing a first seal (40) inside a groove of the top seat (26), wherein the first seal (40) is configured to contact the body (16) and the top seat (26); and

providing a second seal (31) inside a groove of the ram block (20), wherein the second seal (31) is configured to contact the ram block (20) and the top seat (26), wherein

a width (w1) of the groove (36) of the body (16) is larger than a width (w3) of the lock ring (34) by a predetermined value, which is above normal tolerances, and

a distance (D1) from a centerline (19) of the well (10) to the first seal (40) is larger than a distance (D2) from the centerline (19) of the well (10) to the second seal (31).

9. The method of Claim 8, wherein the predetermined value is between 1 and 6 mm.

10. The method of Claim 8, wherein an upper surface of the top seat (26), between the first seal (40) and a face of the top seat (26) facing the well (10) is larger than a lower surface of the top seat (26), opposite to the upper surface, and extending between the second seal (31) and the face facing the well (10) such that when a pressure (P) is applied from above the top seat (26), a net force generated by the applied pressure on the top seat (26) is pressing the top seat (26) against the ram block (20) when the ram block (20) is closed.

11. The method of Claim 8, further comprising:

sliding the top seat (26) integrally with the lock ring (34).

12. The method of Claim 8, further comprising:

sealing the well (10) with the top seat (26) and the ram block (20) when pressure is applied either from above or from below of the ram blowout preventer (16).

13. A method for sealing a well (10) with a ram blowout preventer (16) that is configured to seal the well (10) when a pressure is applied either from above or below of the ram blowout preventer (16), the method comprising:

applying a closing pressure to a ram block (20) within a cavity of a body (16) of the ram blowout preventer (16), wherein the cavity has a recess;

moving the ram block (20) to overlay with a top seat (26) disposed in the recess;

sliding the top seat (26) toward the ram block (20) when a pressure from above the ram blowout preventer (16) acts on the top seat (26), wherein the top seat (26) is configured to slide along a direction substantially parallel to the well (10) as a lock ring (34), extending inside a groove (36) of the body (16) and a corresponding groove (38) of the top seat (26), is configured to move inside the groove (36) of the body (16), along the direction substantially parallel to the well (10);

sealing a space between the body (16) and the top seat (26) with a first seal (40) extending inside a groove of the top seat (26); and

sealing a space between the ram block (20) and the top seat (26) with a second seal (31) extending inside a groove of the ram block (20), wherein a width (w1) of the groove (36) of the body (16) is larger than a width (w3) of the lock ring (34) by a predetermined value, which is above normal tolerances, and a distance (D1) from a centerline (19) of the well (10) to the first seal (40) is larger than a distance (D2) from the centerline (19) of the well (10) to the second seal (31).

14. The method of Claim 13, wherein the predetermined value is between 1 and 6 mm.

15. The method of Claim 13, wherein an upper surface of the top seat (26), between the first seal (40) and a face of the top seat (26) facing the well (10) is larger than a lower surface of the top seat (26), opposite to the upper surface, and extending between the second seal (31) and the face facing the well (10) such that when a pressure is applied from above the top seat (26), a net force generated by the applied

pressure on the top seat (26) is pressing the top seat (26) against the ram block (20) when the ram block (20) is closed.

WHAT IS CLAIMED IS:

1. A ram blowout preventer for bidirectionally sealing a well, the ram blowout preventer comprising:
a body having a cavity with a recess;

a ram block configured to move between a closed position and an open position inside the cavity;

a top seat disposed in the recess and configured to seal the well when in contact with the ram block;

a movable lock ring extending inside a groove of the body and a corresponding groove of the top seat, a width of the groove of the body being different than a width of the groove of the top seat by at least a predetermined value, the movable lock ring being configured to move inside one of the grooves, along a direction substantially parallel to the well between a first seat position and a second seat position;

a first seal positioned between the top seat and the body, the first seal being configured to contact the body and the top seat; and

a second seal positioned between the ram block and the top seat, the second seal being configured to contact the ram block and the top seat when the ram block is in the closed position, wherein

a distance from a centerline of the well to the first seal is larger than a distance from the centerline of the well to a point where the second seal contacts each of the ram block and the top seat when the ram block is in the closed position.

2. The ram blowout preventer of claim **1**, wherein the predetermined value is between 1 and 6 mm.

3. The ram blowout preventer of claim **1**, wherein an upper surface of the top seat, between the first seal and a face of the top seat facing the well is larger than a lower surface of the top seat, opposite to the upper surface, and extending between the second seal and the face facing the well such that when a pressure is applied from above the top seat, a net three generated by the applied pressure on the top seat is pressing the top seat against the ram block when the ram block is closed.

