Claims :

1. An anneal apparatus comprising:

a metal body;

a lid on the metal body with a process chamber formed between the metal body and the lid;

one or more cooling lines in or on the metal body;

a hot plate having a pedestal supported on a thermal choke on the body;

a gas distributor in the lid over the hot plate;

a cold plate on the metal body;

a load slot in the metal body adjacent to the cold plate;

a transfer mechanism having a hoop movable to a first position over the cold plate and to a second position over the hot plate, with the transfer mechanism also having a lifter for lifting and lowering the hoop, with the lifter including a ball spline enclosed in a housing, and a spline nut attached to the hoop;

a volume exchange channel connecting upper and lower chambers in the housing; and

at least one electronic assembly attached to the metal body.

2. The apparatus of claim 1 with the thermal choke comprising a raised ring having a width of less than 2 mm.

3. The apparatus of claim 1 with an upper surface of the hot plate and an upper surface of the cold plate in a common plane.

4. The apparatus of claim 3 with the hot plate in a first circular recess in the body and the cold plate in a second circular recess in the body, and with the first circular recess intersecting the second circular recess.

5. The apparatus of claim 1 comprising first and second electronic assemblies on the body, with the first electronic assembly controlling the transfer mechanism and with the second electronic assembly controlling a heater in the hot plate.

6. The apparatus of claim 5 with the electronic assemblies on a first side of the hot plate and with the cold plate on a second side of the hot plate opposite from the first side.

7. The apparatus of claim 1 with the transfer mechanism having a lift motor and a rotate motor linked to the hoop adapted to fit over the hot plate and the cold plate.

8. The apparatus of claim 7 with the transfer mechanism further including a lift belt linking the lift motor to the hoop and a rotate belt linking the rotate motor to the hoop.

9. The apparatus of claim 7 further including a lead screw in the housing linked to the rotate motor.

10. The apparatus of claim 1 with the housing attached to a base and further including an exhaust port in the base connecting into the lower chamber.

11. The apparatus of claim 1 with the hot plate having a first radius and the cold plate having a second radius, and the hoop having an axis of rotation spaced apart from a centerline of the plates by a dimension less than the first radius and less than the second radius.

12. An anneal apparatus comprising:

a metal body;

one or more cooling lines in or on the metal body;

first and second circular recesses in the metal body;

a hot plate in the first circular recess and a cold plate in the second circular recess in the body, with the first circular recess intersecting the second circular recess ;

a pedestal on the hot plate supported on a thermal choke on the body;

one or more electronic assemblies on the body electrically connected to the transfer mechanism and to a heater in the hot plate;

a lid on the metal body with a process chamber formed between the metal body and the lid;

a gas distributor in the lid over the hot plate;

a load slot in the metal body adjacent to the cold plate; and

a transfer mechanism having a hoop movable to a first position over the cold plate and to a second position over the hot plate, with the transfer mechanism also having a lifter for lifting and lowering the hoop.

13. The apparatus of claim 12 with the transfer mechanism having a housing enclosing a ball spline and a spline nut attached to the hoop, and a lift motor and a rotate motor linked to the hoop.

14. The apparatus of claim 12 with the electronic assembly on a first side of the hot plate and with the cold plate on a second side of the hot plate opposite from the first side.

15. The apparatus of claim 12 with the transfer mechanism having a housing attached to a base, upper and lower chambers with the housing, and an exhaust port in the base connecting into the lower chamber.

16. The apparatus of claim 12 with the hoop having an axis of rotation spaced apart from a centerline of the plates by a dimension less than the radius of either plate.

17. An anneal apparatus comprising:

a metal body;

a lid on the metal body with a process chamber formed between the metal body and the lid;

one or more cooling lines in or on the metal body;

a hot plate having a pedestal supported on a thermal choke on the body;

a gas distributor in the lid over the hot plate;

a cold plate on the metal body, with the hot plate having a first radius and the cold plate having a second radius;

a load slot in the metal body adjacent to the cold plate;

a transfer mechanism having a hoop movable to a first position over the cold plate and to a second position over the hot plate, with the hoop having an axis of

rotation spaced apart from a centerline of the hot and cold plates by a dimension less than the first radius and less than the second radius, and further including a lifter for lifting and lowering the hoop; and

at least one electronic assembly attached to the metal body.

18. The apparatus of claim 17 with the thermal choke comprising a raised ring having a width of less than 2 mm.

19. The apparatus of claim 17 with an upper surface of the hot plate and an upper surface of the cold plate in a common plane, the hot plate in a first circular recess in the metal body and the cold plate in a second circular recess in the metal body, and with the first circular recess intersecting the second circular recess.

20. The apparatus of claim 17 with the transfer mechanism having a housing enclosing a ball spline and a spline nut attached to the hoop, and a volume exchange channel connecting upper and lower chambers in the housing.