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(56) Documents Cited:
WO 2000/059638 A1 DE 002531550 A1
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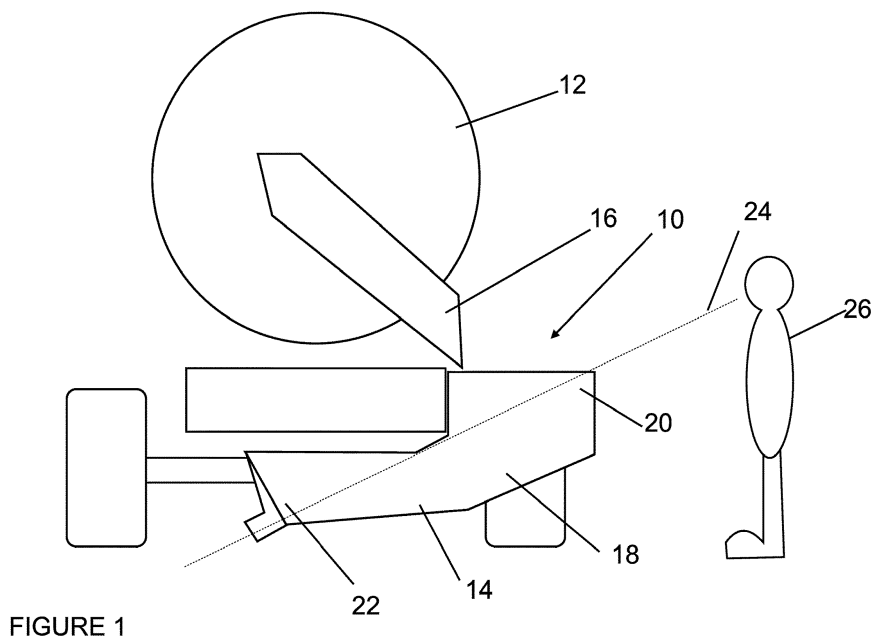
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(54) Title of the Invention: **Improved transfer system**
Abstract Title: **Mixer apparatus vessel arrangement**

(57) An apparatus 10 for a lorry-based concrete mixer 12 comprises a vessel 22 adapted to be positioned beneath a concrete mixer discharge chute portion 16. Vessel 22 comprises a body 18 with an inlet 20 and outlet 22 a vessel outlet. There is a direct line of sight 24 for a user 26 through the vessel inlet to the vessel outlet.