4. The ram blowout preventer of claim **1**, wherein the top seat moves integrally with the lock ring.

5. The ram blowout preventer of claim **1**, wherein the width of the groove of the body is larger than a width of the corresponding groove of the top seat by the predetermined value.

6. The ram blowout preventer of claim **1**, wherein the predetermined value is larger than normal tolerances and normal tolerances are in a range between one tenth and one thousandth of a centimeter.

7. The ram blowout preventer of claim **1**, wherein the top seat and the ram block seal the well when pressure is applied either from above or from below the ram blowout preventer.

8. The ram blowout preventer of claim **1**, wherein a lower surface of the top seat, in the first seat position, is below an upper surface of the ram block when the ram block is in an open position, and the lower surface of the seat, in the second seat position, is above the upper surface of the ram block when the ram block is in a closed position, at least a portion of the seat not being directly over the ram block when the ram block is in the open position.

9. A method for assembling a ram blowout preventer that is configured to bidirectionally seal a well when a pressure is applied either from above or below the ram blowout preventer, the method comprising:
placing a ram block in a cavity of a body of the ram blowout preventer, the cavity having a recess;

disposing a top seat in the recess such that the top seat is configured to seal the well when in contact with the ram block;

inserting a lock ring inside a groove of the body and a corresponding groove of the top seat, a width of the groove of the body being different than a width of the groove of the top seat by at least a predetermined value, the lock ring being configured to move inside one of the grooves, along a direction substantially parallel to the well;

providing a first seal between the top seat and the body, wherein the first seal is configured to contact the body and the top seat; and

providing a second seal between the ram block and the top seat, wherein the second seal is configured to contact the ram block and the top seat, wherein
a distance from a centerline of the well to the first seal is larger than a distance from the centerline of the well to a point where the second seal contacts each of the ram block and the top seat when the ram block is in a closed position.

10. The method of claim **9**, wherein the predetermined value is between 1 and 6 mm.

11. The method of claim **9**, wherein an upper surface of the top seat, between the first seal and a face of the top seat facing the well is larger than a lower surface of the top seat, opposite to the upper surface, and extending between the second seal and the face facing the well such that when a pressure is applied from above the top seat, a net force generated by the applied pressure on the top seat is pressing the top seat against the ram block when the ram block is closed.

12. The method of claim **9**, further comprising
sliding the top seat integrally with the lock ring.

13. The method of claim **9**, further comprising:
sealing the well with the top seat and the ram block when the pressure is applied either from above or from below the ram blowout preventer.

14. A method for bidirectionally sealing a well with a ram blowout preventer that is configured to seal the well when a pressure is applied either from above or below the ram blowout preventer, the method comprising:
applying a closing pressure to a ram block within a cavity of a body of the ram blowout preventer, the cavity having a recess;

moving the ram block to overlay with a top seat disposed in the recess;

sliding the top seat toward the ram block when a pressure from above the ram blowout preventer acts on the top seat, wherein the top seat is configured to slide along a direction substantially parallel to the well as a lock ring, extending inside a groove of the body and a corresponding groove of the top seat, is configured to move inside one of the grooves along the direction substantially parallel to the well;

sealing a space between the body and the top seat with a first seal, the first seal being positioned between the body and the top seat; and

sealing a space between the ram block and the top seat with a second seal, the second seal being positioned between the ram block and the top seat, wherein a width of the groove of the body is larger than a width of the lock ring by a predetermined value, and a distance from a centerline of the well to the first seal is larger than a distance from the centerline of the well to a point where the second seal contacts each of the seat and the ram block when the ram block is in a closed position.

15. The method claim **14**, wherein the predetermined value is between 1 and 6 mm.

16. The method of claim **14**, wherein an upper surface of the top seat, between the first seal and a face of the top seat facing the well is larger than a lower surface of the top seat, opposite to the upper surface, and extending between the second seal and the face facing the well such that when a pressure is applied from above the top seat, a net force generated by the applied pressure on the top seat is pressing the top seat against the ram block when the ram block is closed.

17. The method of claim **14**, wherein the top seat moves integrally with the lock ring.

18. The method of claim **14**, wherein the width of the groove of the body is larger than a width of the corresponding groove of the top seat.

19. The method of claim **14**, further comprising:
sealing the well with the top seat and the ram block when a pressure is applied either from above or from below the ram blowout preventer.