CLAIMS

What is claimed is:

1. A well safety valve, comprising:

an outer housing having a central bore extending axially through the outer housing, wherein the outer housing comprises an outer wall having a receptacle formed in the outer wall;

an inner sleeve disposed in the central bore of the outer housing, wherein the inner sleeve comprises a lockout feature in an exterior surface of the inner sleeve;

a second sleeve disposed in the receptacle;

a piston disposed in the second sleeve, wherein the piston is actuated to travel longitudinally in the second sleeve, wherein the inner sleeve is operable to move in response to movement of the piston; ~~and~~

a valve member disposed in the outer housing, wherein the valve member is operable to selectively restrict flow through the well safety valve in response to movement of the inner sleeve; and

a rod that is disposed at an end of the piston, wherein the inner sleeve comprises a protrusion and a ramp, wherein the protrusion is disposed in a path of motion of the rod.

2. The well safety valve of claim 1, wherein the valve member comprises a flapper valve.

~~3. The well safety valve of claim 1, further comprising a rod, wherein the rod is disposed at an end of the piston.~~

~~4. The well safety valve of claim 3, wherein the inner sleeve comprises a protrusion and a ramp, wherein the protrusion is disposed in a path of motion of the rod.~~

~~5~~3. The well safety valve of claim ~~4~~1, wherein the valve member further comprises a flapper assembly, wherein the flapper assembly comprises a hinge and an opening, wherein the opening accommodates the ramp of the inner sleeve.

~~6~~4. The well safety valve of claim ~~3~~1, wherein the rod has a larger outer diameter than the piston, and wherein a distal end of the rod is contained in a pocket that restricts rotation of the rod.

~~7~~5. The well safety valve of claim 1, wherein a first sub assembly comprises the outer housing, the inner sleeve, the sleeve, the piston, and the valve member, wherein a second sub assembly is threaded into the outer housing.

~~8~~6. The well safety valve of claim ~~7~~5, wherein the lockout feature comprises a notch in the exterior surface of the inner sleeve, wherein the notch in the inner sleeve receives a corresponding lockout feature on an inner surface of the second sub assembly.

~~9~~7. The well safety valve of claim ~~7~~5, wherein the valve member comprises a flapper assembly comprising a hinge and a seat, wherein the valve member further comprise a flapper valve rotatable about the hinge to set again the seat to seal flow through the well safety valve.

~~10~~8. The well safety valve of claim ~~9~~7, wherein the flapper assembly comprises grooves and seals received in the grooves for forming a seal against the outer housing.

~~11~~9. The well safety valve of claim ~~9~~7, wherein the valve member further comprises a supporting rod that engages the second sub assembly to hold valve member in the outer housing.

~~12~~10. The well safety valve of claim ~~11~~9, wherein the supporting rod is unitary with the flapper assembly, or wherein the supporting rod is a separate component from the flapper assembly.

~~13~~11. The well safety valve of claim 1, wherein one or more holes are formed in the sleeve to provide communication with the central bore through the outer housing, wherein one or more holes in the outer wall align with one or more holes in the sleeve.

~~14~~12. The well safety valve of claim 1, further comprising a threaded nut that secures the sleeve in the receptacle, wherein one or more ferrules are disposed in an annulus between the sleeve and the outer wall of the outer housing to form a seal.

~~15~~13. A method of locking out a safety valve in an open position, comprising:

displacing an inner sleeve of the safety valve to move toward a distal end of the safety valve, wherein the inner sleeve engages a valve member to hold the valve member in the open position, wherein the valve member is disposed in an outer housing of a first sub assembly, and wherein the inner sleeve is displaced in a central bore of the outer housing; and

further displacing the inner sleeve such that a lockout feature on an outer surface of the inner sleeve engages a corresponding lockout feature on an inner surface of a second sub assembly to restrict backwards movement of the inner sleeve thus locking out the safety valve in the open position, wherein the second sub assembly is coupled to the first sub assembly; wherein the outer housing comprises a receptacle in an outer wall of the outer housing, wherein a second sleeve is disposed in the receptacle and a piston is disposed in the second sleeve, wherein one or more holes in the second sleeve are aligned with one or more holes in the outer housing that provide fluid communication from the receptacle to the central bore of the outer housing, wherein when the safety valve is locked out, the piston is displaced in the second sleeve beyond one or more holes in the second sleeve such that fluid communication is established between the receptacle and the central bore, wherein the method further comprises flowing fluid from a control line, through the second sleeve, and into the central bore.

~~16~~14. The method of claim ~~15~~13, wherein a ramp of the inner sleeve forms a shoulder with the valve member to inhibit further movement of the inner sleeve toward the distal end.

~~17~~15. The method of claim ~~15~~13, further comprising displacing the inner sleeve away from the distal end to disengage the lockout feature of inner sleeve from the second sub assembly.

~~18~~16. The method of claim ~~15~~13, wherein the lockout feature on the outer surface of the inner sleeve comprise a notch on the outer surface, and wherein the corresponding lockout feature on the inner surface of the second sub assembly comprise a protuberance on the inner surface.

~~19~~17. The method of claim ~~15~~13, wherein the further displacing comprises applying a downward force onto the inner sleeve.

~~20. The method of claim 15, wherein the outer housing comprises a receptacle in an outer wall of the outer housing, wherein a sleeve is disposed in the receptacle and a piston is disposed in the sleeve, wherein one or more holes in the sleeve are aligned with one or more holes in the outer housing that provide fluid communication from the receptacle to the central bore of the outer housing, wherein when the safety valve is locked out, the piston is displaced in the sleeve beyond one or more holes in the sleeve such that fluid communication is established between the receptacle and the central bore, wherein the method further comprises flowing fluid from a control line, through the sleeve, and into the central bore.~~