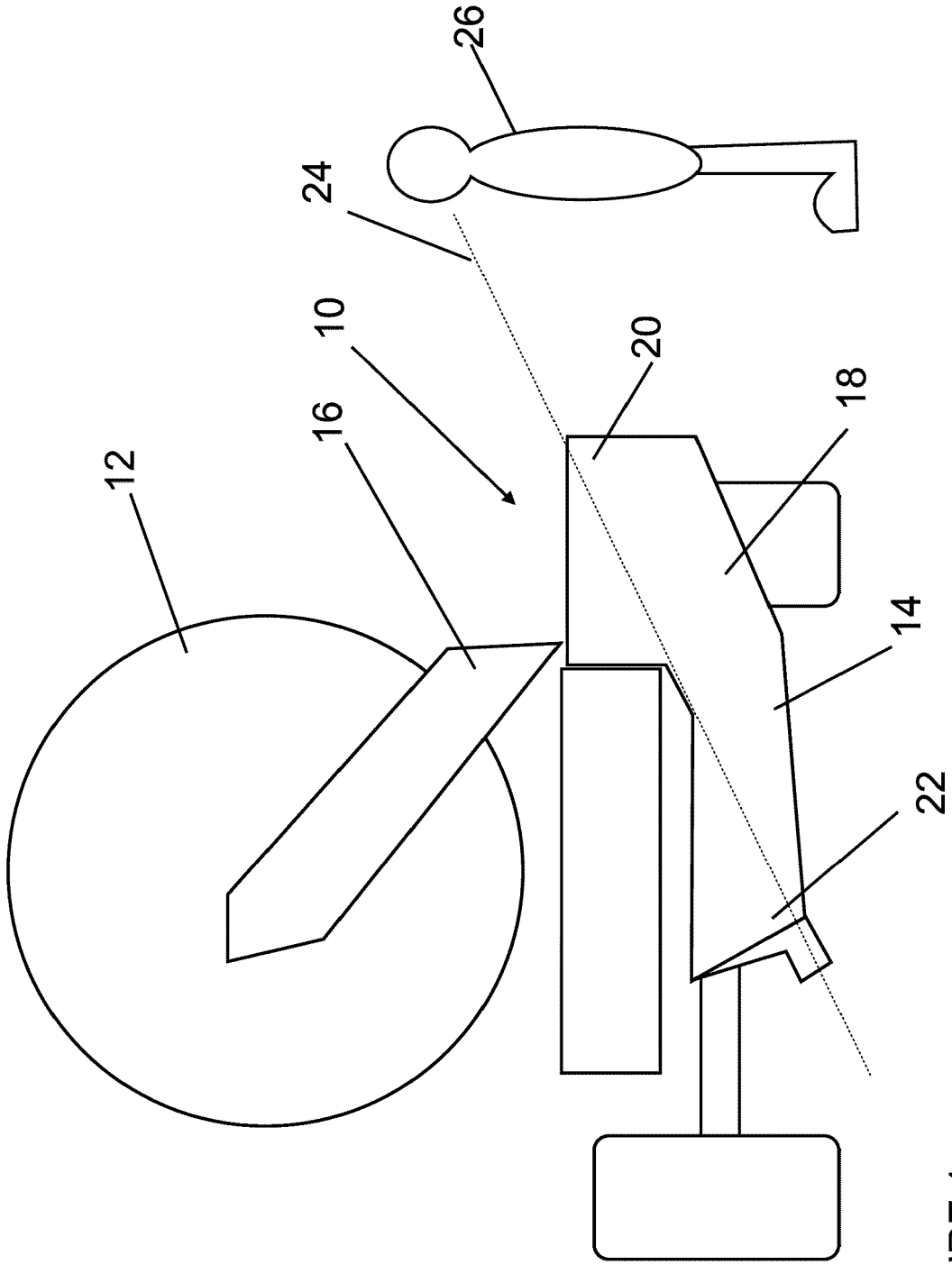


FIGURE 1

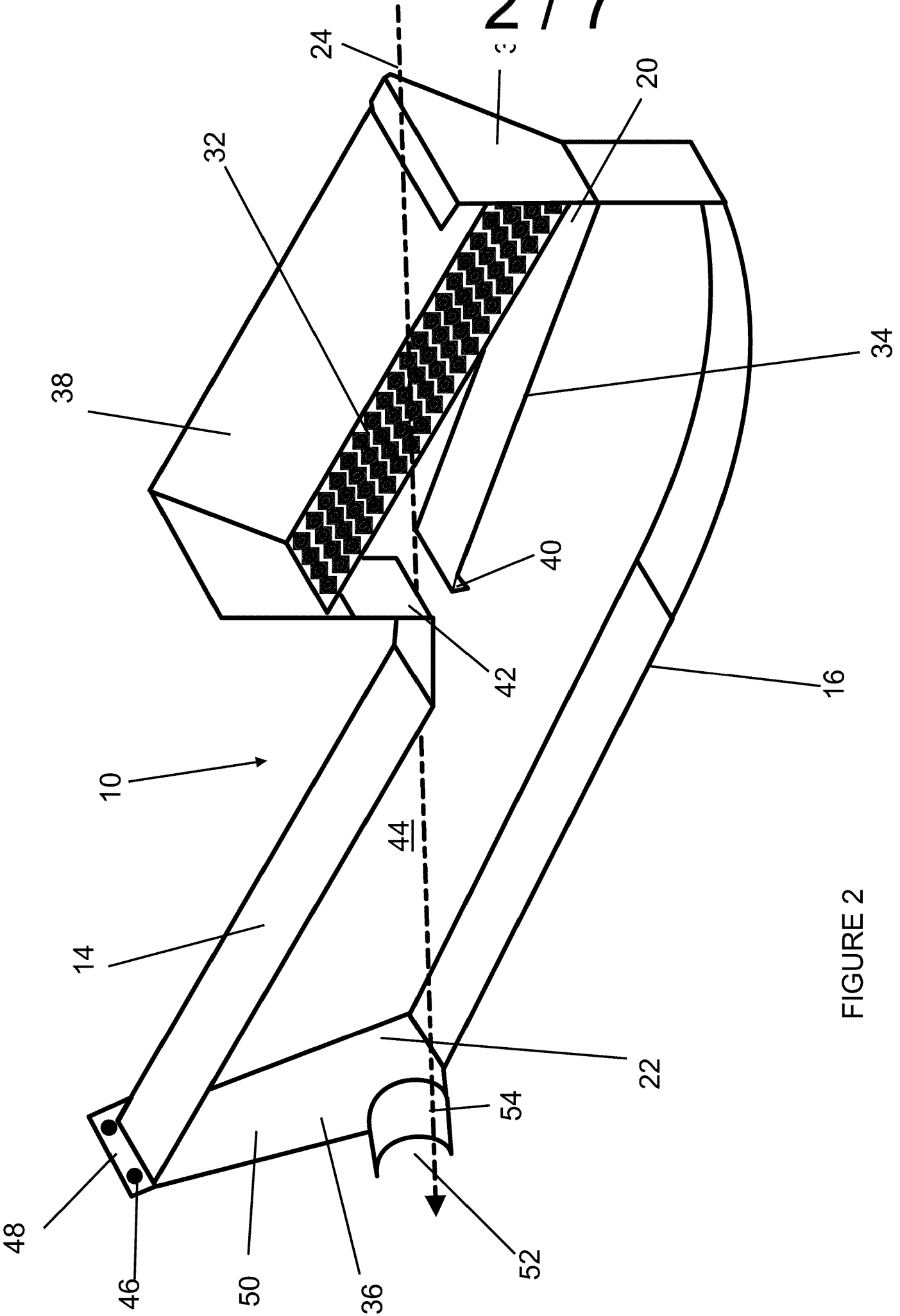


