- the vial adaptor further comprises a filter arranged between the regulation passageway and the chamber;
- the vial adaptor comprises a duct member arranged between the chamber and an extremity of the regulation passageway, the diameter of at least a portion of the duct member being smaller than the diameter of the extremity of the regulation passageway;
- the duct member is arranged between the extremity of the regulation passageway and the regulation port;
- the diameter of at least a portion of the duct member is smaller than the diameter of the regulation port;
- the duct member is integrally formed with the sealing member; and/or
- the vial adaptor further comprises a regulation compartment between the regulation passageway and the chamber.

According to a second example, the chamber may comprise at least a flexible and/or elastic portion which comprises two sheets welded together. This provides a chamber relatively easy to manufacture.

According to a third example, the vial connection port may define a vial connection axis and the chamber may surround the vial connection axis. The vial adaptor may be further configured, when connected to a vial, for the chamber to expand in an orientation toward the vial. This provides a vial adaptor stable during use, notably during expansion of the chamber.

In one aspect, the present disclosure refers to a closed vial adaptor (10a-e, 110a-i, 1010) comprising:

- a body portion (20, 20d-h, 120, 1020) including:
  - a vial connection port (22, 22f-g, 1022),
  - a syringe connection port (24, 1024),
  - an access passageway (26, 1026) between the vial connection port and the syringe connection port, and
  - a regulation passageway (28, 1028);
- an expandable and/or contractible chamber (40, 40a, 1040) impermeable to gas and/or liquid and configured to be cased within an expandable rigid housing (50,

50d-g, 150a-i, 1050), thus creating a closed and sealed vial adaptor that does not allow any substance, either in the form of solid, liquid or gas, to enter or exit said closed vial adaptor, wherein the regulation passageway are configured to connect between the vial connection port and the chamber; and wherein the expandable rigid housing comprises at least two portions (52, 56) configured for telescopically sliding one with respect to the other when the housing expands or retracts.

According to a fourth example, the vial adaptor may comprise a coupling portion which includes a regulation port. The vial adaptor may comprise a fluid path between the regulation port and an extremity of the regulation passageway. The vial adaptor may further comprise another fluid path between the regulation port and the chamber. This provides a vial adaptor relatively easy to manufacture and safe to use.

According to a fifth example, the vial adaptor may be provided in a sealed package and with a positive volume of (e.g. cleaned and/or sterilized) gas contained in the chamber. This provides a vial adaptor ready for use with a vial having content in fluid form, for example as a liquid.

In examples of these additional examples, the vial adaptor may comprise no housing casing the chamber. In alternative examples, the vial adaptor may comprise a housing casing the chamber. The housing may be non-expandable. The volume of the housing may be fixed

CLAIMS

1. A closed vial adaptor (10a-e, 110a-i, 1010) comprising:

- a body portion (20, 20d-h, 120, 1020) including:
  - a vial connection port (22, 22f-g, 1022),
  - a syringe connection port (24, 1024),
  - an access passageway (26, 1026) between the vial connection port and the syringe connection port, and
  - a regulation passageway (28, 1028);
- an expandable and/or contractible chamber (40, 40a, 1040) impermeable to gas and/or liquid and configured to be cased within an expandable rigid housing (50, 50d-g, 150a-i, 1050), thus creating a closed and sealed vial adaptor that does not allow any substance, either in the form of solid, liquid or gas, to enter or exit said closed vial adaptor, wherein the regulation passageway are configured to connect between the vial connection port and the chamber; and wherein the expandable rigid housing comprises at least two portions (52, 56) configured for telescopically sliding one with respect to the other when the housing expands or retracts.

2. The vial adaptor of claim 1, wherein the chamber is configured for imparting expansion to the housing.

3. The vial adaptor of claim 1 or 2, wherein the housing has a contracted state and an expanded state, the housing being less voluminous in the contracted state than in the expanded state, the housing casing the chamber both in the contracted state and in the expanded state.

4. The vial adaptor of claim 1, 2 or 3, wherein the housing is further contractible.

5. The vial adaptor of any one of claims 1 to 4, wherein the chamber (40, 40a) comprises at least a flexible and/or elastic portion, the flexible and/or elastic portion comprising two sheets (42, 44)

welded together, the two sheets (42, 44) each having an annulus shape, the two sheets being welded together at respective external edges (45).

6. The vial adaptor of any one of claims 1 to 5, wherein the vial connection port defines a vial connection axis (A), the housing and/or the chamber surrounding the vial connection axis.

7. The vial adaptor of any one of claims 1 to 5, wherein the housing and/or the chamber surrounds at least a section (30, 30e-g) of the body portion, and wherein the vial connection port defines a vial connection axis (A), the section (30, 30e-g) of the body portion that the housing and/or the chamber surrounds extending along the vial connection axis.

8. The vial adaptor of claim 6 or 7, wherein the housing (50) defines a toroid inside space (51) and/or the chamber (40, 40a) defines a toroid inside space (41, 41a).

9. The vial adaptor of any one of claims 6 to 8, wherein the vial adaptor is configured for the housing to expand and/or contract uniformly around the vial connection axis (A), and/or for the chamber to expand and/or contract uniformly around the vial connection axis (A).

10. The vial adaptor of any one of claims 1 to 9, wherein the vial connection port defines a vial connection axis (A), the vial adaptor being configured for the housing (50, 50d-g, 150a-b, 150f) to expand and/or contract along a direction at least substantially parallel to the vial connection axis (A), and/or for the chamber (40, 40a) to expand and/or contract along a direction at least substantially parallel to the vial connection axis (A).

11. The vial adaptor of any one of claims 1 to 10, wherein the vial adaptor is configured, when connected to a vial, for the housing (50, 50d-g, 150b-c, 150f) to expand in an orientation (D) toward the vial, and/or for the chamber (40, 40a) to expand in an orientation (D) toward the vial.

12. The vial adaptor of any one of claims 1 to 11, wherein:

- the body portion is assembled to one or more other components of the vial adaptor via press-fitting and/or snapping,
- the chamber is assembled to one or more other components of the vial adaptor via welding, and/or
- the housing (50) comprises a cover (56) and a bowl (52), the cover being snapped to the bowl.

13. The vial adaptor any one of claims 1 to 12, wherein the vial adaptor further comprises a coupling portion (63a-b, 63e-g) which includes a regulation port (66, 68e, 66f, 68g), the vial adaptor comprising a fluid path between the regulation port and an extremity of the regulation passageway (282, 282e-g), the vial adaptor comprising another fluid path between the regulation port and the chamber, and wherein the coupling portion (63a-b, 63e-g) forms a passage (61), the central section of the body portion being inserted in the passage.

14. The vial adaptor of claim 13, wherein the coupling portion (63a-b, 63e, 63g, 63f) comprises a sleeve portion (602, 602e, 602g, 584f) which forms the passage (61), the vial connection port (22, 22g) being arranged at one end of the sleeve portion and the syringe connection port (24) being arranged at the other end of the sleeve portion.