CLAIMS

1. An apparatus for measuring mass flow, comprising

an elongate body having at least one frame portion;

an arched structure; and

one or more conduit portions that are part of the body and/or the arched structure;

wherein the arched structure extends outwardly from the frame portion, in which the frame portion is formed with a plurality of struts that support the arched structure; and

wherein the body with the frame portion and its struts, the arched structure, and the conduit portions, are at least integrally formed as a single piece, whereby fluid flowing through the conduit portions has its mass flow measured when the arched structure is induced to vibrate.

2. The apparatus according to claim 1, wherein the conduit portions have a tapered cross-section.

3. The apparatus according to claim 1 or 2, wherein the struts are arranged in an ordered manner to define one or more unit cells that constitute an ordered lattice formation.

4. The apparatus according to any one of the preceding claims, wherein the arched structure comprises

two or more sections; and

one or more elbow portions;

wherein the elbow portions connect each section at one or more angles for at least two sections to meet at a common point.

5. The apparatus according to claim 4, wherein the arched structure further comprises holder portions formed along either one of the sections or the elbow portions, with the holders including

a first holder portion and a second holder portion that are each along one corresponding section; and

a third holder portion that is along one of the elbow portions.

6. The apparatus according to claim 5, further comprising

a first detector module that is mountable on the first holder portion;

a second detector module that is mountable on the second holder portion; and

an exciter module mounted on third holder portion that induces the arched structure to vibrate.

7. The apparatus according to any one of the preceding claims, wherein the conduit portions include

at least one first conduit portion;

at least one second conduit portion; and

at least one third conduit portion;

wherein the second conduit portion is between the first conduit portion and the second conduit portion.

8. The apparatus according to claim 7, wherein the first conduit portion and the third conduit portion are each formed with a branched part to

divert fluid from a single flow path to one or more flow paths; or

converge fluid to flow from one or more flow paths to a single flow path.

9. The apparatus according any one of claims 7 or 8, wherein the arched structures further comprise one or more conduit arrangements in which each conduit arrangement has a corresponding second conduit portion that is in connection with the first conduit portion and the third conduit portion.

10. The apparatus according to claim 9, wherein the arched structure further comprises one or more brace portions to provide support to its conduit arrangements.

11. The apparatus according to any one of the preceding claims, further comprising an inlet and an outlet in which the body extends therebetween, and are each integrally formed with the body and/or conduit portions of the body.

12. The apparatus according to claim 11, further comprising a pair of corrugated portions that are each correspondingly attached to the inlet and the outlet, respectively.

13. The apparatus according to claim 12, further comprising a pair of flanged portions that are each correspondingly attached to each corrugated portion, respectively.

14. The apparatus according to any one of the preceding claims, further comprising a housing that is mountable thereupon to cover the arched structure, and the entirety or portions of the frame portion.

15. The apparatus according to any one of the preceding claims, wherein the arched structure is symmetrical along an axis that is perpendicular to a longitudinal axis of the body.

16. A method for fabricating an apparatus for measuring mass flow according to claim 1, comprising the steps of

forming an elongate body having at least one frame portion;

forming an arched structure,; and

forming one or more conduit portions that are part of the body and/or the arched structure;

wherein the arched structure extends outwardly from the frame portion, in which the frame portion is formed with a plurality of struts that support the arched structure; and

wherein the body with the frame portion and its struts, the arched structure, and the conduit portions, are at least integrally formed as a single piece, whereby fluid flowing through the conduit portions has its mass flow measured when the arched structure is induced to vibrate.

17. The method according to claim 16, wherein the step of forming an elongate body having at least one frame portion further comprises the steps of

forming a plurality of struts to be part of the frame portion; and

forming interfaces to be part of the frame portion in which ends of the arched structure in connection therewith.

18. The method according to any one of claims 16 or 17, wherein the step of forming one or more conduit portions that are part of the body and/or the arched structure further comprises the step of forming these conduit portions to have a tapered cross-section.

19. The method according to any one of claims 16 to 18, wherein the step of forming an arched structure, which extends outwardly from the frame portion, further comprises the steps of

forming one or more sections to define the arched structure; and

forming one or more elbow portions to define the arched structure;

wherein the elbow portions connect each section at one or more angles for at least two sections to meet at a common point.