CLAIMS:

1. An automatic fire extinguisher (AFS) valve assembly, comprising:

a valve body;

a push rod disposed in the valve body;

a poppet stem arranged perpendicular to a longitudinal axis of the push rod and disposed in the valve body;

apoppet-to-valve body seal coupled to the poppet stem and disposed in the valve body; and

a poppet return spring coupled to the poppet stem and disposed in the valve body,

wherein the push rod is configured to engage the poppet stem to open the poppet-to-valve body seal.

2. The assembly as claimed in Claim 1 wherein the push rod includes an angled face.

3. The assembly as claimed in Claim 2 wherein the angled face includes a keyway.

4. The assembly as claimed in Claim 3 wherein the poppet stem engages the keyway, and travels along the keyway upon actuation of the push rod.

5. The assembly as claimed in Claim 4 wherein the poppet stem includes deformable material that secures the poppet stem to the push rod upon actuation of the push rod.

6. The assembly as claimed in Claim 1 further comprising an end stop disposed in the valve body.

7. The assembly as claimed in Claim 6 wherein the push rod includes deformable material that secures the push rod to the end stop upon actuation of the push rod.

8. The assembly as claimed in Claim 4 wherein the push rod includes a groove configured to receive the poppet stem upon actuation of the push rod.

9. An automatic fire extinguisher (AFE) system, comprising:

a valve assembly;

an actuator coupled to the valve assembly;

a main outlet coupled to the valve assembly;

a refill valve coupled to the valve assembly; and

a cylinder coupled to the valve assembly,

wherein the actuator is configured to place the valve assembly and the cylinder in fluid communication.

10. The system as claimed in Claim 9, wherein the valve assembly comprises:

a valve body;

a push rod disposed in the valve body;

a poppet stem arranged perpendicular to the push rod and disposed in the valve body;

a poppet-to-valve body seal coupled to the poppet stem and disposed in the valve body; and

a poppet return spring coupled to the poppet stem and disposed in the valve body,

wherein the push rod is configured to engage the poppet stem to open the poppet-to-valve body seal.

11. The system as claimed in Claim 10 wherein the push rod includes an angled face.

12. The system as claimed in Claim 11 wherein the angled face includes a keyway.

13. The system as claimed in Claim 12 wherein the poppet stem engages the keyway, and travels along the keyway upon actuation of the push rod.

14. The system as claimed in Claim 13 wherein the poppet stem includes deformable material that secures the poppet stem to the push rod upon actuation of the push rod.

15. The system as claimed in Claim 10 further comprising an end stop disposed in the valve body.

16. The system as claimed in Claim 15 wherein the push rod includes deformable material that secures the push rod to the end stop upon actuation of the push rod.

17. The system as claimed in Claim 13 wherein the push rod includes a groove configured to receive the poppet stem upon actuation of the push rod.

18. A method for operating an automatic fire extinguisher (AFE), the method comprising:

detecting at least one of a fire or explosion in a confined space;

activating an automatic fire extinguisher that includes:

a valve assembly including:

a valve body;

an end stop disposed in the valve body;

a push rod having an angled face and keyway disposed in the angled face, and disposed in the valve body;

a poppet stem arranged perpendicular to the push rod and disposed in the valve body;

a poppet-to-valve body seal coupled to the poppet stem and disposed in the valve body; and

a poppet return spring coupled to the poppet stem and disposed in the valve body,

wherein the push rod is configured to engage the poppet stem to open the poppet-to-valve body seal;

an actuator coupled to the valve assembly;

a main outlet coupled to the valve assembly;

a refill valve coupled to the valve assembly; and

a cylinder coupled to the valve assembly,

wherein the actuator is configured to place the valve assembly and the cylinder in fluid communication in response to the at least one of the fire and explosion event; and

securing the push rod.

19. The method as claimed in Claim 18 wherein the poppet stem includes deformable material that secures the poppet stem to the push rod upon actuation of the push rod, and wherein the push rod includes deformable material that secures the push rod to the end stop upon actuation of the push rod.

20. The method as claimed in Claim 18 wherein the push rod includes a groove configured to receive the poppet stem upon actuation of the push rod, which secures the push rod to the poppet stem.

