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Queensland (AU)

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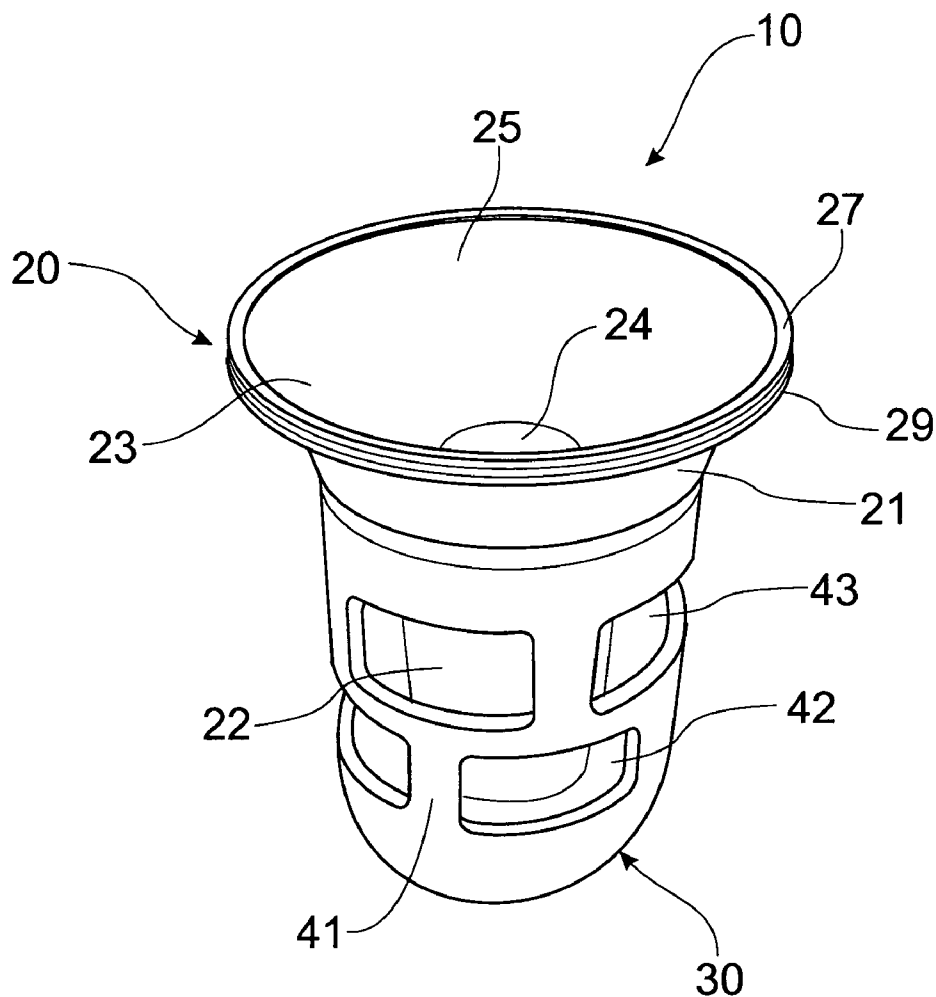
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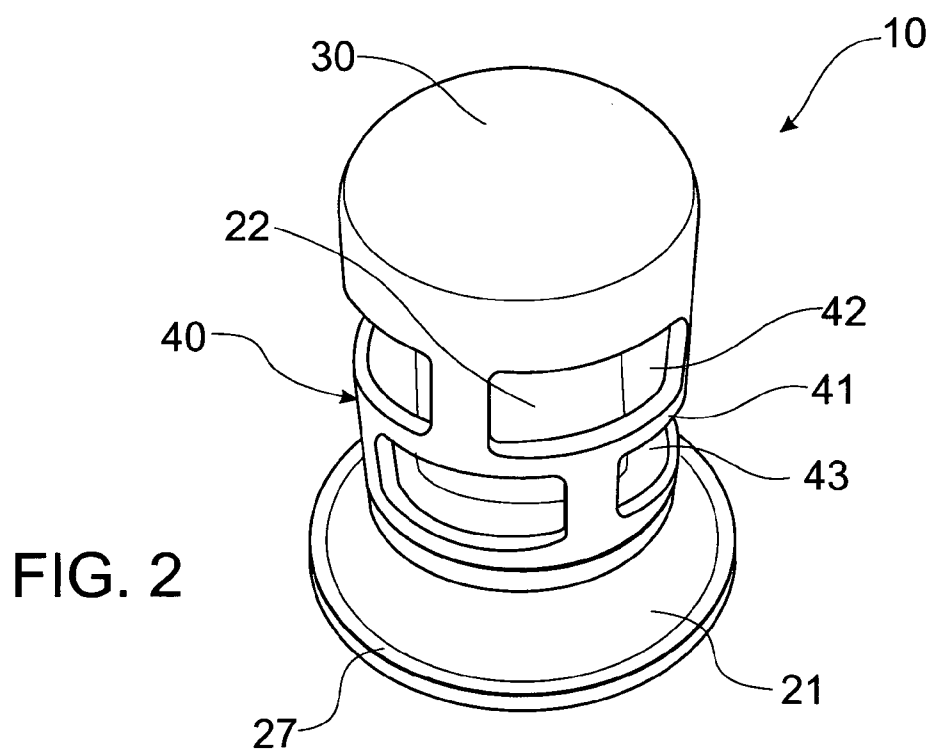
