

WHAT IS CLAIMED IS:

1. A pair of shear blades to be provided in a ram blowout preventer for cutting a tubular, the pair of shear blades comprising:

a first ram shear blade; and

a second shear blade configured to shear the tubular in concert with the first ram shear blade, the second ram shear blade having a portion configured to puncture the tubular,

wherein the first ram shear blade is configured to guide the tubular to a location opposite the portion of the second shear.

2. The pair of shear blades of Claim 1, wherein the first blade has two cutting edges that form an acute angle with each other and a curved cutting edge connecting the two cutting edges and the second blade has two cutting edges that form an obtuse angle with each other.

3. The pair of shear blades of Claim 2, wherein the first blade has a front face configured to cut the tubular, the front face having a first cutting face, a second cutting face and a curved cutting face configured to connect the first cutting face to the second cutting face, each of the cutting faces having a corresponding cutting edge;

the first cutting face and the second cutting face of the first blade forming a V-shape with the curved cutting face positioned at an apex of the V-shape; and

the first cutting face, the second cutting face, and the curved cutting face of the first blade being slanted relative to a direction on which the tubular extends.

4. The pair of shear blades of Claim 3, wherein the second blade has a front face configured to cut the tubular, the front face having a first cutting face and a second cutting face, the first cutting face intersecting the second cutting face along an edge that forms the portion, each of the first cutting face and the second cutting face having a corresponding cutting edge;

the first cutting face and the second cutting face of the second blade forming an angle larger than 180^0 ; and

the first cutting face and the second cutting face of the second blade being slanted relative to the direction on which the tubular extends.

5. The pair of shear blades of Claim 4, wherein an angle between the first cutting face and the second cutting face of the first blade is different from an angle between the first cutting face and the second cutting face of the second blade.

6. The pair of shear blades of Claim 3, wherein the first blade has a number of front cutting faces different from the second blade.

7. The pair of shear blades of Claim 3, wherein the first blade further comprises:

first and second non-cutting faces that connect to the first cutting face and the second cutting face, the first and second non-cutting faces directly facing the first and second cutting faces of the second blade.

8. The pair of shear blades of Claim 1, wherein the first blade has two cutting edges that form an acute angle with each other and a curved cutting edge connecting the two cutting edges, and the second blade has a front face having a W-shape, wherein the first blade and the second blade are configured to slide one over the other for cutting the tubular.

9. The pair of shear blades of Claim 8, wherein the first blade has a front face configured to cut the tubular, the front face having a first cutting face, a second cutting face and a curved cutting face configured to connect the first cutting face to the second cutting face, each of the cutting faces having a corresponding cutting edge;

the first cutting face and the second cutting face of the first blade forming a V-shape with the curved cutting face positioned at an apex of the V-shape; and

the first cutting face, the second cutting face, and the curved cutting face of the first blade being slanted relative to a direction on which the tubular extends.

10. The pair of shear blades of Claim 9, wherein the second blade has the front face configured to cut the tubular, the front face having a first cutting face, a second cutting face, the first cutting face intersecting the second cutting face along an edge that

forms the portion, and each of the first cutting face and the second cutting face having a corresponding cutting edge;

the front face of the second blade further comprising a third curved cutting face connected to the first cutting surface, a fourth curved cutting face connected to the second cutting surface, a fifth cutting surface connected to the third curved cutting face, and a sixth cutting surface connected to the fourth curved cutting face;

the first cutting face and the fifth cutting face of the second blade forming a V-shape;

the second cutting face and the sixth cutting face of the second blade forming a V-shape; and

the first cutting face and the second cutting face of the second blade being slanted relative to the direction on which the tubular extends.

11. The pair of shear blades of Claim 10, wherein an angle between the first cutting face and the second cutting face of the second blade is larger than 180° , an angle between the first cutting surface and the fifth cutting surface is less than 180° , and an angle between the second cutting surface and the sixth cutting surface is less than 180° .

12. The pair of shear blades of Claim 8, wherein the first blade has a number of front cutting faces different from the second blade.

