

WHAT IS CLAIMED IS:

1. A cryogenic storage device for storing items in cryogenic environment, the cryogenic storage device having a storage tank, the storage tank including an inner tank, an outer tank, the inner tank is configured to hold a cryogenic liquid, the inner tank is disposed within the outer tank and spaced apart from an inner surface of the outer tank so as to define a thermal insulative space, the cryogenic storage device comprising:

a fluid inlet configured to supply the cryogenic liquid into a fluid reservoir of the inner tank;

a fluid sensor configured to detect a fluid level within the inner tank, the fluid sensor is removably disposed within the inner tank so as to allow an ice formation to be thawed without having to thaw the entire cryogenic storage device.

2. The cryogenic storage device as set forth in claim 1, wherein the fluid sensor is a capacitance sensor.

3. The cryogenic storage device as set forth in claim 1, further including a collar assembly having an upper collar mounted to the outer tank and a lower collar mounted to the inner tank, the collar assembly sealed to the inner tank and outer tank so as to maintain the integrity of the thermal insulative space, the fluid sensor removable coupled to the upper collar.

4. The cryogenic storage device as set forth in claim 3, wherein the lower collar and the upper collar each have a cylindrical body having a through hole extending an axial length of the cylindrical body.

5. The cryogenic storage device as set forth in claim 4, wherein the upper collar and the lower collar each have a slot extending along a radius of the respective upper and lower collar, the collar assembly further including an intermediate tube seated within the slot of the respective upper and lower collar.

6. The cryogenic storage device as set forth in claim 3, wherein the fluid sensor includes a head removable attached to the collar assembly.

7. The cryogenic storage device as set forth in claim 6, wherein the head includes a vacuum port open to the thermal insulative space.

8. The cryogenic storage device as set forth in claim 1, further including a control housing for housing a control unit, the control unit configured to process a pressure sensor within the inner tank so as to determine an amount of cryogenic liquid within the inner tank.

9. The cryogenic storage device as set forth in claim 1, further including a carousel rotatably mounted within the inner tank.

10. The cryogenic storage device as set forth in claim 1, further including a valve assembly and a control inlet and a manual inlet, the control inlet fluidly coupled to the valve assembly, the valve assembly fluidly coupled to the fluid inlet, the manual inlet fluidly coupled to the fluid inlet.

11. A cryogenic storage device for storing items in cryogenic environment, the cryogenic storage device having an inner tank, an outer tank, the inner tank is disposed within the outer tank and spaced apart from an inner surface of the outer tank so as to define a thermal insulative space, the cryogenic storage device comprising:

a fluid inlet configured to supply the cryogenic liquid into the fluid reservoir;
a capacitance sensor configured to detect a pressure within the cryogenic storage device, the capacitance sensor having a tubular member open to the thermal space, the fluid sensor removably disposed within the thermal insulative space so as to allow an ice formation to be thawed without having to thaw the entire cryogenic storage device.

12. The cryogenic storage device as set forth in claim 11, further including a collar assembly having an upper collar mounted to the outer tank and a lower collar mounted to the inner tank, the collar assembly sealed to the inner tank and outer tank so as to maintain the integrity of the thermal space, the fluid sensor removable coupled to the upper collar.

13. The cryogenic storage device as set forth in claim 12, wherein the lower collar and the upper collar each have a cylindrical body having a through hole extending an axial length of the cylindrical body.

14. The cryogenic storage device as set forth in claim 13, wherein the upper collar and the lower collar each have a slot extending along a radius of the respective upper and lower collar,

the collar assembly further including an intermediate tube seated within the slot of the respective upper and lower collar.

15. The cryogenic storage device as set forth in claim 13, wherein the fluid sensor includes a
5 head removable attached to the collar assembly.

16. The cryogenic storage device as set forth in claim 13, wherein the fluid sensor includes a head removable attached to the collar assembly

10 17. The cryogenic storage device as set forth in claim 16, wherein the head includes a vacuum port open to the thermal space.