FIGURE 2

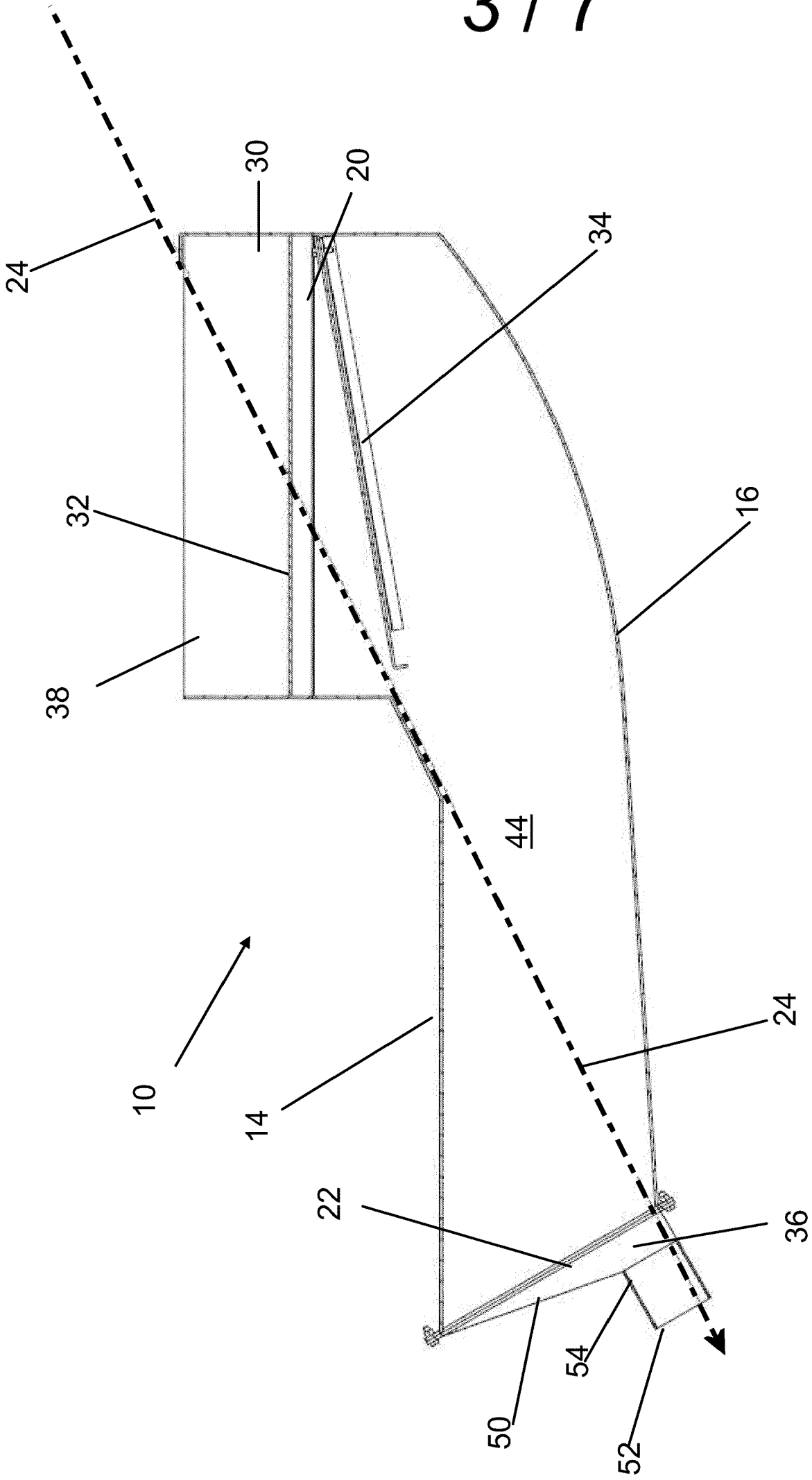
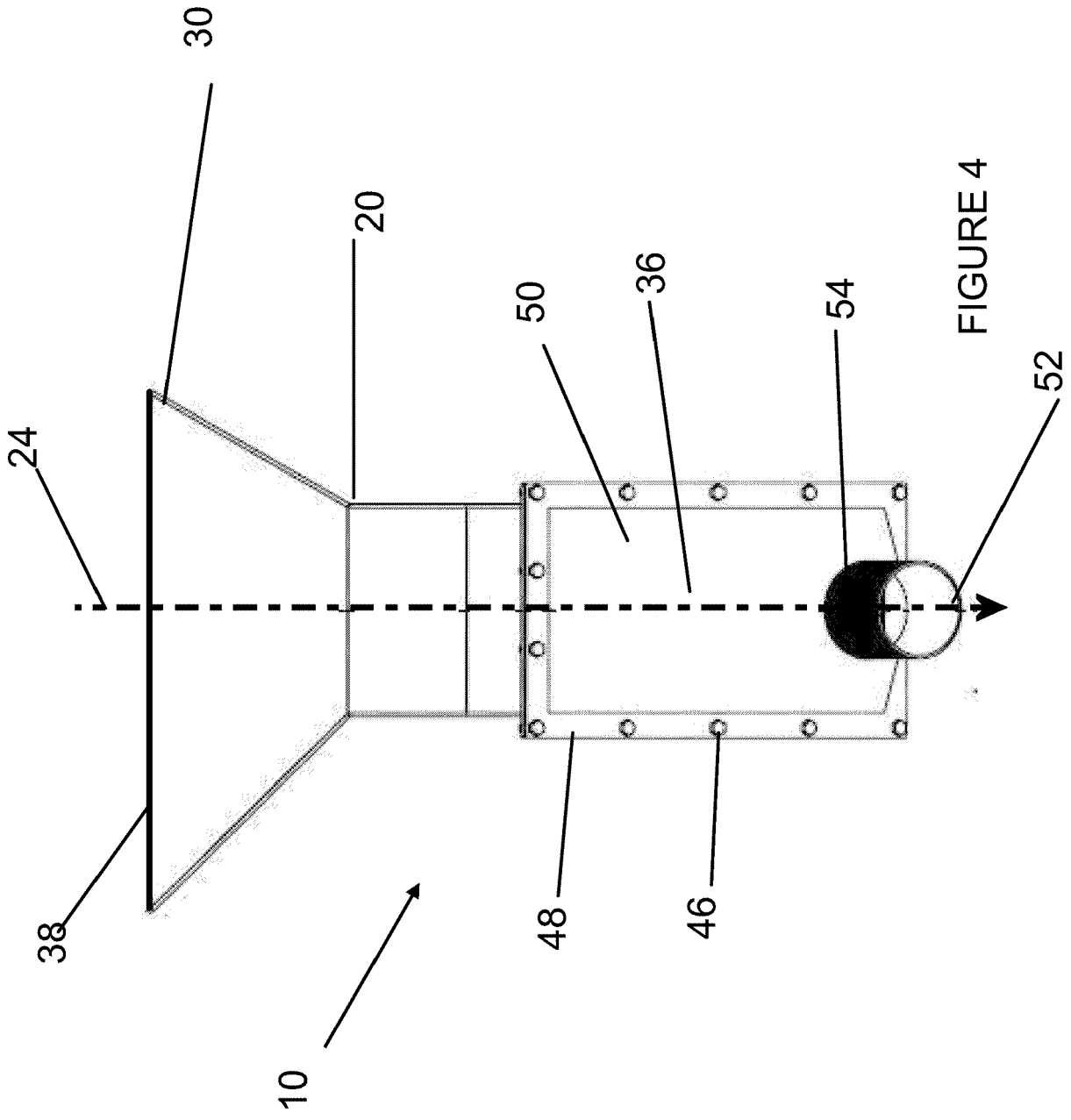


