Claims

1. A nozzle apparatus comprising:
an inlet,
an outlet,
a filter disposed between the inlet and the outlet,
and a container;
wherein the nozzle apparatus defines a first flow path for particles too large for said filter and a second flow path towards the outlet for particles small enough for said filter;
and wherein the container is provided downstream of the first flow path.

2. A nozzle apparatus as claimed in claim 1, comprising a removable portion to allow access to the container.

3. A nozzle apparatus as claimed in claim 2, wherein the container comprises the removable portion.

4. A nozzle apparatus as claimed in claim 2 or claim 3, wherein the removable portion is removable by way of any one or more of a threaded connection, a snap fit connection, springs, clips and bolt & screw.

5. A nozzle apparatus as claimed in any one of claims 2 to 4, wherein the removable portion is connected to, and separable from, the filter.

6. A nozzle apparatus as claimed in any preceding claim, wherein the first flow path terminates in the container.

7. A nozzle apparatus as claimed in any preceding claim, wherein the cross-sectional size of the inlet is at least the same size, optionally bigger, than the cross-sectional size of the first flow path

8. A nozzle apparatus as claimed in any preceding claim, wherein the cross-sectional size of the inlet is at least the same size, optionally bigger, than the cross-sectional size of a flowpath between the filter and the container.

9. A nozzle apparatus as claimed in any preceding claim, wherein, arranged such that in use, fluid from the outlet is directed onto an outer face of the container.

10. A nozzle apparatus as claimed in any preceding claim, wherein an outer face of the container comprise a series of slots.

11. A nozzle apparatus as claimed in any preceding claim, wherein the filter comprises a screen comprising at least one aperture therein.

12. A nozzle apparatus as claimed in any claim 11, wherein the at least one aperture of the screen is linear in shape.

13. A nozzle apparatus as claimed in any one of claims 11 or 12, wherein the screen is a tubular screen with a passage therein, and said at least one aperture thereon is on a face of the tubular screen.

14. A nozzle apparatus as claimed in any one of claims 11 to 13, wherein the size of the at least one aperture in the first screen is equal to or smaller than the size of the outlet.

15. A nozzle apparatus as claimed in any preceding claim, wherein the portion of the nozzle apparatus between the inlet and the filter is a relatively central portion of the nozzle apparatus compared to the portion of the nozzle apparatus between the filter and the outlet.

16. A nozzle apparatus as claimed in any preceding claim, wherein the portion of the nozzle apparatus between the inlet and the filter and the first flow path are co-linear.

17. A nozzle apparatus as claimed in any preceding claim, wherein the outlet is a channel, disposed at an angle of from 10 to 50 degrees.

18. A nozzle apparatus as claimed in any preceding claim, wherein an outer body is provided, which creates a third flow path between the filter and the outlet.

19. A nozzle apparatus as claimed in any claim 18, wherein the outer body is a tube with an angled edge, said edge defining a portion of the outlet.

20. A nozzle apparatus as claimed in any preceding claim, comprising an inlet screen comprising at least one first aperture sized to resist flow of particles of a pre-defined size and a second larger aperture sized to allow flow of particles of the pre-defined size.

21. The use of the apparatus as claimed in any one of claims 1 to 20 with an oil based fluid.

22. A method of monitoring pipework integrity comprising weighing debris recovered from the pipework, and assessing the integrity of the pipework based on the weight of the debris.

23. A method as claimed in claim 22, using the apparatus as claimed in any one of claims 1 to 20.

24. A method as claimed in claim 22 or claim 23, wherein the debris is recovered and weighed periodically, such as at least once per year.

Claims

1. A nozzle apparatus comprising:
an inlet,
an outlet,
a particulate filter disposed between the inlet and the outlet, the filter comprising a screen with at least one aperture therein;
and a container, wherein the nozzle apparatus defines a first flow path between the filter and the container for particles too large for said filter and a second flow path towards the outlet for particles small enough for said filter;
and wherein the container is provided downstream of the first flow path such that said first flow path terminates in the container and in use, particulate debris accumulates in the container;
wherein an inlet flow path is defined between the portion of the nozzle apparatus between the inlet and the screen;
and the inlet flow path and the first flow path, are co-linear.

2. A nozzle apparatus as claimed in claim 1, wherein the container is a removable portion.

3. A nozzle apparatus as claimed in claim 2, wherein the removable portion is removable by way of any one or more of a threaded connection, a snap fit connection, springs, clips and bolt & screw.

4. A nozzle apparatus as claimed in any one of claims 2 to 3, wherein the removable portion is connected to, and separable from, the filter.

5. A nozzle apparatus as claimed in claim 2, wherein the container and filter are threadably connected.

6. A nozzle apparatus as claimed in any preceding claim, wherein the cross-sectional size of the inlet is at least the same size, optionally bigger than the cross-sectional size of the first flow path.

7. A nozzle apparatus as claimed in any preceding claim, arranged such that in use, fluid from the outlet is directed onto an outer face of the container.

8. A nozzle apparatus as claimed in any preceding claim, wherein an outer face of the container comprise a series of slots.

9. A nozzle apparatus as claimed in any preceding claim, wherein the at least one aperture of the screen is linear in shape.

10. A nozzle apparatus as claimed in any preceding claim, wherein the screen is a tubular screen with a passage therein, and said at least one aperture thereon is on a face of the tubular screen.

11. A nozzle apparatus as claimed in any preceding claim, wherein the size of the at least one aperture in the screen is equal to or smaller than the size of the outlet.

12. A nozzle apparatus as claimed in claim 11, wherein there are a plurality of apertures in the screen, and the size of each aperture in the screen is equal to or smaller than the size of the outlet.

13. A nozzle apparatus as claimed in any preceding claim, wherein the portion of the nozzle apparatus between the inlet and the filter is a relatively central portion of the nozzle apparatus compared to the portion of the nozzle apparatus between the filter and the outlet.

14. A nozzle apparatus as claimed in any preceding claim, wherein the outlet is a channel, disposed at an angle of from 10 to 50 degrees to a main longitudinal

axis of the nozzle apparatus.

15. A nozzle apparatus as claimed in any preceding claim, wherein an outer body is provided, which creates a third flow path between the filter and the outlet.

16. A nozzle apparatus as claimed in any claim 15, wherein the outer body is a tube with an angled edge, said edge defining a portion of the outlet.

17. A nozzle apparatus as claimed in any preceding claim, comprising an inlet screen comprising at least one first aperture sized to resist flow of particles of a pre-defined size and a second larger aperture sized to allow flow of particles of the pre-defined size.

18. The use of the apparatus as claimed in any one of claims 1 to 17 with an oil based fluid.

19. A method of monitoring pipework integrity comprising using the apparatus as claimed in any one of claims 1 to 18, periodically removing the container to remove accumulated debris, weighing the debris recovered from the pipework, and assessing the integrity of the pipework using the weight of the debris to calculate the corrosion rate of the pipework.

20. A method as claimed in claim 19, wherein the debris is recovered and weighed periodically, at least once per year.