What is Claimed:

1. A manipulator for translating a load along an axis of translation, said manipulator comprising:

a first column;

a telescoping column attached to the load and configured to translate the load along said axis of translation, said first column and said telescoping column telescopingly positioned relative to one another such that one is positioned within the other with a space therebetween;

at least one guiding member mounted in the space between said first column and said telescoping column, wherein said at least one guiding member is configured to guide said telescoping column as said telescoping column translates along said axis of translation.

2. The manipulator according to claim 1 wherein said at least one guide member is configured to prevent relative rotation between said first column and said telescoping column about said axis of translation.

3. The manipulator according to claim 1 wherein the telescoping column is within the first column.

4. The manipulator according to claim 1 wherein the first column is within the telescoping column.

5. The manipulator of claim 1 wherein one or more of said guiding members are positioned to limit translation of said telescoping column about orthogonal axes with respect to said axis of translation.

6. The manipulator of claim 1 wherein said at least one guiding member is selected from the group consisting of a cam follower, cam, wheel, roller, caster, and a bearing.

7. The manipulator of claim 1 wherein the load is a test head for testing integrated circuits.

8. The manipulator of claim 1 wherein a cross sectional shape of said telescoping column is polygonal.

9. The manipulator of claim 8 further comprising a plurality of guiding members, wherein each side of said telescoping column that extends along said axis of translation is positioned in contact with at least one guiding member.

10. The manipulator of claim 1 wherein a cross sectional shape of said first column is polygonal.

11. The manipulator of claim 1 wherein said at least one guiding member is mounted to said first column.

12. The manipulator of claim 1 wherein said at least one guiding member is mounted to said telescoping column.

13. The manipulator of claim 1 further comprising a plurality of guiding members mounted between said first column and said telescoping column.

14. The manipulator of claim 11, said telescoping column defining a plurality of surfaces, wherein each surface is positioned in contact with a guiding member.

15. A load positioning system for translating a load along an axis of translation, said load positioning system comprising:

a first column;

a telescoping column coupled to said load, said first column and said telescoping column telescopingly positioned relative to one another such that one is positioned within the other;

a fluidly operated piston configured to drive said telescoping column along said axis of translation, wherein said fluidly operated piston is configured to receive an equalizing pressure that substantially maintains the position of said telescoping column along said axis of translation and is selectively adjustable to increase pressure to change in a first direction the position of said telescoping column along said axis of translation or decrease pressure to change in an opposite direction the position of said telescoping column along said axis of translation.

16. The load positioning system of claim 15 wherein said system is configured such that a rate of change in position in either direction is a function of said pressure.

17. The load positioning system of claim 15 further comprising at least one guiding member mounted between said first column and said telescoping column.

18. The load positioning system of claim 17 wherein said at least one guiding member is configured to guide said telescoping column as said telescoping column translates along said axis of translation.

19. The load positioning system of claim 18 wherein said guiding member is positioned to limit rotation of said telescoping column about said axis of translation.

20. The load positioning system of claim 18 wherein one or more of said guiding members are positioned to limit translation of said telescoping column about orthogonal axes with respect to said axis of translation.

21. The load positioning system of claim 15 wherein the load is a test head for testing integrated circuits.

22. A load positioning system for translating a load along an axis of translation, said load positioning system comprising:

a support coupled to said load;

a fluidly operated piston configured to drive said support along said axis of translation;

a regulator unit configured to control a pressure of a primary fluid delivered to said fluidly operated piston, said regulator unit receiving a first supply of fluid and a second supply of fluid; and

a control unit configured to control a pressure of said second supply of fluid to said regulator, wherein increasing the pressure of said second supply of fluid causes said pressure of said primary fluid to be increased and said support to move in a first direction, decreasing the pressure of said second supply of fluid causes said pressure of said primary fluid to be decreased and said support to move in the opposite direction, and maintaining the pressure of said second supply of fluid at a constant pressure substantially maintains the position of said support along said axis of translation.

23. The load positioning system of claim 22 wherein said support comprises a column.

24. The load positioning system of claim 22 wherein said support comprises a telescoping column.

25. The load positioning system of claim 22 wherein the pressure of said second supply of fluid is continuously adjustable between a maximum pressure and a minimum pressure.