FIGURE 3



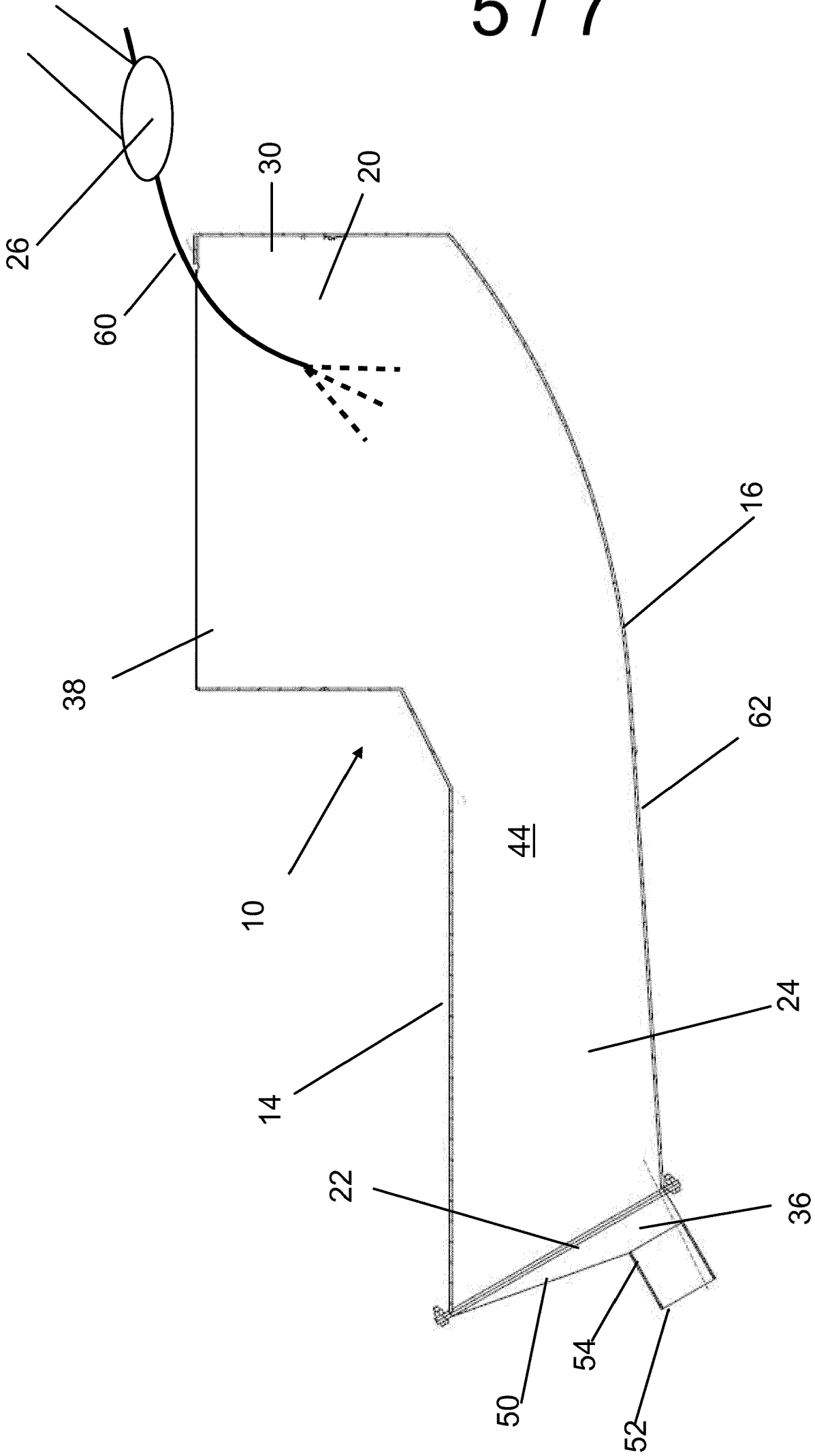


FIGURE 5

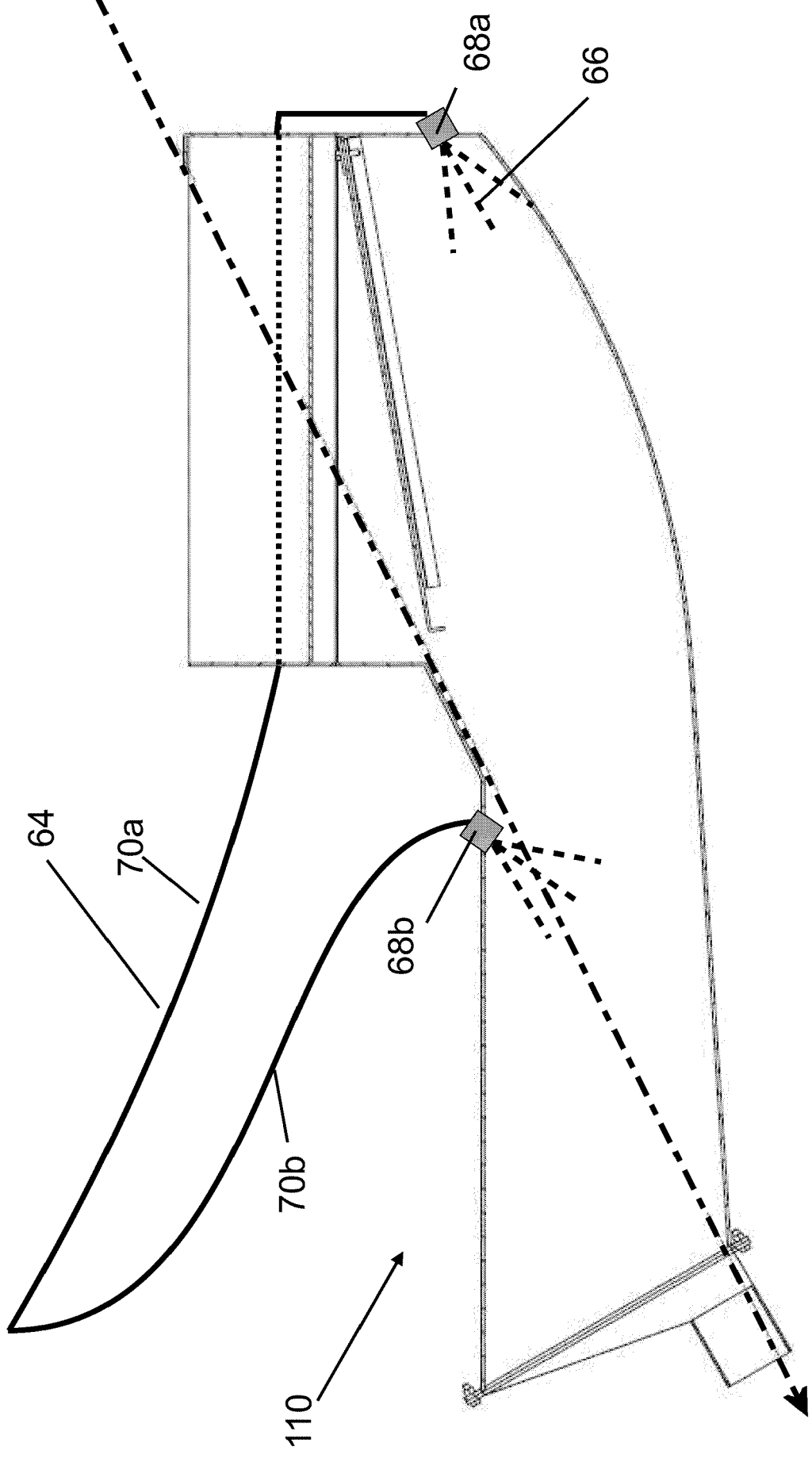


FIGURE 6

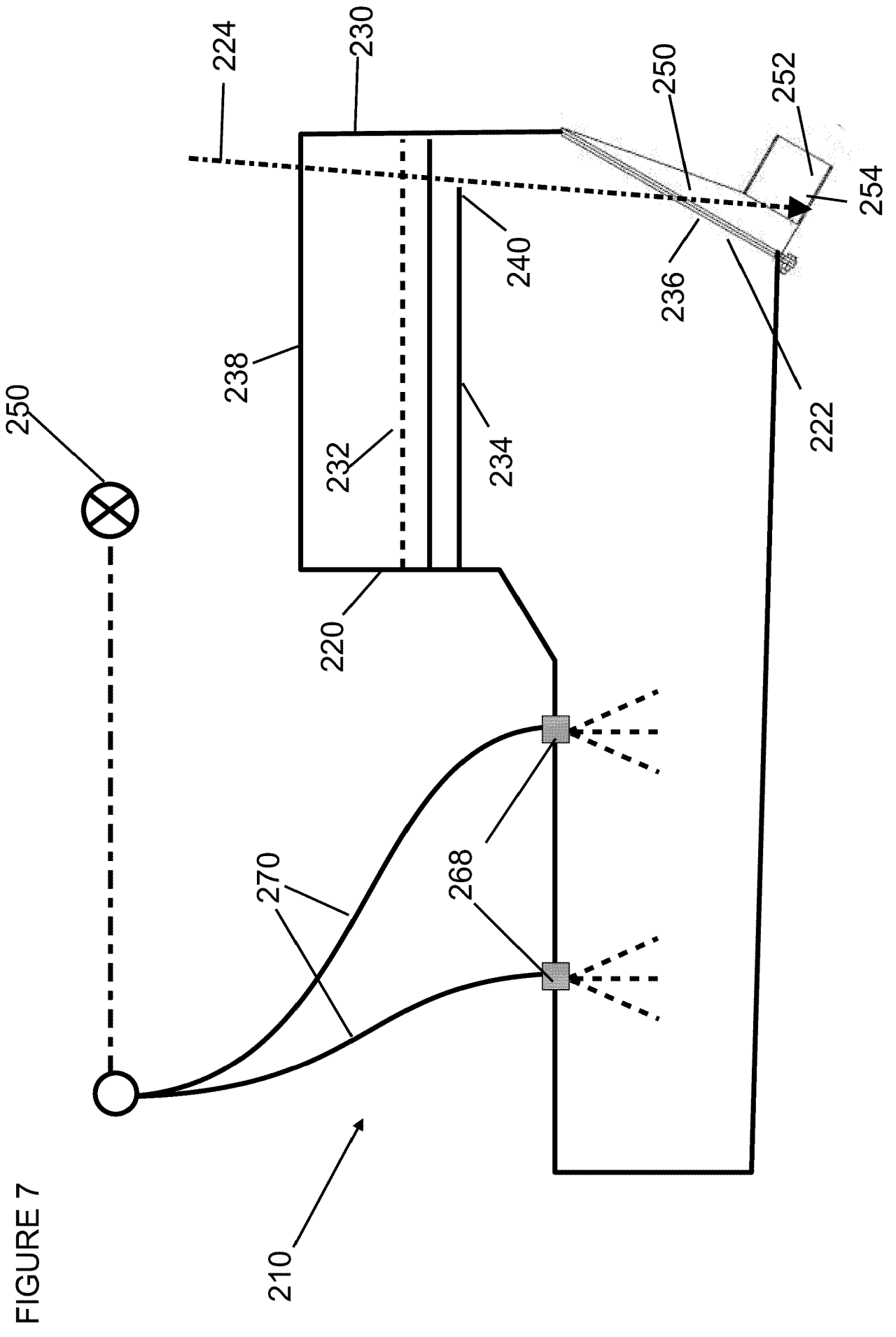


FIGURE 7

IMPROVED TRANSFER SYSTEM

Field of the Invention

The present invention relates to an apparatus for a lorry-based concrete mixer. Particularly, but not exclusively the apparatus relates to an apparatus for catching debris which may fall from a discharge chute of a lorry-based concrete mixer during transit.

Background to the Invention

Lorry-based concrete mixers are supplied with a movable discharge chute which can be positioned in various configurations to allow the discharge of concrete from the mixer drum.

After discharge of concrete, it is extremely desirable to wash down the chute as quickly as possible to remove concrete residue. If this residue is not removed relatively quickly, it can set on the chute, adhering to the chute surface and creating a build up of concrete.

This build up residue can have a number of negative effects. For example if the residue breaks free of the surface whilst the vehicle is in transit there is a high risk of the residue hitting a vehicle travelling behind the concrete mixer.

Furthermore, the residue build up increases the weight of the truck and particularly the discharge chute, putting undue strain on the chute support structure.

However, it is not always possible to clean the chute immediately after discharge as a growing number of construction companies are restricting or even banning lorry-based concrete mixers from washing down chutes on site to ensure

site compliance with environmental regulations such as the Water Resources Act 1991, the Water Industry Act 1991, the Anti Pollution Works Regulations 1999, and the Environmental Permitting Regulations (EPR) 2010.

5 Additionally there is a problem with stones in the drum bouncing out of the drum and down the chute when the mixer is in transit, posing a similar danger as the residue to other vehicles.

These problems have been alleviated by supplying a lorry based mixer with a method of collecting and storing the chute wash water and loose stones and debris in a tank until such times as the contaminated water can be disposed
