We claim:

1. A valve subassembly comprising:

a body plug including a tubular side wall defining a central cavity and one or more lateral flow apertures in the side wall;

a poppet including axially extending upper and lower stem portions and a radially extending poppet sealing portion between the upper and lower stem portions, with the lower stem portion and the poppet sealing portion being received in the central cavity of the body plug;

a seat carrier including a central bore receiving the upper stem portion of the poppet therethrough, the seat carrier retaining a seat seal in radial alignment with the poppet sealing portion; and

a piston assembled with the central bore of the seat carrier and including a lower end portion engaging the upper stem portion of the poppet and an upper end portion extending above the seat carrier;

wherein the seat carrier is assembled with the body plug to retain the poppet, the seat seal, and the piston together with the seat carrier and the body plug as a replaceable cartridge subassembly.

2. The valve subassembly of claim 1, wherein the seat carrier is threadably assembled with the body plug.

3. The valve subassembly of claim 1, wherein the seat carrier includes one or more lateral flow apertures.

4. The valve subassembly of claim 1, wherein the seat seal is staked into a lower end portion of the seat carrier.

5. The valve subassembly of claim 1, further comprising a poppet spring disposed in the central cavity of the body plug, the poppet spring applying an upward biasing force to the poppet, toward sealing engagement with the seat seal.

6. The valve subassembly of claim 1, wherein the piston includes a shoulder portion that engages a counterbore in the central bore of the seat carrier to retain the piston with the seat carrier.

7. A valve comprising:

a valve body housing including a central bore disposed between first and second end ports; and

the valve subassembly of claim 1, wherein the body plug is installed in the central bore of the valve body, such that at least one of the one or more lateral flow apertures is in fluid communication with the first end port.

8. The valve of claim 7, wherein the body plug is threadably assembled with the central bore of the valve body housing.

9. The valve of claim 7, wherein the body plug includes an end flange fastened to the valve body housing.

10. A pressure regulator comprising:

a valve body housing including a central bore disposed between first and second end ports;

the valve subassembly of claim 1; and

a loading mechanism assembled with the valve body housing and operable to apply a set load force against the poppet for downward movement of the poppet; and

wherein the piston of the valve subassembly functions as a sensing element disposed between the loading mechanism and the poppet of the valve subassembly to transmit the load force from the loading mechanism to the poppet, wherein when fluid pressure within one of the first and second end ports exceeds a pressure setting corresponding to the set load force, the sensing element is movable against the set load force to permit upward movement of the poppet.

11. The pressure regulator of claim 10, wherein the seat carrier is threadably assembled with the body plug.

12. The pressure regulator of claim 10, wherein the seat carrier includes one or more lateral flow apertures.

13. The pressure regulator of claim 10, wherein the seat seal is staked into a lower end portion of the seat carrier.

14. The pressure regulator of claim 10, further comprising a poppet spring disposed in the central cavity of the body plug, the poppet spring applying an upward biasing force to the poppet, toward sealing engagement with the seat seal.

15. The pressure regulator of claim 10, wherein the piston includes a shoulder portion that engages a counterbore in the central bore of the seat carrier to retain the piston with the seat carrier.

16. The pressure regulator of claim 10, wherein the body plug is threadably assembled with the central bore of the valve body housing.

17. The pressure regulator of claim 10, wherein the body plug includes an end flange fastened to the valve body housing.

18. A method of replacing a poppet and seat seal in a regulator valve assembly, the method comprising:

providing a regulator valve assembly including a valve body having a valve body housing defining a central bore, and the valve subassembly of claim 1, with the body plug of the valve subassembly being installed in the central bore;

removing the valve subassembly from the valve body by disassembling the body plug from the valve body housing, thereby withdrawing the body plug, the seat carrier, the poppet, the piston, and the seat seal from the central bore; and

assembling a replacement valve subassembly with the regulator valve body to install a new poppet, piston, and seat seal in the valve body housing bore.

19. The method of claim 18, wherein the body plug includes a male threaded outer portion and the central bore comprises a female threaded portion, wherein disassembling the body plug from the valve body housing comprises unthreading the body plug from the central bore.

20. The method of claim 18, wherein the body plug includes a mounting plate extending from an end portion of the body plug, wherein disassembling the body plug from the valve body housing comprises removing mounting bolts securing the mounting plate to the valve body housing.