26. The load positioning system of claim 22 wherein a rate of movement of said support is continuously adjustable as a function of the pressure of said second supply of fluid.

27. The load positioning system of claim 22 wherein said regulator unit is a biased pressure regulator.

28. The load positioning system of claim 22 wherein the control unit includes a toggle valve moveable between up, down and neutral positions which correspond to an increase in pressure of said second supply of fluid, a decrease in pressure of said second supply of fluid, and a maintaining of pressure of said second supply of fluid, respectively.

29. The load positioning system of claim 22 wherein the control unit includes a throttle assembly continuously adjustable between a maximum pressure increase position and a maximum pressure decrease position.

30. The load positioning system of claim 29 wherein the throttle assembly includes a throttle piston moveable within a throttle cylinder and having a first port vented to atmosphere and a second port in fluid communication with said regulator unit to provide said second supply of fluid.

31. The load positioning system of claim 22 wherein the control unit includes a pedal throttle assembly continuously adjustable between a maximum pressure increase position and a maximum pressure decrease position.

32. The load positioning system of claim 31 wherein the pedal throttle assembly includes a flexible bladder with an outlet in fluid communication with said regulator unit to provide said second supply of fluid.

33. The load positioning system of claim 22 wherein the control unit includes a plunger throttle assembly continuously adjustable between a maximum pressure increase position and a maximum pressure decrease position.

34. The load positioning system of claim 33 wherein the plunger throttle assembly includes a plunger actuated pressure regulator with an outlet in fluid communication with said regulator unit to provide said second supply of fluid.

35. The load positioning system of claim 22 wherein the control unit includes a multi-position valve moveable between n number of positions which correspond to n number of pressure increase, pressure decrease or pressure maintain positions or a combination thereof.

36. A load positioning system for translating a load along an axis of translation, said load positioning system comprising:

a support coupled to said load;

a fluidly operated piston configured to drive said support along said axis of translation;

a regulator unit configured to control a pressure of primary fluid delivered to the fluidly operated piston; and

a control unit configured to control a pressure of a secondary supply of fluid, wherein increasing said pressure of said secondary supply of fluid causes an operating force at said fluidly operated piston to be modified and said support to move in a first direction, decreasing said pressure of said secondary supply of fluid causes said operating force to be oppositely modified and said support to move in an opposite direction, and maintaining the pressure of said secondary supply of fluid at a constant pressure substantially maintains the position or speed of said support along said axis of translation.

37. The load positioning system of claim 36 wherein said support comprises a column.

38. The load positioning system of claim 36 wherein said support comprises a telescoping column.

39. The load positioning system of claim 36 wherein increasing said pressure of said secondary supply of fluid causes said operating force to increase and decreasing said pressure of said secondary supply of fluid causes said operating force to decrease.

40. The load positioning system of claim 36 wherein increasing said pressure of said secondary supply of fluid causes said operating force to decrease and decreasing said pressure of said secondary supply of fluid causes said operating force to increase.

41. The load positioning system of claim 36 wherein said regulator unit is a biased pressure regulator.

42. The load positioning system of claim 36 wherein the control unit includes a toggle valve moveable between up, down and neutral positions which correspond to an increase in pressure of said secondary supply of fluid, a decrease in pressure of said secondary supply of fluid, and a maintaining in pressure of said secondary supply of fluid, respectively.

43. The load positioning system of claim 36 wherein the control unit includes a throttle assembly continuously adjustable between a maximum pressure increase position and a maximum pressure decrease position.

44. The load positioning system of claim 43 wherein the throttle assembly includes a throttle piston moveable within a throttle cylinder and having a first port vented to atmosphere and a second port in fluid communication with said regulator unit to provide said secondary supply of fluid.

45. The load positioning system of claim 36 wherein the control unit includes a pedal throttle assembly continuously adjustable between a maximum pressure increase position and a maximum pressure decrease position.

46. The load positioning system of claim 45 wherein the pedal throttle assembly includes a flexible bladder with an outlet in fluid communication with said regulator unit to provide said secondary supply of fluid.