10 of correctly. However, it has been found that a layer of sludge can build up in these tanks and the tanks can, subsequently, be difficult to empty.

Summary of the Invention

According to a first aspect of the present invention there is provided an apparatus for a lorry-based concrete mixer, the apparatus comprising:

15 a vessel adapted to be positioned beneath a concrete mixer discharge chute portion, the vessel comprising a vessel body, the vessel body defining a vessel inlet and a vessel outlet, the vessel inlet being adapted to receive debris and fluid exiting the chute discharge portion, and the vessel outlet being adapted to permit debris and fluid stored in the vessel body to be discharged from the
20 vessel body;

wherein there is a direct line of sight for a user through the vessel inlet to the vessel outlet.

In at least one embodiment of the present invention, providing a direct line of sight for a user through the vessel inlet to the vessel outlet permits a user to identify and clear blockages more easily.

5 In one embodiment, the vessel inlet is adapted to receive debris and fluid exiting the chute discharge portion when the discharge chute is in a stowed position.

The vessel may have a longitudinal axis.

The vessel longitudinal axis may, in use, lie perpendicular to a concrete mixer lorry longitudinal axis.

10 The vessel longitudinal axis may, in use, lie in the same plane as a discharge chute longitudinal axis.

The vessel may extend, in use, across more than 50% of the width of a concrete mixer lorry.

15 In one embodiment, the vessel inlet and the vessel outlet may be located on opposite sides of the vessel.

Where the vessel inlet and the vessel outlet are located on opposite sides of the vessel, the apparatus line of sight between the vessel inlet and the vessel outlet may be at an acute angle to the horizontal.

20 In this embodiment, the apparatus line of sight may pass through a vertical plane containing the concrete mixer lorry longitudinal axis.