13. The pair of shear blades of Claim 10, wherein the first blade further comprises first and second non-cutting faces that connect to the first cutting face and the second cutting face, and the second blade comprises first and second non-cutting faces that connect to the fifth cutting surface and the sixth cutting surface and directly face the first and second non-cutting faces of the first blade.

14. The pair of shear blades of Claim 1, wherein the first blade has a front face configured to cut the tubular, the front face being curved, and the second blade has a front face and the portion, the front face being configured to cut the tubular and the portion being configured to puncture the tubular.

15. The pair of shear blades of Claim 14, wherein the front face of the second blade comprises:

- a first cutting surface having a cutting edge;
- a second cutting surface having a cutting edge, wherein the first cutting surface forms a V-shape with the second cutting surface;
- a first curved cutting surface connected to the first cutting surface; and
- a second curved cutting surface connected to the second cutting surface.

16. The pair of shear blades of Claim 15, wherein the portion comprises:

- a first cutting surface connected to the first curved cutting surface; and

a second cutting surface connected to the second curved cutting surface,
wherein

the first curved surface intersects with the second cutting surface at an edge.

17. The pair of shear blades of Claim 16, wherein the second blade further
comprises:

non-cutting faces connected to the first cutting surface and the second cutting
surface.

18. The pair of shear blades of Claim 14, wherein the portion has a most
projected point that is configured to contact the tubular and pierce it.

19. The pair of shear blades of Claim 14, wherein the front surface of the first
blade comprises:

a curved cutting surface; and

non-cutting faces connected to the curved cutting surface.

20. A shear ram blowout preventer (BOP), comprising:

a body having a first elongated cavity extending along a first axis and a second
elongated cavity extending perpendicular to and intersecting the first elongated cavity;

a pair of ram blocks provided in the first elongated cavity and configured to slide along the first axis, wherein the ram blocks have frontal faces facing each other and the frontal faces are configured to slide towards the second elongated cavity; and

a pair of shear blades configured to be attached to the ram blocks and also configured to shear a tubular provided in the second elongated cavity when the ram blocks slide towards the tubular,

wherein the pair of shear blades comprises a first ram shear blade and a second shear blade configured to shear the tubular in concert with the first ram shear blade, the second ram shear blade having a portion configured to puncture the tubular, and

wherein the first ram shear blade is configured to guide the tubular to a location opposite the portion of the second shear.

21. The shear ram BOP of Claim 20, wherein the first blade has a front face configured to cut the tubular, the front face having a first cutting face, a second cutting face and a curved cutting face configured to connect the first cutting face to the second cutting face, each of the cutting faces having a corresponding cutting edge;

the first cutting face and the second cutting face of the first blade form a V-shape with the curved cutting face positioned at an apex of the V-shape; and

the first cutting face, the second cutting face, and the curved cutting face of the first blade are slanted relative to a direction on which the tubular extends.

22. The shear ram BOP of Claim 21, wherein the second blade has a front face configured to cut the tubular, the front face having a first cutting face and a second cutting face, the first cutting face intersecting the second cutting face along an edge that forms the portion, each of the first cutting face and the second cutting face having a corresponding cutting edge;

the first cutting face and the second cutting face of the second blade form an angle larger than 180^0 ; and

the first cutting face and the second cutting face of the second blade are slanted relative to the direction on which the tubular extends.

23. The shear ram BOP of Claim 20, wherein the first blade has a front face configured to cut the tubular, the front face having a first cutting face, a second cutting face and a curved cutting face configured to connect the first cutting face to the second cutting face, each of the cutting faces having a corresponding cutting edge;

the first cutting face and the second cutting face of the first blade forming a V-shape with the curved cutting face positioned at an apex of the V-shape; and

the first cutting face, the second cutting face, and the curved cutting face of the first blade being slanted relative to a direction on which the tubular extends.