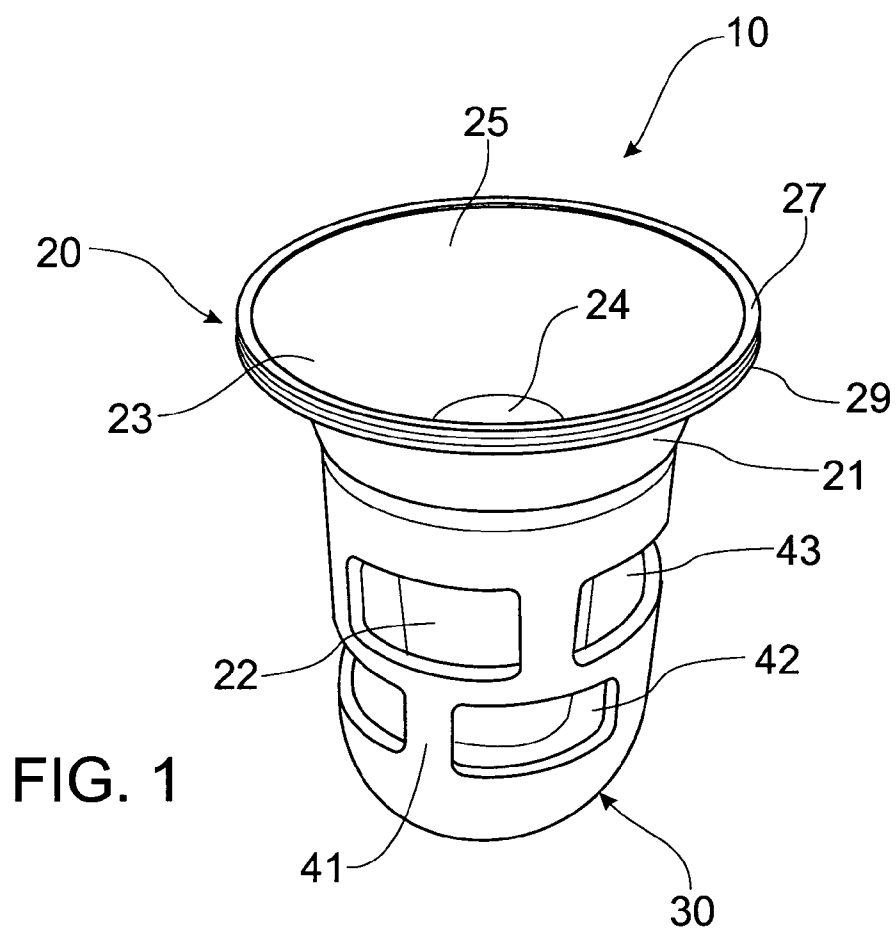
**WONG, CABELLO, LUTSCH, RUTHERFORD
& BRUCCULERI,**
L.L.P.**20333 SH 249 6th Floor**
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Cove, QLD (AU)(21) Appl. No.: **12/522,902**(22) PCT Filed: **Dec. 18, 2007**(86) PCT No.: **PCT/AU2007/001953**