In an alternative embodiment, the vessel inlet and the vessel outlet may be located on the same side of the vessel.

25 Where the vessel inlet and the vessel outlet are located on the same side of the vessel, the apparatus line of sight between the vessel inlet and the vessel outlet may be at an obtuse angle to the horizontal.

The vessel inlet may lie in a substantially horizontal plane.

The apparatus may comprise an inlet section.

The inlet section may be attached to the vessel body.

The inlet section may, particularly, be attached to the vessel inlet.

5 Alternatively, the inlet section may be integral with the vessel body.

The inlet section may define a secondary inlet.

The secondary inlet may have a larger cross sectional area than the vessel inlet.

10 The inlet section may, in use, taper inwardly from the secondary inlet to the vessel inlet.

The secondary inlet may be adapted to funnel fluid or debris to the vessel inlet.

The apparatus line of sight may permit a user to see through the secondary inlet to the vessel outlet.

15 The vessel outlet may lie in a substantially vertical plane.

The apparatus may comprise an outlet member.

The outlet member may be releasably attachable to the vessel outlet.

The outlet member may be releasably attachable to the vessel outlet by means of bolts or any suitable fixing.

20 The outlet member may be adapted to form a seal with the vessel outlet.

The apparatus may further include a seal for forming a seal between the outlet member and the vessel outlet.

The seal may be adapted to be sandwiched between the outlet member and the vessel outlet.

25 The outlet member may define a secondary outlet.

The secondary outlet may have a smaller cross sectional area than the vessel outlet.

The secondary outlet may have a lowest point, the secondary outlet lowest point being, in use, lower than a vessel outlet lowest point.

5 The outlet member may define a transition portion between the vessel outlet and the secondary outlet.

The secondary outlet may be closable. The secondary outlet may be closable by means of a cap.

10 The apparatus line of sight may permit a user to see through the vessel inlet to the secondary outlet.

Particularly, where the apparatus comprises a secondary inlet and a secondary outlet, the apparatus of line sight may permit a user to see through the secondary inlet to the secondary outlet.

15 The apparatus line of sight may be perpendicular to a plane containing the secondary outlet.

The apparatus may further include a fluid containment device. A fluid containment device may be provided to substantially prevent fluid in the vessel from splashing out whilst, in use, the mixer is in motion.

The fluid containment device may be a baffle.

20 The fluid containment device may be located adjacent the vessel inlet.

The fluid containment device may be located in the vessel body.

Alternatively or additionally, the fluid containment device may be located in the inlet member.

25 The fluid containment device may be positioned such that the apparatus line of sight may be maintained.

The fluid containment device may be removably located adjacent the vessel inlet.

Alternatively or additionally, the fluid containment device may be pivotably located adjacent the vessel inlet.

5 The apparatus may further include a filter device. The filter device may be provided to prevent large objects entering a portion of the vessel.

The filter device may be a sieve.

The filter device may be located adjacent the vessel inlet.

The filter device may be located in the vessel body.

10 Alternatively or additionally, the filter device may be located in the inlet member.

The filter device may be removably located adjacent the vessel inlet.

In some embodiments, where the inlet member is removably attached to the vessel body, the filter device may be removable from the vessel inlet with
15 removal of the inlet member.

Where there is both a fluid containment device and a filter device, the filter device may be located above the fluid containment device.

Where there is both a fluid containment device and a filter device, the fluid containment device and the filter device may be unitary.

20 The apparatus may comprise at least one access port.

The at least one access port may be in fluid communication with the vessel body.

The at least one access port may be adapted to receive a water supply. Being able to spray or jet water into the vessel facilitates cleaning of the vessel.

25 The at least one access port may be mounted to a vessel body wall.

The at least one access port may be pivotably mounted to a vessel body wall. Such an arrangement permits, for example, a water jet to be directed to various locations within the vessel through external manipulation by user.

The at least one access port may alternatively or additionally provide
5 visual inspection of a vessel interior.

The vessel body may comprise a metal.

Alternatively or additionally, the vessel body may comprise a polymer.

Brief Description of the Drawings

Embodiments of the present invention will now be described with reference
10 to the accompanying drawings in which:

Figure 1 is a schematic view of an apparatus for a lorry-based concrete mixer according to a first embodiment of the present invention;

Figure 2 is a perspective view of a section of the apparatus of Figure 1;

Figure 3 is a side section of the apparatus of Figure 1;

15 Figure 4 is an end view of the apparatus of Figure 1;

Figure 5 is a section of the apparatus of Figure 1 with the baffle and the sieve removed;

Figure 6 is a section view of an apparatus for a lorry-based concrete mixer according to a second embodiment of the present invention; and

20 Figure 7 is a section view of an apparatus for a lorry-based concrete mixer according to a second embodiment of the present invention.

Detailed Description of the Drawings

Referring firstly to Figure 1 there is shown a schematic view of an apparatus, generally indicated by reference numeral 10, for a lorry-based concrete mixer 12. The apparatus 10 comprises a vessel 14 adapted to be positioned beneath a concrete mixer discharge chute portion 16. The vessel the vessel 14 comprises a vessel body 18, the vessel body 18 defining vessel inlet 20 and the vessel outlet 22. Vessel inlet 20 is adapted to receive debris and fluid exiting the chute discharge portion 16, and vessel outlet 22 is adapted to permit debris and fluid stored in the vessel body 18 to be discharged from the vessel body 18.

As can be seen from Figure 1, there is a direct line of sight 24 for a user 26 through the vessel inlet 20 to the vessel outlet 22.

Referring now to Figure 2, a perspective view of a section of the apparatus of Figure 1 and Figure 3 is a side section of the apparatus 10 of Figure 1, further features of the apparatus 10 will now be described.

The apparatus 10 further comprises an inlet section 30, a sieve 32, a baffle 34 and an outlet member 36.

The inlet section 30 is integral with the vessel body 18 and extends above the inlet 20 to a secondary inlet 38. The secondary inlet 38 has a greater cross sectional area than the inlet 20 and the inlet section 30 acts as a funnel to catch fluid and debris exiting the discharge chute portion 16. Particularly, the inlet section 30 is adapted, and is formed, to catch fluid and debris exiting the discharge chute portion 16 when the discharge chute portion 16 is in a stowed configuration, that is in a configuration in which the discharge chute portion 16 is secured for transit.

The baffle 34 is located adjacent and below the vessel inlet 20 and is provided to stop fluid in the vessel 14 from slopping out during transit.

Referring particularly to Figure 3, the baffle 34 is arranged such that a baffle end 40 is spaced away from the vessel wall 42 such that the line of sight 26
5 is maintained.

