CLAIMS

What is claimed is:

1. A 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;

a sleeve disposed in the receptacle;

a piston disposed in the sleeve, wherein the piston is actuated to travel in the sleeve;

a spring positioned to apply a biasing force to the piston;

a valve member disposed in the outer housing, wherein the valve member is operable to selectively restrict flow through the safety valve in response to movement of the piston, the valve member configured to restrict flow through the central bore upon expansion of the spring;

an inner sleeve disposed within the central bore of the outer housing, the inner sleeve operable to axially move to open or close the valve member upon expansion or compression of the spring; and

a first rod operable to contact the valve member to prevent translation of the valve member.

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

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

4. The safety valve of claim 3, wherein a distal end of the second rod is disposed in a pocket formed between the outer housing and a protrusion from the inner sleeve.

5. The safety valve of claim 3, wherein a distal extension of the piston extends into a hole at a proximal end of the second rod.

6. The safety valve of claim 3, wherein the inner sleeve comprises a protrusion that is in engagement with an end of the spring, wherein the protrusion is disposed in a path of motion of the second rod.

7. The safety valve of claim 1, further comprising a seat, wherein the valve member comprises a flapper valve that is actuated to be disposed against the seat to seal off flow through the safety valve.

8. The safety valve of claim 1, further comprising a control line port at a proximal end of the sleeve, wherein the sleeve comprises a flow tube of reduced diameter that provides fluid communication between the control line port and the piston.

9. The safety valve of claim 1, further comprising a threaded nut at a proximal end of the receptacle, wherein the threaded nut engages the outer housing to secure the sleeve in the receptacle.

10. The safety valve of claim 1, further comprising a first sub assembly comprising the outer housing and a second sub assembly threaded into the first sub assembly.

11. A method of actuating a safety valve, comprising:

displacing a piston in a sleeve in response to a change in hydraulic pressure provided to the safety valve from a surface of a wellbore, wherein a receptacle is formed in an outer wall of an outer housing of the safety valve, wherein the sleeve is disposed in the receptacle;

axially moving an inner sleeve disposed within a central bore of the outer housing, in response to the displacing the piston;

actuating a valve member in response to axially moving the inner sleeve, the valve member configured to restrict flow through the central bore upon expansion of a spring; and

contacting the valve member with a first rod to prevent translation of the valve member.

12. The method of claim 11, wherein the actuating the valve member comprises displacing a flapper valve to rotate about a hinge.

13. The method of claim 11, wherein a control line is connected to the safety valve, wherein the control line provides the hydraulic pressure to the safety valve.

14. The method of claim 11, wherein a decrease in the hydraulic pressure causes the spring to expand and exert a force against a second rod in engagement with the piston to cause the piston to move through the sleeve.

15. The method of claim 14, wherein the spring engages an inner sleeve disposed in a central bore of the outer housing to displace the inner sleeve in the central bore, wherein the inner sleeve in turn engages the second rod to cause displacement of the second rod.

16. The method of claim 14, wherein a distal end of the second rod is disposed in a pocket formed between a protrusion from the inner sleeve and the outer housing to constrain lateral movement of the second rod.

17. A system for sealing a well, comprising:

a control line;

a production tubing; and

a safety valve coupled to the production tubing, wherein the safety valve comprises:

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, wherein the control line is coupled to the safety valve;

a sleeve disposed in the receptacle;

a piston disposed in the sleeve, wherein the piston is actuated to travel in the sleeve;

a spring positioned to apply a biasing force to the piston;

a valve member disposed in the outer housing, wherein the valve member is operable to selectively restrict flow through the safety valve in response to movement of the piston, the valve member configured to restrict flow through the central bore upon expansion of the spring; and

an inner sleeve disposed within the central bore of the outer housing, the inner sleeve operable to axially move to open or close the valve member upon expansion or compression of the spring; and

a first rod operable to contact the valve member to prevent translation of the valve member.

18. The system of claim 17, wherein the valve member comprises a flapper valve.

19. The system of claim 17, further comprising a second rod, wherein the second rod is disposed at an end of the piston, wherein a distal end of the second rod is disposed in a pocket formed between the outer housing and a protrusion from the inner sleeve.

20. The system of claim 17, further comprising a rod, wherein the second rod is disposed at an end of the piston, wherein a distal extension of the piston extends into a hole at a proximal end of the second rod.