

WHAT IS CLAIMED IS:

1. An intraocular shunt inserter for treating glaucoma, comprising:
a housing having a distal portion, a proximal portion, a longitudinal axis extending between the distal and proximal portions, the housing further comprising an inner cavity, a guide channel and an elongate slot, the guide channel extending along the longitudinal axis and accessible along an outer surface of the housing, the guide channel having an inner wall, the elongate slot extending along the longitudinal axis along the outer surface of the housing into the inner cavity; and
a slider component slidably coupled to the housing along the outer surface thereof, the slider component slidable along the elongate slot for actuating a function of the inserter via the elongate slot, the slider component comprising a guide tab and a friction tab, the guide tab disposed within and slidable along the guide channel of the housing, the friction tab being movable relative to the guide tab and comprising a biasing portion configured to urge the friction tab against the housing for causing the guide tab to be contacted against the inner wall of the guide channel for providing frictional resistance between the slider component and the housing against sliding.
2. The inserter of Claim 1, wherein the slider component comprises an interior region into which the housing is fitted.
3. The inserter of Claim 2, wherein the interior region is semi-cylindrical.
4. The inserter of Claim 2, wherein the friction tab extends inwardly toward the interior region of the slider component for contacting an outer surface of the housing.
5. The inserter of Claim 4, wherein the friction tab comprises a pair of friction tabs extending inwardly toward the interior region of the slider component.
6. The inserter of Claim 2, wherein the guide tab extends inwardly toward the interior region of the slider component.
7. The inserter of Claim 2, wherein the guide tab comprises a pair of guide tabs extending inwardly toward the interior region of the slider component.
8. The inserter of Claim 2, wherein the slider component comprises a generally cylindrical profile and the guide tabs are spaced between about 90 degrees to about 180 degrees apart from each other along an inner surface of the interior region.

9. The inserter of Claim 1, wherein when coupled to the housing, the slider component contacts the housing only via the guide tab and the friction tab.

10. The inserter of Claim 1, wherein the guide tab comprises a pair of guide tabs, each of the pair of guide tabs comprising a longitudinally extending flange configured to sit within the guide channel.

11. The inserter of Claim 1, wherein the housing comprises a generally cylindrical profile and a pair of guide channels are spaced between about 90 degrees to about 180 degrees apart from each other along the outer surface of the housing.

12. The inserter of Claim 11, wherein the guide channels are disposed about 180 degrees from each other.

13. The inserter of Claim 1, wherein the guide tab, the friction tab, and the slider component are formed as a single, continuous piece of material.

14. The inserter of Claim 1, wherein the friction tab is formed as a cut out through a body of the slider component.

15. The inserter of Claim 14, wherein the friction tab comprises a protrusion extending toward an interior region of the slider component.

16. The inserter of Claim 15, wherein when the slider component is coupled to the housing, the protrusion of the friction tab contacts the housing.

17. The inserter of Claim 16, wherein the protrusion of the friction tab contacts the housing to cause the friction tab to bend in a direction away from the guide tab.

18. The inserter of Claim 1, wherein the housing comprises a generally cylindrical profile.

19. The inserter of Claim 1, wherein the housing comprises an indicator area against which the friction tab can contact the housing for providing audible or tactile feedback to an operator.

20. The inserter of Claim 19, wherein the indicator area comprises at least one discontinuity in the outer surface of the housing.

21. The inserter of Claim 19, wherein the indicator area comprises at least one bump on the outer surface of the housing.

22. The inserter of Claim 19, wherein the indicator area comprises a plurality of serrated features on the outer surface of the housing.

23. The inserter of Claim 19, wherein the indicator area comprises a plurality of tapered peaks on the outer surface of the housing.

24. The inserter of Claim 19, wherein the function of the inserter comprises advancing a shunt within a needle, and a position of the slider component along the indicator area corresponds to a deployment position of the shunt relative to the needle.

25. The inserter of Claim 19, wherein the indicator area comprises a plurality of bumps on the outer surface of the housing, wherein each of the bumps corresponds to a deployment position of an intraocular shunt.

26. The inserter of Claim 1, wherein the slider component is operatively coupled to a deployment mechanism within the housing.

27. The inserter of Claim 26, wherein the slider component is coupled to the deployment mechanism via a rod extending through the elongate slot, the rod being coupled to the slider component and the deployment mechanism.

28. The inserter of Claim 1, further comprising a hollow needle that comprises a bend at an angle of between about 6 degrees to about 10 degrees, the needle being configured to carry an intraocular shunt.