The sieve 32 is located adjacent and above the vessel inlet 20, between the vessel inlet 20 and the secondary inlet 38. The sieve 32 is provided to prevent large pieces of debris from entering the vessel 14 and potentially accumulating to form a blockage and preventing fluid from being able to access
10 the vessel outlet 22.

The sieve 32 and the baffle 34 are removably located adjacent the vessel inlet 20 such that they can be removed to allow access to the vessel interior 44 for cleaning.

Referring to Figure 3 and to Figure 4, an end view of the apparatus 10 of
15 Figure 1, the outlet member 36 is attached to the vessel 14 by means of a series of bolts 46. The bolts 46 attach an outlet member plate 50 to a vessel body flange 48 which extends from the vessel wall 42 away from the vessel outlet 22.

The outlet member 36 further comprises an exit pipe 54 leading to a secondary outlet 52. As can be seen from Figure 3, the outlet member plate is
20 frustoconical in shape and funnels fluid in the vessel 14 towards the exit pipe 54.

For most training purposes, the exit pipe 54 is adequate to allow the vessel 14 to drain. However, the provision of a removable outlet member 36 allows the entire vessel outlet 22 to be opened by removal of the bolts 46 allowing for greater access to the vessel interior 44 for cleaning if required.

Sandwiched between the outlet member 36 and the vessel flange 48 is a seal gasket (not shown) preventing leakage around the interface between the outlet member 36 and the vessel 14.

During normal use, a cap (not shown) is provided to threadably attach to
5 the exit pipe 54 and cover the secondary exit 52.

Reference is now made to Figure 5, a section of the apparatus of Figure 1 with the baffle 34 and the sieve 32 removed. As can be seen from this Figure, with the baffle 34 and the sieve 32 removed, a user 26 can easily hose the vessel interior 44 down using a hose 60. The vessel base 62 is curved to facilitate flow
10 of fluid whether from the discharge chute 16 from a hose 44 towards the vessel outlet 22 and particularly the secondary outlet 52. A scraper (not shown) can be used to push debris towards the secondary exit 52. If the secondary exit 52 is blocked, the outlet member 36 can be removed and debris can then be scraped through the vessel outlet 22.

15 Reference is now made to Figure 6, a section view of an apparatus 110 according to a second embodiment of the present invention. The features described in this embodiment are similar to those of the first embodiment with the additional provision of a cleaning water supply 64. Water 66 is supplied to nozzles 68a, 68b by hoses 70a, 70b supplied by the concrete mixer truck water
20 system (not shown). Each truck has a water system to allow for cleaning of the truck.

Reference is now made to Figure 7, a section view of an apparatus 210 according to a second embodiment of the present invention. The primary difference between this embodiment and the embodiments shown in Figure 1 and

Figure 6 is the location of the vessel outlet 222 which is on the same side of the vessel 214 as the vessel inlet 220.

It will be noted, to accommodate this, the baffle free end 240 is positioned opposite of that shown in Figures 1 to 6 such that the line of sight 224 is at an
5 obtuse angle to the horizontal.

In addition, a valve 280 is provided to control the flow of water through the hoses 270 to the nozzles 268. This arrangement permits the inspection, washing and opening of the vessel 214 to be conducted from the same side of the apparatus 210.

Claims

1. An apparatus for a lorry-based concrete mixer, the apparatus comprising:
a vessel adapted to be positioned beneath a concrete mixer discharge chute portion, the vessel comprising a vessel body, the vessel body defining a
5 vessel inlet and a vessel outlet, the vessel inlet being adapted to receive debris and fluid exiting the chute discharge portion, and the vessel outlet being adapted to permit debris and fluid stored in the vessel body to be discharged from the vessel body;
wherein there is a direct line of sight for a user through the vessel inlet to
10 the vessel outlet.
2. The apparatus of claim 1, wherein the vessel inlet is adapted to receive debris and fluid exiting the chute discharge portion when the discharge chute is in a stowed position.
15
3. The apparatus of any preceding claim, wherein the vessel has a longitudinal axis.
4. The apparatus of claim 3, wherein the vessel longitudinal axis, in use, lies
20 perpendicular to a concrete mixer lorry longitudinal axis.
5. The apparatus of either of claims 3 or 4, wherein the vessel longitudinal axis, in use, lies in the same plane as a discharge chute longitudinal axis.

6. The apparatus of any preceding claim, wherein the vessel extends, in use, across more than 50% of the width of a concrete mixer lorry.

7. The apparatus of any preceding claim, wherein the vessel inlet and the
5 vessel outlet are located on opposite sides of the vessel.

8. The apparatus of claim 7, wherein where the vessel inlet and the vessel outlet are located on opposite sides of the vessel, the apparatus line of sight between the vessel inlet and the vessel outlet is at an acute angle to the
10 horizontal.

9. The apparatus of any preceding claim, wherein, the apparatus line of sight passes through a vertical plane containing a concrete mixer lorry longitudinal axis.

15

10. The apparatus of any of claims 1 to 6, wherein the vessel inlet and the vessel outlet are located on the same side of the vessel.

11. The apparatus of claim 10, wherein where the vessel inlet and the vessel
20 outlet are located on the same side of the vessel, the apparatus line of sight between the vessel inlet and the vessel outlet is at an obtuse angle to the horizontal.

12. The apparatus of any preceding claim, wherein the vessel inlet lies in a
25 substantially horizontal plane.

13. The apparatus of any preceding claim, wherein the apparatus comprises an inlet section.
- 5 14. The apparatus of claim 13, wherein the inlet section is attached to the vessel body.
15. The apparatus of claim 13 or 14, wherein the inlet section is attached to the vessel inlet.
- 10 16. The apparatus of claim 13, wherein the inlet section is integral with the vessel body.
- 15 17. The apparatus of any of claims 13 to 16, wherein the inlet section defines a secondary inlet.
18. The apparatus of claim 17, wherein the secondary inlet has a larger cross sectional area than the vessel inlet.
- 20 19. The apparatus of claim 17 or 18, wherein the inlet section may, in use, taper inwardly from the secondary inlet to the vessel inlet.
20. The apparatus of any of claims 17 to 19, wherein the secondary inlet is adapted to funnel fluid or debris to the vessel inlet.