24. The shear ram BOP of Claim 23, wherein the second blade has the front face configured to cut the tubular, the front face having a first cutting face, a second cutting face, the first cutting face intersecting the second cutting face along an edge that forms

the portion, each of the first cutting face and the second cutting face having a corresponding cutting edge;

the front face of the second blade further comprising a third curved cutting face connected to the first cutting surface, a fourth curved cutting face connected to the second cutting surface, a fifth cutting surface connected to the third curved cutting face, and a sixth cutting surface connected to the fourth curved cutting face;

the first cutting face and the fifth cutting face of the second blade forming a V-shape;

the second cutting face and the sixth cutting face of the second blade forming a V-shape; and

the first cutting face and the second cutting face of the second blade being slanted relative to the direction on which the tubular extends.

25. The ram BOP of Claim 20, wherein a front face of the second blade comprises:

a first cutting surface having a cutting edge;

a second cutting surface having a cutting edge, wherein the first cutting surface forms a V-shape with the second cutting surface;

a first curved cutting surface connected to the first cutting surface; and

a second curved cutting surface connected to the second cutting surface.

26. The ram BOP of Claim 20, wherein the portion comprises:

a first cutting surface connected to the first curved cutting surface; and
a second cutting surface connected to the second curved cutting surface,
wherein
the first cutting surface intersects with the second cutting surface at an edge.

What is claimed is:

1. A pair of shear blades to be provided in a ram blowout preventer for cutting a tubular, the pair of shear blades, comprising:

a first ram shear blade having a forward end and a rearward end, a recessed cutting surface extending rearward from the forward end, the recessed cutting surface having a rearwardly curved central region, the entire recessed cutting surface having is cutting edge; and

a second ram shear blade configured to shear the tubular in concert with the first ram shear blade, the second ram shear blade having a forward end, a rearward end, a top, a bottom, opposite side edges that are parallel to each other, each of the side edges extending from the top to the bottom and from the rearward end to the forward end, a forward extending cutting surface on the forward end of the second ram shear blade with two lateral cutting surfaces extending forward from and joining the side edges, each of the lateral cutting surfaces being in a single plane, the lateral cutting surfaces converging toward each other and intersecting at a central apex, the entire forward extending cutting surface having a cutting edge flush with a plane containing the bottom.

2. The pair of shear blades of claim 1, wherein:

the first ram shear blade has two lateral cutting surfaces that form an acute angle with each other and join the central region; and

the lateral cutting surfaces of the second ram shear blade converge at a different angle than the angle between the lateral cutting surfaces of the first ram shear blade.

3. The pair of shear blades of claim 1, wherein the recessed cutting surface of the first ram shear blade has a width at the forward end that is less than a width of the forward extending cutting surface of the second ram shear blade.

4. The pair of shear blades of claim 1, wherein each of the single planes of the lateral cutting surface is inclined relative to the top and the bottom.

5. The pair of shear blades of claim 1, wherein the first ram shear blade further comprises:

top and bottom surfaces joined by opposite side edges;

first and second non-cutting faces, each extending from one of the side edges to the recessed cutting surface; and

the first and second non-cutting faces being located in a single common plane perpendicular to planes containing the top and bottom surfaces and parallel to the rearward end of the first ram shear blade.

6. A shear ram blowout preventer (BOP), comprising:

a body having a first elongated cavity extending along a first axis and a second elongated cavity extending perpendicular to and intersecting the first elongated cavity;

a pair of ram blocks provided in the first elongated cavity and configured to slide along the first axis, wherein the ram blocks have frontal faces facing each other and the frontal faces are configured to slide towards the second elongated cavity;

a pair of shear blades configured to be attached to the ram blocks and also configured to shear a tubular provided in the second elongated cavity when the ram blocks slide towards the tubular, wherein the pair of shear blades comprises a first ram shear blade and a second ram shear blade configured to shear the tubular in concert with the first ram shear blade;

the second ram Shear blade having a top, a bottom and opposite side edges that are parallel to each other and join the top and the bottom, a generally V-shaped cutting surface comprising a pair of cutting faces, each joining and extending forward from one of the side edges and intersecting each other at an apex equidistant between and forward of the side edges to puncture the tubular, each of the cutting faces being in a single plane and having a cutting edge flush with a plane containing the bottom; and

the first ram shear blade having a generally V-shaped recessed cutting surface extending rearward from as forward end of the first ram shear blade to guide the tubular to a location opposite the apex, the recessed cutting surface having a cutting edge to shear the tubular, the cutting surface of the first ram shear blade having two lateral cutting faces converging toward each other rearwardly curved central cutting face, each of the lateral cutting faces being located in a single plane extending from the central cutting face to the forward end of the first ram shear blade, the cutting edge of the recessed cutting surface extending along each of the cutting faces of the cutting surface of the first ram shear blade.

