CLAIMS

1. A device for the conversion from a solid state to liquid state of a sample contained in a vessel, the device comprising:
a pliable solid material forming a receptacle for receiving the vessel;
a heater for heating the pliable solid material to a temperature higher than a melting point of the sample;
wherein the pliable solid material is interposed between the vessel and a non-pliable solid material, when the vessel is received within the receptacle formed by the pliable solid material and wherein the pliable and the non-pliable solid material form two or more separate segments that join together to form the receptacle and the segments are joined by a mechanical linkage that may move the segments into an open configuration for receiving or releasing the vessel and a closed configuration for forming the receptacle and thawing the vessel, and wherein the pliable solid material may be selectively placed in contact with the vessel when transitioning the segments from the open configuration to the closed configuration or removed from contact with the vessel when transitioning the segments from the closed configuration to the open configuration.

2. The device of claim 1, wherein the pliable solid material has a thermal conductivity between 0.05 Watts per meter-Kelvin and 10 Watts per meter-Kelvin and the non-pliable solid material has a thermal conductivity between 10 Watts per meter-Kelvin and 410 Watts per meter-Kelvin.

3. The device of claim 1, wherein the pliable solid material and the non-pliable solid material are permanently bonded together.

4. The device of claim 1, wherein the pliable solid material and the non-pliable solid material are removably bonded together.

5. The device of claim 1, further comprising a clamp for imposing a clamping force on the segments on the vessel contained within the receptacle, where the clamping force is imposed by magnetic, electromagnetic, spring, hydraulic, pneumatic, or mechanical forces, or any combination thereof.

6. The device of claim 1, further comprising a vessel sensor for detecting the presence of the vessel between the segments of the pliable solid material when the segments are in the open configuration and closed configuration.

7. The device of claim 1, further comprising a micro-controller, wherein, when the segments are in the open configuration, the micro-controller is configured to detect a placement of the vessel at a position between the segments while the segments are in the open configuration and configured to deliver a control signal to actuate the mechanical linkage to move the segments toward the closed configuration to contact the vessel with the pliable solid material of the segments upon insertion of the vessel into the position between the open segments.

8. The device of claim 1, further comprising a micro-controller, wherein, when the segments are in the closed configuration and thawing the vessel, the micro-controller is configured to interrupt thawing of the vessel by delivering a control signal to actuate the mechanical linkage to move the segments toward the open configuration such that the pliable solid material of the segments do not contact the vessel.

9. The device of claim 1, wherein the non-pliable solid material is heated by the heater.

10. The device of claim 1, further comprising a temperature sensor fixed in the non-pliable solid material, and wherein the sample vessel temperature sensor is thermally insulated from the non-pliable solid material and is held in contact with the vessel at a contact location such that a temperature signal reported by the temperature sensor is associated with a temperature of an exterior surface of the vessel at the contact location.

11. The device of claim 1, further comprising an infra-red temperature sensor fixed within the non-pliable solid material, and wherein a temperature signal reported by the infra-red sensor is associated with a temperature of the sample vessel.

12. The device of claim 11, wherein a total duration of a sample thawing interval is determined by algorithmic analysis of the temperature signal from the infra-red temperature sensor reporting an exterior surface temperature of the vessel at a location below the top level of the sample contained therein.

13. The device of claim 1, wherein the heating of the pliable solid material causes radial heating of the vessel to achieve a thaw time that is predominantly independent of a vessel fill level.