29. The inserter of Claim 28, wherein the needle defines a straight section and an angled section.

30. The inserter of Claim 1, further comprising a hollow needle extending from a distal end portion of the inserter, the inserter further comprising a deflector component releasably attachable to the distal end portion of the inserter, and wherein when the deflector component is coupled to the inserter, the hollow needle extends through the deflector component and the deflector maintains the needle in a bended configuration.

31. The inserter of Claim 30, wherein in the bended configuration, the needle is bended at an angle of between about 6 degrees to about 10 degrees.

32. The inserter of Claim 30, wherein when coupled with the deflector, the needle is elastically deformed.

33. The inserter of Claim 30, wherein the distal end portion of the inserter comprises an indexing structure and the deflector component comprises an alignment index, wherein the alignment index of the deflector component can be releasably engaged with the indexing structure to define a rotational orientation of the deflector component relative to the inserter.

34. The inserter of Claim 33, wherein the deflector component comprises a bent needle guide attached to and extending from a coupler, wherein the alignment index is formed along the coupler.

35. The inserter of Claim 34, wherein the alignment index is positioned along a proximal portion of the coupler.

36. The inserter of Claim 34, wherein the alignment index comprises at least one groove extending along a perimeter of the coupler.

37. The inserter of Claim 34, wherein the needle guide comprises a hollow shaft.

38. The inserter of Claim 33, wherein the indexing structure comprises at least one protrusion configured to slide into a corresponding groove.

39. An intraocular shunt inserter for treating glaucoma, comprising:

a housing having a distal portion, a proximal portion, and a longitudinal axis extending between the distal and proximal portions, the housing further comprising an interior cavity, a guide channel, and an elongate slot extending along an outer surface of the housing into the cavity for actuating a function of the inserter;

a slider component coupled to the housing and positioned along the outer surface thereof, the slider component slidable along the elongate slot, the slider comprising a guide tab disposed within the guide channel; and

a position feedback mechanism comprising a biased tab and an indicator area, the biased tab being coupled to the slider component, the indicator area being formed along the outer surface of the housing, wherein motion of the slider component causes the biased tab to slide along the indicator area to generate tactile or auditory feedback to an operator regarding a position of an intraocular shunt relative to the inserter.

40. The inserter of Claim 39, wherein the indicator area comprises at least one discontinuity in the outer surface of the housing.

41. The inserter of Claim 39, wherein the indicator area comprises at least one bump on the outer surface of the housing.

42. The inserter of Claim 39, wherein the indicator area comprises a plurality of serrated features on the outer surface of the housing.

43. The inserter of Claim 39, wherein the indicator area comprises a plurality of tapered peaks on the outer surface of the housing.

44. The inserter of Claim 39, wherein the function of the inserter comprises advancing a shunt within a needle, and a position of the slider component along the indicator area corresponds to a deployment position of the shunt relative to the needle.

45. The inserter of Claim 39, wherein the indicator area comprises a plurality of bumps on the outer surface of the housing, wherein each of the bumps corresponds to a deployment position of an intraocular shunt.

46. The inserter of Claim 45, wherein each of the plurality of bumps is disposed along the housing at positions corresponding to rotational positions of a drive component of a deployment mechanism of the inserter.

47. The inserter of Claim 39, further comprising a hollow needle extending from a distal end portion of the inserter, the inserter further comprising a deflector component releasably attachable to the distal end portion of the inserter, and wherein when the deflector component is coupled to the inserter, the hollow needle extends through the deflector component and the deflector maintains the needle in a bended configuration.

48. The inserter of Claim 47, wherein in the bended configuration, the needle is bended at an angle of between about 6 degrees to about 10 degrees.

49. The inserter of Claim 47, wherein when coupled with the deflector, the needle is elastically deformed.

50. The inserter of Claim 52, wherein the needle guide comprises a hollow shaft.

51. The inserter of Claim 47, wherein the distal end portion of the inserter comprises an indexing structure and the deflector component comprises an alignment index, wherein the alignment index of the deflector component can be releasably engaged with the indexing structure to define a rotational orientation of the deflector component relative to the inserter.

52. The inserter of Claim 51, wherein the deflector component comprises a bent needle guide attached to and extending from a coupler, wherein the alignment index is formed along the coupler.

53. The inserter of Claim 52, wherein the alignment index is positioned along a proximal portion of the coupler.

54. The inserter of Claim 52, wherein the alignment index comprises at least one groove extending along a perimeter of the coupler.