§ 371 (c)(1),

(2), (4) Date: **Sep. 10, 2009**(57) **ABSTRACT**

A drain fitting comprising a cage having a plurality of apertures extending through the cage; a conduit having an inlet and an outlet, the conduit extending at least partially through the cage; and a base cap attached to the cage, the outlet located within the base cap wherein the conduit includes an internal surface that extends from the inlet to the outlet, the internal surface increasing the velocity of the water substantially the length of the internal surface as the water passes from the inlet to the outlet.





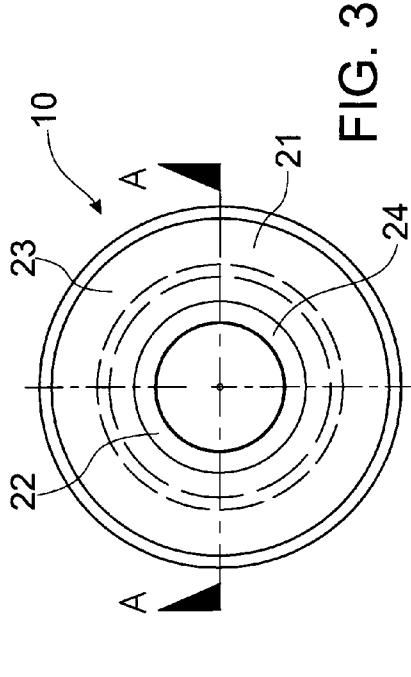


FIG. 3

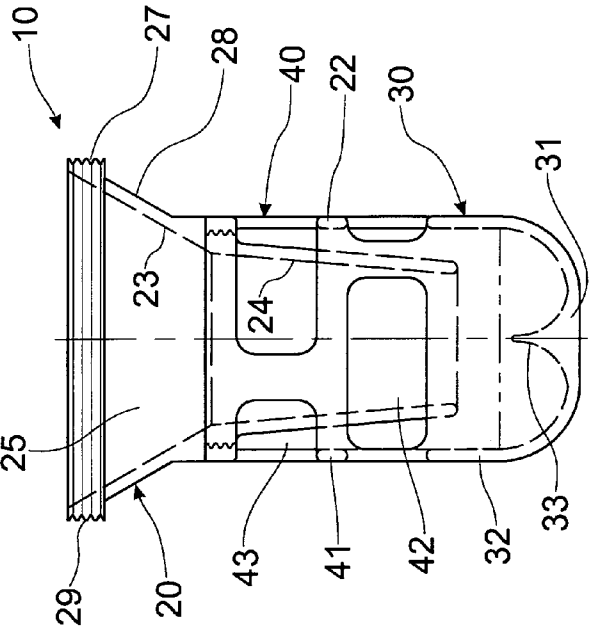


