CLAIMS

1. A single stage wafer cushion comprising :

a cushion having ~~essentially~~ a continuous ring shape;

~~said~~ the ring shape ~~having~~ consisting of a "V" or "U" cross section wherein an opening ~~of said~~ of the "V" or "U" is opened on the outer peripheral end of ~~said~~ the ring;

~~said~~ the ring being made of a compliant material with a hinging portion formed at an inner diameter;

an upper and a lower contact surface located on a top edge and a bottom edge of ~~said~~ the opened outer peripheral end such that,

when force is applied to ~~said~~ the upper and lower contact surface ~~said~~ the hinge portion will flex to close ~~said~~ the opened outer peripheral end~~.~~;

wherein the cushion is a single unit.

2. The single stage wafer cushion according to Claim 1 wherein ~~said~~ the upper contact surface is configured to rest on a housing of a wafer carrier.

3. The single stage wafer cushion according to Claim 1 wherein ~~said~~ the lower contact surface is configured to rest on a semiconductor wafer.

4. The single stage wafer cushion according to Claim 1 wherein when force is applied to ~~said~~ the top and ~~a~~ the bottom edge of ~~said~~ the opened outer peripheral end a cushion is created having a linear spring constant.

5. The single stage wafer cushion according to Claim 1 wherein when force is applied to ~~said~~ the top and ~~a~~ the bottom edge of ~~said~~ the opened outer peripheral end a cushion is created having a non-linear spring constant.

6. The single stage wafer cushion according to Claim 1 wherein at least one peripheral end of ~~said~~ the ring is serrated.

7. The single stage wafer cushion according to Claim 1 wherein when ~~said~~ the ~~upper~~ top and ~~said~~ the ~~lower~~ bottom edges of the opened outer peripheral end come in contact with each other, ~~surfaces are closed~~ an outside diameter thickness is created that is greater than a thickness of ~~said~~ the inside diameter.

8. A single and dual stage wafer cushion comprising :

a compliant continuous ring having an inner diameter and an outer diameter;

the ring shape consisting of a single "V" or "U" cross section wherein an opening of the "V" or "U" is opened on the outer peripheral end of the ring;

~~said~~ the inner diameter having a hinge profile with a first leg extending from ~~said~~ the hinge profile to ~~said~~ the outer diameter and ~~said~~ the first leg having an inner and an outer top surface;

a second leg extending from ~~said~~ the hinge profile to ~~said~~ the outer diameter and having an inner and an outer bottom surface to form an opening between ~~said~~ the first leg and ~~said~~ the second leg at ~~said~~ the outer diameter, and

~~said~~ the first leg and ~~said~~ the second leg are spaced from ~~said~~ the inner diameter~~.~~;

wherein the cushion is a single unit.

9. The single and dual stage wafer cushion according to Claim 8 wherein ~~said~~the first and ~~said~~ the second leg further includes an elbow section between ~~said~~ the hinge profile and ~~said~~ the outer diameter.

10. The single and dual stage wafer cushion according to Claim 9 wherein ~~said~~ the elbow sections bend ~~inward~~ towards each other.

11. The single and dual stage wafer cushion according to Claim 10 wherein, when force is applied to ~~said~~ the outer top surface and ~~said~~ the outer bottom surface, ~~said~~ the first leg and ~~said~~ the second leg ~~will be~~ are brought together allowing ~~said~~ the elbow sections to make contact whereby providing a first stage cushion.

12. The single and dual stage wafer cushion according to Claim 11 wherein, when additional force is applied to ~~said~~ the outer top surface and ~~said~~ the outer bottom surface, ~~said~~ the first leg and the second leg of ~~said~~ the wafer cushion will provide a second dual stage cushion where a spring constant of ~~said~~ the first stage is different from a spring constant ~~from said~~of the second stage.

13. The single and dual stage wafer cushion according to Claim 8 wherein ~~said~~ the outer bottom surface is configured to rest on a housing of a wafer carrier.

14. The single and dual stage wafer cushion according to Claim 8 wherein ~~said~~ the outer top surface is configured to rest on a semiconductor wafer.

15. A single and dual stage wafer cushion comprising :

a compliant continuous ring having an inner diameter and an outer diameter;

the ring shape consisting of a single "V" or "U" cross section wherein an opening of the "V" or "U" is opened on the outer peripheral end of the ring;

~~said~~ the ring having a first bottom surface and a first top surface;

~~said~~ the bottom surface having an essentially planar surface at ~~said~~ the inner diameter;

at least one elevation change from ~~said~~ the essentially planar surface at ~~said~~ the inner diameter to a second bottom surface,

whereby ~~said~~ the at least one elevation change provides a cushion having a first spring constant when a load is applied between ~~said~~ the first bottom surface and ~~said~~ the first top surface~~.~~;

wherein the cushion is a single unit.

16. The single and dual stage wafer cushion according to Claim 15 that further includes a bent profile located between ~~said~~ the essentially planar surface and ~~said~~ the inner diameter to a second bottom surface.

17. The single and dual stage wafer cushion according to Claim 16 wherein ~~said~~ the bent profile provides a second spring constant when compliant ring is compressed to ~~said~~ the bend profile.

18. The single and dual stage wafer cushion according to Claim 15 wherein ~~said~~ the first bottom surface is configured to rest on a housing of a wafer carrier.

19. The single and dual stage wafer cushion according to Claim 18 wherein ~~said~~ the first bottom surface is bonded to ~~said~~ the housing of ~~said~~ the wafer carrier.

20. The single and dual stage wafer cushion according to Claim 15 wherein ~~said~~ the first top surface is configured to rest on a semiconductor wafer.