55. The inserter of Claim 54, wherein the indexing structure comprises at least one protrusion configured to slide into the at least one groove.
56. The inserter of Claim 47, wherein the needle is elastically deformable.
57. A method of operating an intraocular shunt inserter, the method comprising:
distally advancing a slider component along a housing of an intraocular shunt inserter by overcoming a frictional resistance between a friction tab of the slider component and the housing, the slider component being slidable for actuating a function of the inserter, the slider component comprising a guide tab and a friction tab, the guide tab disposed within and slidable along a guide channel of the housing, the friction tab being movable relative to the guide tab and comprising a biasing portion configured to urge the friction tab against the housing for causing the guide tab to be contacted against an inner wall of the guide channel for providing the frictional resistance between the slider component and the housing; and
contacting a plunger, engaged with the slider, against a shunt disposed within a needle of the inserter to distally advance the shunt within the needle.
58. The method of Claim 57, further comprising engaging a discontinuity of the housing via the friction tab.
59. The method of Claim 58, further comprising generating an auditory signal by engaging the discontinuity.
60. The method of Claim 58, wherein a position of the discontinuity corresponds to a position of the shunt within a lumen of the needle.
61. The method of Claim 60, wherein the discontinuity comprises a bump.
62. The method of Claim 60, wherein the discontinuity comprises a serrated feature.
63. The method of Claim 60, wherein the discontinuity comprises a tapered peak.
64. The method of Claim 57, further comprising bending the needle of the inserter by coupling a deflector component to a distal end portion of the inserter.
65. The method of Claim 64, wherein the bending comprises inserting the needle through the deflector component to cause the needle to bend.
66. The method of Claim 64, wherein the bending comprises bending the needle at an angle of between about 6 degrees to about 10 degrees.

67. The method of Claim 64, wherein the deflector component defines a straight insertion portion and an angled deployment portion.

68. The method of Claim 64, further comprising aligning the deflector component with the distal end portion of the inserter via an indexing mechanism.

69. The method of Claim 68, wherein the indexing mechanism comprises at least one protrusion on the distal end portion of the inserter.

70. The method of Claim 57, further comprising elastically deforming the needle.

71. A system for deploying an intraocular shunt, the system comprising:

an intraocular shunt inserter comprising a housing having a distal end portion and a needle extending from the distal end portion; and

a deflector component releasably attachable to the distal end portion of the inserter, the deflector component having a needle guide configured to receive the needle of the inserter therein, wherein the needle guide maintains the needle in a bended configuration.

72. The system of Claim 71, wherein the needle guide comprises a hollow shaft.

73. The system of Claim 71, wherein in the bended configuration, the needle is bended at an angle of between about 6 degrees to about 10 degrees.

74. The system of Claim 71, wherein when coupled with the deflector component, the needle is elastically deformed.

75. The system of Claim 71, wherein the distal end portion of the inserter comprises an indexing structure and the deflector component comprises an alignment index, wherein the alignment index of the deflector component can be releasably engaged with the indexing structure to define a rotational orientation of the deflector component relative to the inserter.

76. The system of Claim 75, wherein the deflector component comprises a coupler, the needle guide being attached to the coupler, wherein the alignment index is formed along the coupler.

77. The system of Claim 76, wherein the alignment index is positioned along a proximal portion of the coupler.

78. The system of Claim 76, wherein the alignment index comprises at least one groove extending along a perimeter of the coupler.

79. The system of Claim 76, wherein the indexing structure comprises at least one protrusion configured to slide into a corresponding groove.

80. An intraocular shunt delivery device, comprising:

a cylindrical housing comprising guide channels extending longitudinally along the housing, each guide channel defining an inner wall having an upper face; and

a semi-cylindrical slider disposed about the housing, wherein the slider is axially moveable relative to the housing, the slider comprising:

a pair of guide tabs disposed within respective ones of the guide channels of the housing to secure the slider to the housing;

a friction tab, disposed intermediate the guide tabs on the slider, comprising a biasing portion configured to urge the friction tab against the housing for causing the guide tab to be contacted against the inner wall of the guide channel; and

a slider protrusion operatively coupled to a shunt deployment mechanism within the housing.

81. The delivery device of Claim 80, wherein the guide channels are disposed about 180 degrees from each other.

82. The delivery device of Claim 80, wherein the slider protrusion passes through the housing to the deployment mechanism.

83. The delivery device of Claim 80, wherein the housing comprises an indicator area disposed along an outer surface of the housing against which the friction tab can contact the housing for providing audible or tactile feedback to an operator.

84. The delivery device of Claim 83, wherein the indicator area comprises a groove, an indentation, or a protrusion.

85. The delivery device of Claim 83, wherein the indicator area comprises at least one discontinuity to receive the biasing portion.

86. The delivery device of Claim 83, wherein the indicator area comprises at least one bump on the outer surface of the housing.