21. The apparatus of any of claims 17 to 20, wherein the apparatus line of sight permits a user to see through the secondary inlet to the vessel outlet.
22. The apparatus of any preceding claim, wherein the vessel outlet lies in a substantially vertical plane.
23. The apparatus of any preceding claim, wherein the apparatus comprises an outlet member.
24. The apparatus of claim 23, wherein the outlet member is releasably attachable to the vessel outlet.
25. The apparatus of claim 24, wherein the outlet member is releasably attachable to the vessel outlet by means of bolts or any suitable fixing.
26. The apparatus of any of claims 23 to 25, wherein the outlet member is adapted to form a seal with the vessel outlet.
27. The apparatus of claim 26, wherein the apparatus further includes a seal for forming the seal between the outlet member and the vessel outlet.
28. The apparatus of claim 27, wherein the seal is adapted to be sandwiched between the outlet member and the vessel outlet.

29 The apparatus of any of claims 23 to 29, wherein the outlet member defines a secondary outlet.

30. The apparatus of claim 29, wherein the secondary outlet has a smaller
5 cross sectional area than the vessel outlet.

31. The apparatus of either of claims 29 or 30, wherein the secondary outlet may have a lowest point, the secondary outlet lowest point being, in use, lower than a vessel outlet lowest point.

10

32. The apparatus of any of claims 29 to 31, wherein the outlet member may define a transition portion between the vessel outlet and the secondary outlet.

33. The apparatus of any of claims 29 to 32, wherein the secondary outlet is
15 closable.

34. The apparatus of any of claims 29 to 33, wherein the apparatus line of sight may permit a user to see through the vessel inlet to the secondary outlet.

20 35. The apparatus of any of claims 29 to 34, wherein the apparatus line of sight is perpendicular to a plane containing the secondary outlet.

36. The apparatus of any preceding claim, wherein the apparatus further includes a fluid containment device.

25

37. The apparatus of claim 36, wherein the fluid containment device is a baffle.

38. The apparatus of either claim 35 or 36, wherein the fluid containment
5 device is located adjacent the vessel inlet.

39. The apparatus of any of claims 36 to 38, wherein the fluid containment device is located in the vessel body.

10 40. The apparatus of any of claims 36, 37 and 39, wherein the fluid containment device is located in the inlet.

41. The apparatus of any of claims 36 to 40, wherein the fluid containment device is positioned such that the apparatus line of sight is maintained.

15

42. The apparatus of claim 38, wherein the fluid containment device is removably located adjacent the vessel inlet.

43. The apparatus of either claims 38 or 39, wherein the fluid containment
20 device is pivotably located adjacent the vessel inlet.

44. The apparatus of claims 36 to 43, wherein the fluid containment device is at least partially polymeric.

45. The apparatus of any preceding claim, wherein the apparatus further includes a filter device.

46. The apparatus of claim 45, wherein the filter device is a sieve.

5

47. The apparatus of either of claims 45 or 46, wherein the filter device is located adjacent the vessel inlet.

48. The apparatus of any of claims 45, 46 or 47, wherein the filter device is located in the vessel body.

10

49. The apparatus of either of claims 45 or 46, wherein the filter device is located in the inlet.

50. The apparatus of claim 47, wherein the filter device is removably located adjacent to the vessel inlet.

15

51. The apparatus of any of claims 45 to 50, wherein where the inlet is removably attached to the vessel body, the filter device is removable from the vessel body with removal of the inlet.

20

52. The apparatus of any preceding claim, wherein where there is both a fluid containment device and a filter device, the filter device is located above the fluid containment device.

25

53. The apparatus of claim 52, wherein where there is both a fluid containment device and a filter device, the fluid containment device and the filter device is unitary.

5 54. The apparatus of either of claims 52 or 53, wherein the filter device is connected to the fluid containment device.

55. The apparatus of claims 52 to 54 wherein filter device and the fluid containment device are removable as a single unit.

10

56. The apparatus of any preceding claim, wherein the apparatus comprises at least one access port.

15 57. The apparatus of claim 56, wherein the at least one access port is in fluid communication with the vessel body.

58. The apparatus of either of claims 56 or 57, wherein the at least one access port is adapted to receive a water supply.

20 59. The apparatus of any of claims 56 to 58, wherein the at least one access port is mounted to a vessel body wall.

60. The apparatus of claim 59, wherein the at least one access port is pivotably mounted to a vessel body wall.

25

61. The apparatus of any of claims 56 to 60, wherein the at least one access port provides visual inspection of a vessel interior.

62. The apparatus of any preceding claim, wherein the vessel body comprises
5 a metal.

63. The apparatus of any preceding claim, wherein the vessel body comprises a polymer.

10 64. The apparatus of any preceding claims, wherein the apparatus further comprises a secondary vessel.

65. The apparatus of claim 64, wherein the secondary vessel is adapted to be located within the vessel.

15

66. The apparatus of either of claims 64 or 65, wherein the secondary vessel is a liner.

67. The apparatus of claim 66, wherein the liner is a basket.

20

68. The apparatus of either of claims 66 or 67, wherein the liner is a plastic tank.

69. The apparatus of any of claims 64 to 68, wherein the vessel further
25 comprises a weir.

70. The apparatus of claim 69, wherein the weir is located along the vessel bottom.

5 71. The apparatus of any preceding claim, wherein the vessel is at least partially resilient.

72. The apparatus of any preceding claim, wherein a portion of the vessel is adapted to move between a first position and a second position, movement
10 between the first and second positions causing debris on the vessel portion surface to be removed.

73. The apparatus of claim 72, wherein the vessel includes movable material.

15 74. The apparatus of any preceding claim, wherein the vessel further includes an auger. An auger could be used to move material towards the vessel outlet.

75. An apparatus for a lorry-based concrete mixer, the apparatus comprising:
a vessel adapted to be positioned beneath a concrete mixer discharge
20 chute portion, the vessel comprising a vessel body, the vessel body defining a vessel inlet and a vessel outlet, the vessel inlet being adapted to receive debris and fluid exiting the chute discharge portion, and the vessel outlet being adapted to permit debris and fluid stored in the vessel body to be discharged from the vessel body.



Application No: GB1309615.1

Examiner: Mr David J Evans

Claims searched: 1-75

Date of search: 17 October 2014

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	75	WO 2000/59638 A1 (OCEAN CONSTRUCTION SUPPLIES LTD) refer to figures 2 & 4.
X	75	DE 2531550 A1 (FORTMEIER) refer to abstract translation and figure 1.
X	75	US 2009/229707 A1 (ROYCE INNOVATIONS LLC) see figs 1 & 2.
X	75	US 2008/175092 A1 (MANNO) see figs 1 & 3.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

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The following online and other databases have been used in the preparation of this search report

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International Classification:

Subclass	Subgroup	Valid From
B28C	0005/42	01/01/2006
B28C	0007/16	01/01/2006
B28C	0009/04	01/01/2006