CLAIMS

1. A valve assembly for an automatic fire extinguishing system, comprising
   a valve body,
   a push rod that is disposed in the valve body,
   a poppet stem that is disposed perpendicularly to a lengthwise axis of the push rod and is disposed in the valve body,
   a poppet-valve body seal that is linked to the poppet stem and is disposed in the valve body,
   a poppet return spring that is linked to the poppet stem and is disposed in the valve body,
   wherein
   the push rod is configured so as to open the poppet-valve seal by engaging the poppet stem, and includes a deformable material that deforms so as to secure the push rod to an end stop disposed in the valve body when the push rod is operated.

2. The valve assembly as claimed in claim 1, wherein the push rod includes an inclined face.

3. The valve assembly as claimed in claim 2, wherein the inclined face includes a key groove.

4. The valve assembly as claimed in claim 3, wherein the poppet stem engages with the key groove, and moves along the key groove during operation of the push rod.
5. The valve assembly as claimed in claim 4, wherein the poppet stem includes a deformable mobile telecommunications that secures the poppet stem to the push rod during operation of the push rod.
6. The valve assembly as claimed in claim 4, wherein the push rod is configured to contain the poppet stem during operation of the push rod.

7. An automatic fire extinguisher system, comprising
   a valve assembly,
   an actuator linked to the valve assembly,
   a main outlet linked to the valve assembly,
   a fill valve linked to the valve assembly, and
   a cylinder linked to the valve assembly,
   wherein
   the valve assembly comprises
   a valve body,
   a push rod disposed in the valve body,
   a poppet stem that is disposed perpendicularly to a lengthwise axis of the push rod and is disposed in the valve body,
   a poppet-valve body seal that is linked to the poppet stem and is disposed in the valve body, and
   a poppet return spring that is linked to the poppet stem and is disposed in the valve body,
   the push rod is configured so as to open the poppet-valve seal by engaging the poppet stem,
   the actuator is configured so as to cause the valve assembly and the cylinder to fluidly communicate, and
   the push rod includes a deformable material that deforms so as to secure the push rod to an end stop disposed in the valve body when the push rod is operated.

8. The automatic fire extinguishing system as claimed in claim 7, wherein the push rod includes an inclined face.

9. The automatic fire extinguishing system as claimed in claim 8, wherein the inclined face includes a key groove.

10. The automatic fire extinguishing system as claimed in claim 9, wherein the poppet stem engages with the key groove, and moves along the key groove during operation of the push rod.

11. The automatic fire extinguishing system as claimed in claim 10, wherein the poppet stem includes a deformable mobile telecommunications that secures the poppet stem to the push rod during operation of the push rod.

12. The automatic fire extinguishing system as claimed in claim 10, wherein the push rod is configured to contain the poppet stem during operation of the push rod.

13. A method for activating an automatic fire extinguisher system, wherein
automatic fire extinguisher system comprises
a valve assembly,
an actuator linked to the valve assembly,
a main outlet linked to the valve assembly,
a fill valve linked to the valve assembly, and
a cylinder linked to the valve assembly,
the actuator being configured so as to cause the valve assembly and the cylinder to fluidly communicate in response to at least one of a fire or explosion event, and
the valve assembly comprises
a valve body,
an end stop disposed in the valve body,
a push rod disposed in the valve body,
a poppet stem that is disposed perpendicularly to a lengthwise axis of the push rod and is disposed in the valve body,
a poppet-valve body seal that is linked to the poppet stem and is disposed in the valve body, and
a poppet return spring that is linked to the poppet stem and is disposed in the valve body,
the push rod being configured so as to open the poppet-valve seal by engaging the poppet stem, the poppet stem including a deformable material that deforms so as to secure the poppet stem to the push rod when the push rod is operated, and push rod including a deformable material that deforms so as to secure the push rod to an end stop disposed in the valve body when the push rod is operated,
wherein
at least one of a fire or explosion is detected inside a closed space,
the automatic extinguishing system is activated, and
the push rod is secured.

14. The method for activating an automatic fire extinguisher system as claimed in claim 13, wherein the push rod includes a groove configured to include the poppet stem during operation of the push rod, and the groove secures the push rod in the poppet stem.