87. The delivery device of Claim 83, wherein the indicator area comprises a plurality of serrated features on the outer surface of the housing.

88. The delivery device of Claim 83, wherein the indicator area comprises a plurality of tapered peaks on the outer surface of the housing.

89. The delivery device of Claim 80, further comprising a hollow needle that comprises a bend at an angle of between about 6 degrees to about 10 degrees and is configured to hold an intraocular shunt.

90. The delivery device of Claim 89, wherein the bend defines a straight insertion portion and an angled deployment portion of the needle.

91. The delivery device of Claim 89, further comprising a deflector component releasably attachable to a distal end portion of the delivery device, and wherein when the deflector component is coupled to the delivery device, the hollow needle extends through the deflector component and the deflector maintains the needle in a bended configuration.

92. The delivery device of Claim 91, wherein the needle is elastically deformed.

93. The delivery device of Claim 91, wherein the distal end portion of the delivery device comprises an indexing structure and the deflector component comprises an alignment index, wherein the alignment index of the deflector component can be releasably engaged with the indexing structure to define a rotational orientation of the deflector component relative to the delivery device.

94. An inserter device for deploying an intraocular shunt, the device comprising:
a housing;

a shunt deployment mechanism disposed within the housing;

a deformable hollow needle coupled to the housing and the deployment mechanism for delivering an intraocular shunt; and

a deflector component releasably attachable to a distal end portion of the housing, the deflector component comprising a coupling body and a needle guide positionable against a portion of the needle to cause the needle to be positioned in a bended configuration.

95. The device of Claim 94, wherein the needle guide comprises a bend at an angle of between about 0 degrees to about 15 degrees.

96. The device of Claim 94, wherein the needle guide comprises a bend at an angle of between about 2 degrees to about 10 degrees.

97. The device of Claim 94, wherein the needle guide comprises a bend at an angle of between about 3 degrees to about 8 degrees.

98. The device of Claim 94, wherein the needle guide comprises a bend at an angle of between about 4 degrees to about 6 degrees.

99. The device of Claim 94, wherein the needle guide comprises a straight insertion portion and an angled deployment portion.

100. The device of Claim 94, wherein the needle is elastically deformable.

101. The device of Claim 94, wherein the housing comprises an indexing structure and the deflector component comprises an alignment index, wherein the alignment index of the deflector component can be releasably engaged with the indexing structure to define a rotational orientation of the deflector component relative to the inserter device.

102. The device of Claim 101, wherein the indexing structure comprises a plurality of index grooves.

103. The device of Claim 102, wherein the plurality of index grooves are configured to receive a plurality of index protrusions of the deflector component.

104. The device of Claim 101, wherein the indexing structure defines a plurality of orientations at which the deflector component can engage with the housing.

105. The device of Claim 94, further comprising a slider component as recited in any of the preceding claims.

106. A method of operating an intraocular shunt inserter, the method comprising:

providing an inserter device for deploying an intraocular shunt, the device comprising a housing having a distal end portion, a shunt deployment mechanism disposed within the housing, and a deformable hollow needle coupled to the housing and the deployment mechanism for delivering an intraocular shunt;

inserting the needle into a needle guide of a deflector component to cause the needle to be positioned in a bended configuration; and

coupling the deflector component to the distal end portion of the housing with a coupling body of the deflector component positioned against the distal end portion.

107. The method of Claim 106, wherein the inserting comprising causing the needle to be bended at an angle of between about 0 degrees to about 15 degrees in the bended configuration.

108. The method of Claim 106, wherein the inserting comprising causing the needle to be bended at an angle of between about 6 degrees to about 10 degrees in the bended configuration.

109. The method of Claim 106, wherein the inserting comprising causing the needle to be bended at an angle of between about 2 degrees to about 10 degrees in the bended configuration.

110. The method of Claim 106, wherein the inserting comprising causing the needle to be bended at an angle of between about 3 degrees to about 8 degrees in the bended configuration.

111. The method of Claim 106, wherein the inserting comprising causing the needle to be bended at an angle of between about 4 degrees to about 6 degrees in the bended configuration.

112. The method of Claim 106, wherein the needle guide comprises a straight insertion portion and an angled deployment portion.

113. The method of Claim 106, further comprising aligning the deflector component with the distal end portion of the inserter via an indexing mechanism.

114. The method of Claim 113, wherein the indexing mechanism comprises at least one protrusion on the distal end portion of the inserter.

115. The method of Claim 113, wherein the aligning comprises rotationally aligning the deflector component relative to the housing.

116. The method of Claim 115, wherein the rotationally aligning comprises selecting an indexed rotational position from a plurality of rotational positions.