47. The load positioning system of claim 36 wherein the control unit includes a plunger throttle assembly continuously adjustable between a maximum pressure increase position and a maximum pressure decrease position.

48. The load positioning system of claim 47 wherein the plunger throttle assembly includes a plunger actuated pressure regulator with an outlet in fluid communication with said regulator unit to provide said secondary supply of fluid.

49. The load positioning system of claim 47 wherein the plunger throttle assembly includes a plunger actuated pressure regulator with an outlet in fluid communication with an outlet port of said fluidly operated piston to provide said secondary supply of fluid to an opposite side of an internal piston relative to the primary fluid.

50. A load positioning system for translating a load along an axis of translation, said load positioning system comprising:

a support coupled to said load;

an actuator configured to drive said support along said axis of translation; and

a fluidly operated brake lock configured to substantially lock the position of the actuator upon engagement of the lock, wherein the brake lock is further configured to sense when the load is unbalanced and prevent disengagement of the lock when the load is unbalanced.

51. The load positioning system of claim 50 wherein said support comprises a column.

52. The load positioning system of claim 50 wherein said support comprises a telescoping column.

53. The load positioning system of claim 50 further comprising at least one indicator which indicates whether the load is balanced or unbalanced.

54. The load positioning system of claim 53 wherein said at least one indicator indicates whether an unbalanced load is based on overloading or underloading.

55. The load positioning system of claim 54 further comprising a control unit which is configured to facilitate adjustment of an operating force on said actuator in response to an indication of said at least one indicator.

56. The load positioning system of claim 55 wherein said at least one indicator indicates whether the operating force should be increased or decreased to balance an unbalanced load.

57. The load positioning system of claim 53 wherein said at least one indicator provides a visual indication, an audible indication or a combination thereof.

58. The load positioning system of claim 53 wherein said at least one indicator includes a fluidly extensible post.

59. A method of balancing a load supported on a load positioning system comprising a support coupled to said load; a fluidly operated piston configured to drive said support along said axis of translation; and a fluidly operated brake lock configured to substantially lock the position of the piston upon engagement of the lock,

wherein the brake lock is further configured to sense and indicate when the load is unbalanced and prevent disengagement of the lock when the load is unbalanced, comprising the steps of:

observing an indication of an unbalanced load; and

adjusting an operating force on said fluidly operated piston until an unbalanced load is no longer indicated.

60. The method of claim 59 wherein said support comprises a column.

61. The method of claim 59 wherein said support comprises a telescoping column.

62. The method of claim 59 wherein the indication of the unbalanced load indicates whether said operating force requires an increase or decrease to balance the load.

Claims

1. A manipulator for translating a load along an axis of translation, said manipulator comprising:

a first column;

a telescoping column attached to the load and configured to translate the load along said axis of translation, said first column and said telescoping column telescopingly positioned relative to one another such that one is positioned within the other with a space therebetween;

at least one guiding member configured as a cam follower mounted in the space between said first column and said telescoping column, wherein said at least one guiding member is configured to guide said telescoping column as said telescoping column translates along said axis of translation.

2. The manipulator according to claim 1

wherein said at least one guide member is configured to prevent relative rotation between said first column and said telescoping column about said axis of translation and/or

wherein the telescoping column is within the first column or

wherein the first column is within the telescoping column and/or

wherein one or more of said guiding members are positioned to limit translation of said telescoping column about orthogonal axes with respect to said axis of translation and/or

wherein the load is a test head for testing integrated circuits and/or

wherein a cross sectional shape of said telescoping column is polygonal and/or the manipulator further comprises a plurality of guiding members, wherein each side of said telescoping column that extends along said axis of translation is positioned in contact with at least one guiding member and/or

wherein a cross sectional shape of said first column is polygonal and/or

wherein said at least one guiding member is mounted to said first column

and/or

to said telescoping column and/or

the manipulator further comprises a plurality of guiding members mounted between said first column and said telescoping column and/or said telescoping column defining a plurality of surfaces, wherein each surface is positioned in contact with a guiding member.