CLAIMS

We claim:

1. A downhole tool subassembly comprising:
   a tubing segment having a first set of apertures extending from an inner bore of the tubing segment through an external surface of the tubing segment;
   a first sleeve having a second set of apertures extending from a sleeve bore of the sleeve through an external surface of the sleeve, the first sleeve being operable to restrict flow across the first set of apertures when the first sleeve is in a first position; and
   a first frangible fastener coupling the tubing segment to the first sleeve when the first sleeve is in the first position,
   wherein the first sleeve further comprises a first sealing seat for receiving a first occluding member, the first sealing seat being operable to form a seal across the sleeve bore when the first sealing seat is engaged by the occluding member, and
   wherein the first frangible fastener is operable to fail upon a pressure differential across the seal reaching a predetermined threshold.

2. The downhole tool subassembly of claim 1, further comprising a second frangible fastener extending into the inner bore of the tubing segment, wherein the first sleeve further comprises a slot, wherein the first sleeve is operable to slide downhole to a second position in which an uphole boundary of the slot engages the second frangible fastener upon failure of the first frangible fastener, and wherein the second set of apertures align with the first set of apertures when the first sleeve is in the second position and, optionally, the sealing seat is operable to release the first occluding member upon the pressure differential across the seal reaching a second predetermined threshold and, optionally, the first sleeve further comprises a second sealing seat for receiving a second occluding member, the second occluding member having an outer diameter that is greater than the outer diameter of the first occluding member, wherein the second sealing seat is operable to form a second seal across the sleeve bore when the second sealing seat is engaged by the second occluding member.

3. The downhole tool subassembly of claim 2, wherein the tubing segment comprises an inner shoulder having an inner diameter that is less than an outer diameter of a base of the first sleeve.

4. The downhole tool subassembly of claim 3, wherein the first sleeve is operable to slide downhole to a third position in which the inner shoulder engages the base of the first sleeve upon failure of the second frangible fastener, and wherein the first sleeve is operable to restrict flow across the first set of apertures when the first sleeve is in the third position.

5. The downhole tool subassembly of claim 4, wherein the base of the first sleeve comprises an external latching surface that engages an internal latching surface of the tubing segment when the first sleeve is in the third position.

6. The downhole tool subassembly of claim 4, wherein the second sealing seat is operable to release the second occluding member upon the pressure differential across the second seal reaching a third predetermined threshold.

7. The downhole tool subassembly of claim 1, wherein the first sleeve comprises an uphole member and a downhole member and, optionally, an upper portion of the downhole member is slidingly positioned within a downhole portion of the uphole member and, optionally, the first frangible fastener engages and restricts movement of the downhole member when the first sleeve is in the first position, and wherein the downhole member comprises the first sealing seat.

8. A system for cementing a portion of a wellbore, the system comprising:
a pressurized fluid source;
a controller, and
downhole tool subassembly, the downhole tool subassembly comprising a tubing segment having a first set of apertures extending from an inner bore of the tubing segment through an external surface of the tubing segment, a first sleeve having a second set of apertures extending from a sleeve bore of the sleeve through an external surface of the sleeve, the first sleeve being operable to restrict flow

across the first set of apertures when the first sleeve is in a first position, and a frangible fastener coupling the tubing segment to the first sleeve when the first sleeve is in the first position;

wherein the first sleeve further comprises a first sealing seat for receiving a first occluding member, the first sealing seat being operable to form a seal across the sleeve bore when the first sealing seat is engaged by the first occluding member, and

wherein frangible fastener is operable to fail upon a pressure differential across the seal reaching a predetermined threshold.

9. The system of claim 8, wherein the downhole tool subassembly further comprises a second frangible fastener extending into the inner bore of the tubing segment, wherein the first sleeve further comprises a slot, wherein the first sleeve is operable to slide downhole to a second position in which an uphole boundary of the slot engages the second frangible fastener upon failure of the first frangible fastener, and wherein the second set of apertures align with the first set of apertures when the first sleeve is in the second position.

10. The system of claim 9, wherein the first sealing seat is operable to release the first occluding member upon the pressure differential across the seal reaching a second predetermined threshold, and wherein the first sleeve further comprises a second sealing seat for receiving a second occluding member, the second occluding member having an outer diameter that is greater than the outer diameter of the first occluding member, wherein the second sealing seat is operable to form a second seal across the sleeve bore when the second sealing seat is engaged by the second occluding member.

11. The system of claim 10, wherein the tubing segment comprises an inner shoulder having an inner diameter that is less than an outer diameter of a base of the first sleeve, wherein the first sleeve is operable to slide downhole to a third position in which the inner shoulder engages the base of the first sleeve upon failure of the second frangible fastener, and wherein the first sleeve is operable to restrict flow across the first set of apertures when the first sleeve is in the third position.

12. A method of providing a fluid to an annulus of a wellbore, the method comprising:

deploying a first occluding member to a downhole tool subassembly comprising:

a tubing segment having a first set of apertures extending from an inner bore of the tubing segment through an external surface of the tubing segment;

a first sleeve having a second set of apertures extending from a sleeve bore of the sleeve through an external surface of the sleeve, the first sleeve being in a first position in which the first sleeve restricts fluid flow across the first set of apertures when the first sleeve is in a first position;

a frangible fastener coupling the tubing segment to the first sleeve when the first sleeve is in the first position;

positioning the first occluding member at a first sealing seat of the first sleeve to form a seal across the sleeve bore; and

increasing hydrostatic pressure to a predetermined threshold at an inlet of the tubing segment to cause the frangible fastener to fail.

13. The method of claim 12, wherein the downhole tool subassembly further comprises a second frangible fastener extending into the inner bore of the tubing segment, and wherein the first sleeve further comprises a slot, the method further including causing the first sleeve to slide downhole to a second position in which an uphole boundary of the slot engages the second frangible fastener upon and the second set of apertures align with the first set of apertures and, optionally further comprising increasing hydrostatic pressure to a second predetermined threshold to extrude the first occluding member through the first sealing seat.

14. The method of claim 13, wherein the first sleeve further comprises a second sealing seat, the method comprising receiving a second occluding member at the second sealing seat and forming a second seal across the sleeve bore when the second sealing seat is engaged by the second occluding member.

15. The method of claim 13, further comprising sliding the first sleeve downhole to a third position in which an inner shoulder of the tubing segment engages a base of the first sleeve, and restricting flow across the first set of apertures when the first sleeve is in the third position.