7. The shear ram BOP of claim 6, wherein:

the first ram shear blade has top and bottom surfaces joined by opposite side edges;

the first ram shear blade has first and second forward end portions extending from the side edges of the first blade to the first and second cutting faces, respectively, of the first ram shear blade, the first and second forward end portions being non-cutting surfaces located in a single common plane that is perpendicular to planes containing the top and bottom surfaces.

8. The shear ram BOP of claim 6, wherein each of the cutting faces of the second ram shear blade is flat from one of the side edges of the second ram shear blade to the apex, and each of the cutting faces of the second ram shear blade is located in a plane that is inclined relative to the top and the bottom of the second ram shear blade.

9. The shear ram BOP of claim 6, wherein:

the cutting faces of the first ram shear blade are at a first angle relative to each other; and

the cutting faces of the second ram shear blade are at a second angle relative to each other, the second angle differing from the first angle.

10. The shear ram BOP of claim 6, wherein the recessed cutting surface of the first ram shear blade has a width at the forward end that is less than a width of the cutting surface of the second ram shear blade.

11. A shear ram blowout preventer (BOP), comprising:

a body having a first elongated cavity extending along a first axis and a second elongated cavity extending perpendicular to and intersecting the first elongated cavity;

a pair of ram blocks provided in the first elongated cavity and configured to slide along the first axis, wherein the ram blocks have frontal faces facing each other and the frontal faces are configured to slide towards the second elongated cavity;

a pair of shear blades configured to be attached to the ram blocks and also configured to shear a tubular provided in the second elongated cavity when the ram blocks slide towards the tubular, wherein the pair of shear blades comprises a first ram shear blade and a second ram shear blade configured to shear the tubular in concert with the first ram shear blade;

the second ram shear blade having a top, a bottom and opposite side edges that are parallel to each other and join the top and bottom, a generally V-shaped cutting surface

comprising a pair of lateral cutting faces, each lateral cutting face having an outer end joining and extending forward from one of the side edges and an inner end intersecting the other cutting face at an apex equidistant between and forward of the side edges, the lateral cutting faces and the apex of the second ram shear blade having cutting edges to shear the tubular, each of the lateral cutting faces of the second ram shear blade located in a single plane the is inclined relative to the top and bottom, each of the lateral cutting faces having a cutting edge flush with a plane containing the bottom;

the first ram shear blade having a top surface, a bottom surface and opposite side edges that are parallel with each other and join the top surface and bottom surface, the first ram shear blade generally V-shaped recessed cutting surface comprising a pair of lateral cutting faces extending rearward from a forward end of the first ram shear blade and converging to a curved central cutting face, each of the lateral cutting faces of the first ram shear blade being in a single plane from the central cutting face to the forward end of the first ram shear blade, the lateral cutting faces and the central cutting face of the recessed cutting surface having cutting edges to shear the tubular; and

a pair of non-cutting surfaces at the forward end of the first ram shear blade, each of the non-cutting surfaces extending from one of the lateral cutting faces of the first ram shear blade to one of side edges of the first ram shear blade, the non-cutting surfaces being located in a single plane that is perpendicular to the planes containing the top surface, the bottom surface and the side edges of the first ram shear blade.

12. The shear ram BOP of claim 11, wherein the lateral cutting faces of the second ram shear blade are at an angle relative to each other that differs from an angle between the lateral cutting faces of the first ram shear blade.

13. The shear ram BOP of claim 11, wherein the recessed cutting surface of the first ram shear blade has a width at the forward end that is less than a width of the cutting surface of the second ram shear blade.