FIG. 4

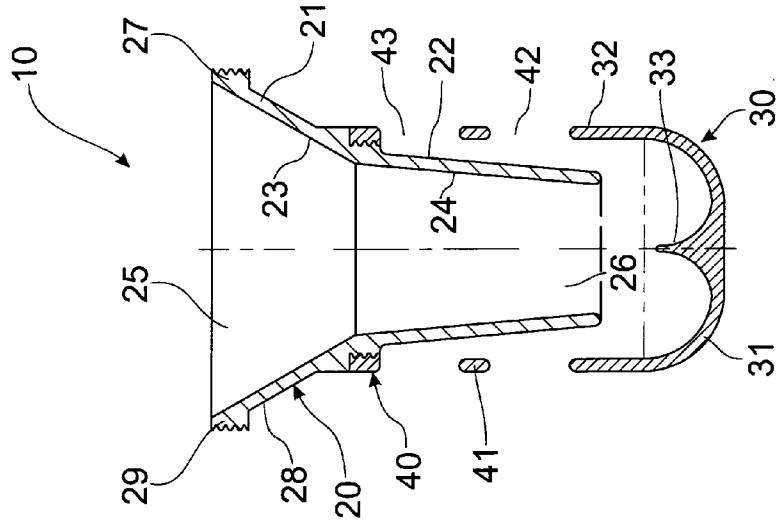


FIG. 5

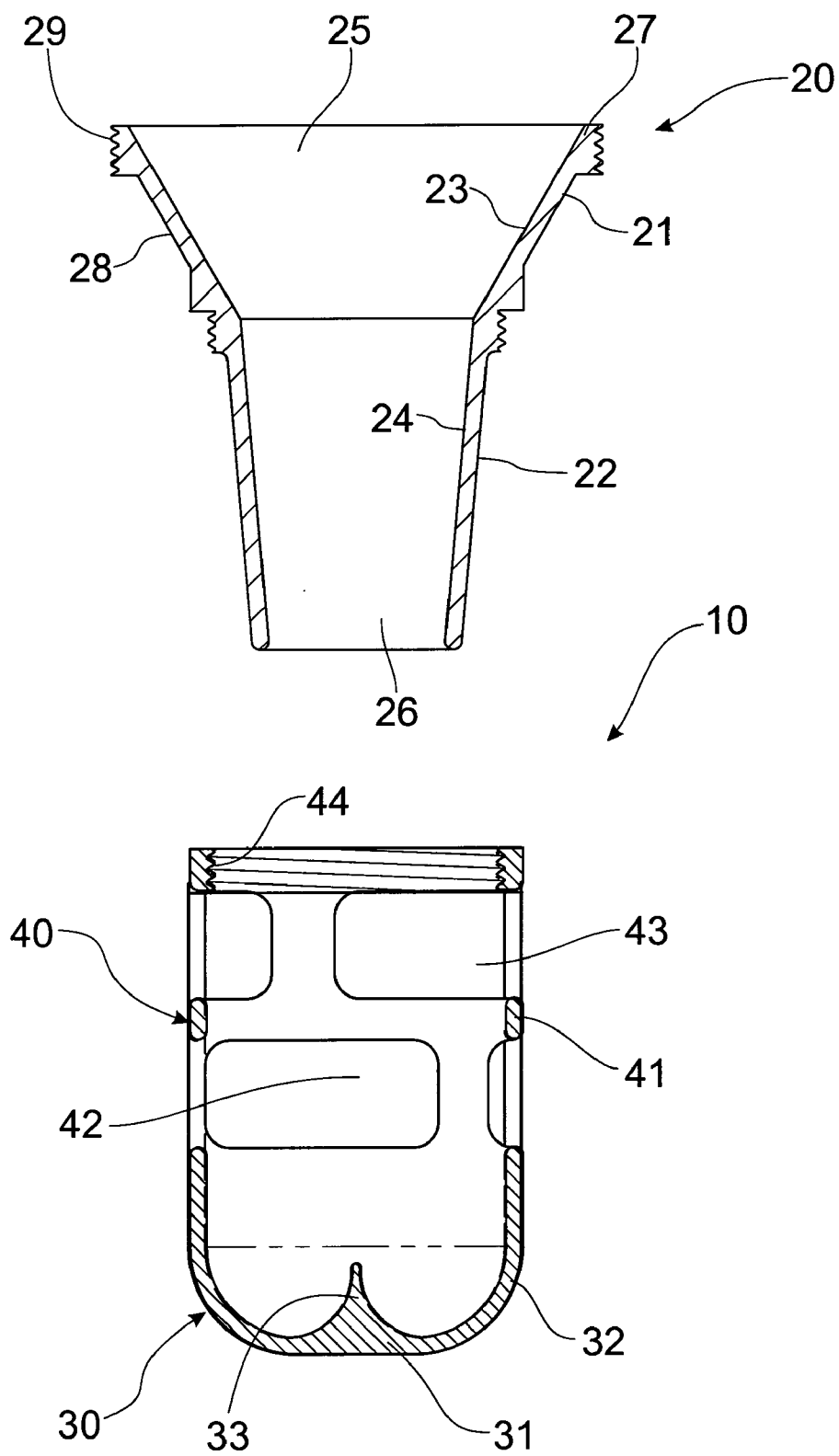


FIG. 6

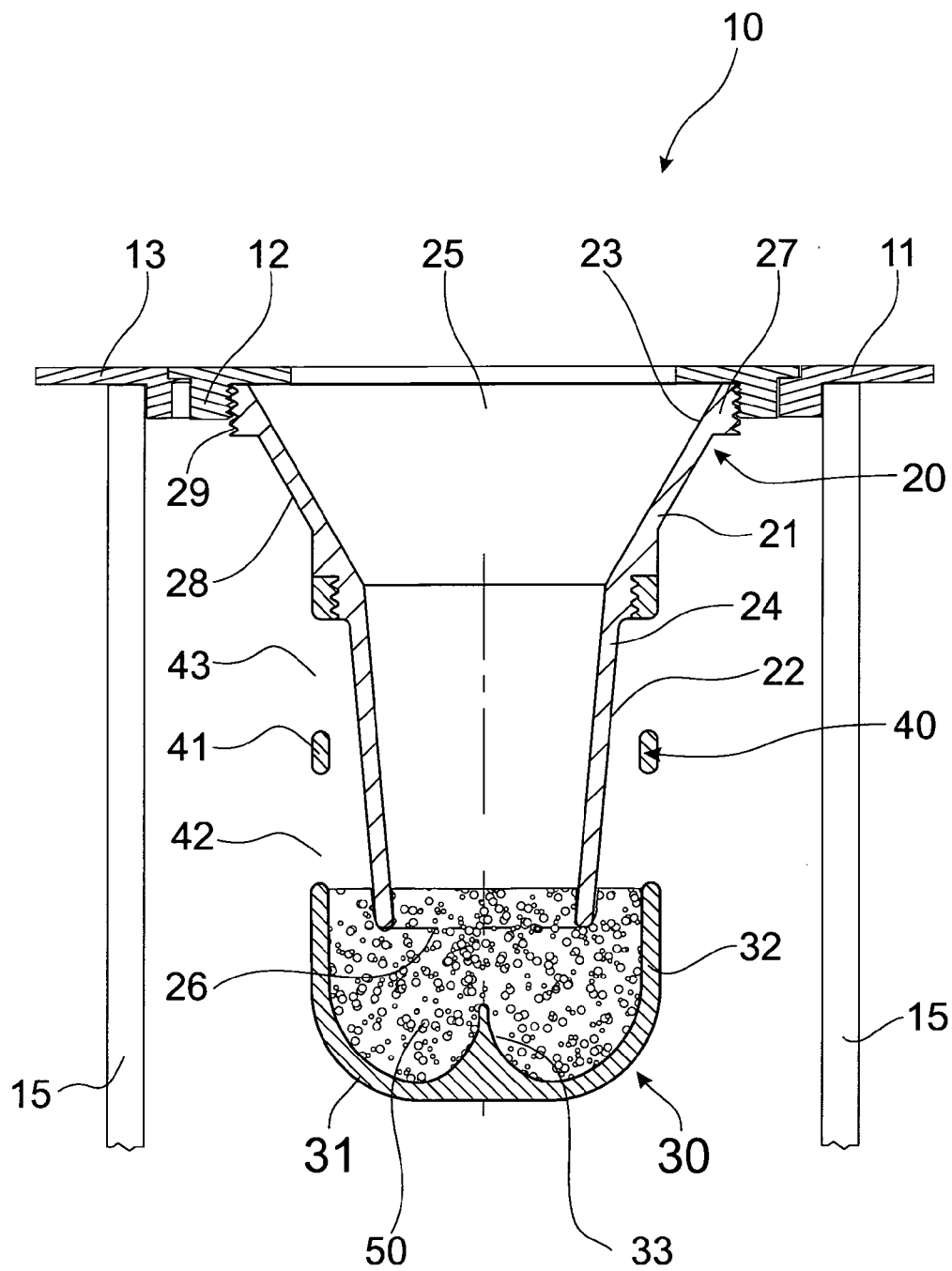


FIG. 7

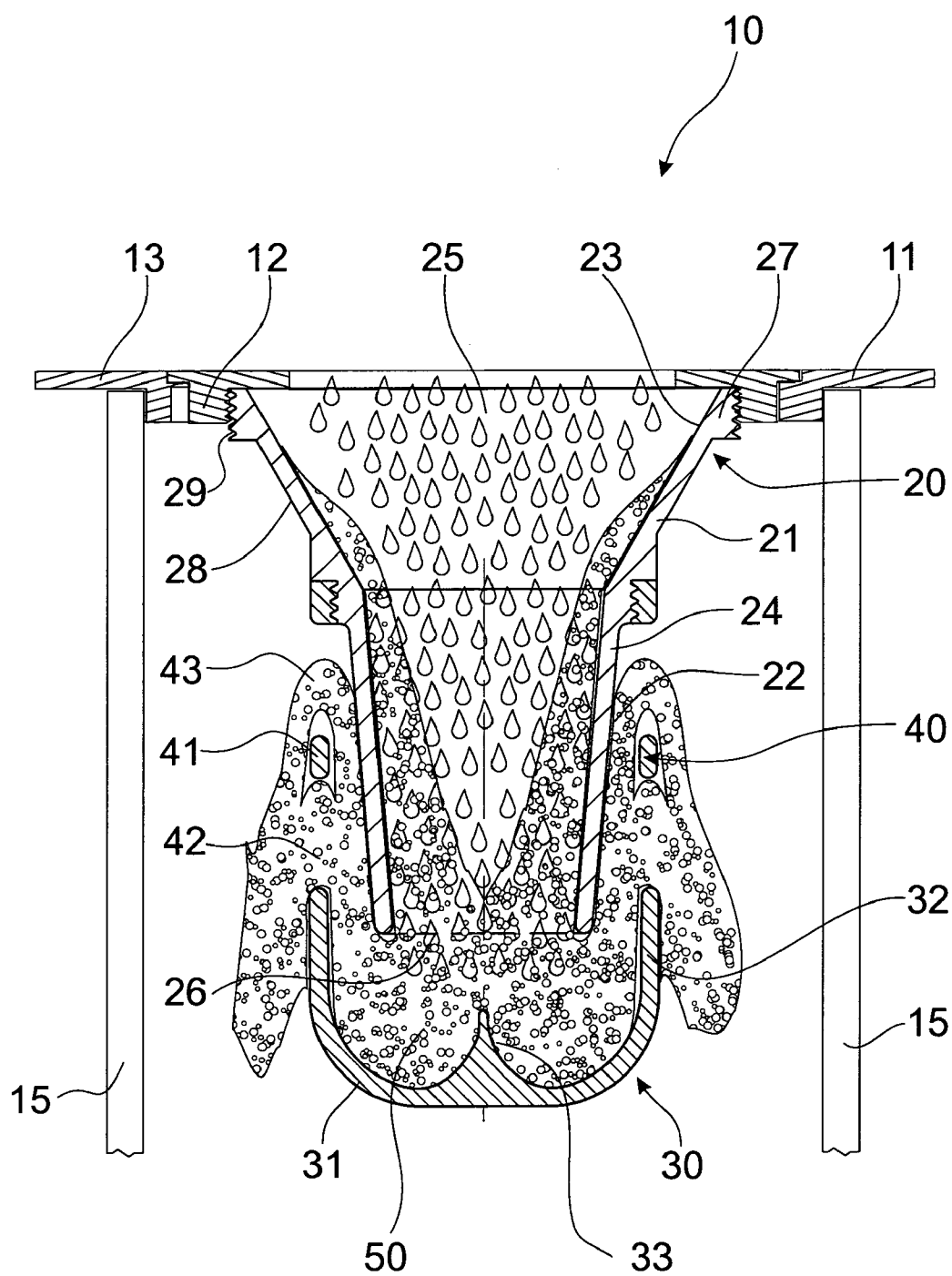


FIG. 8

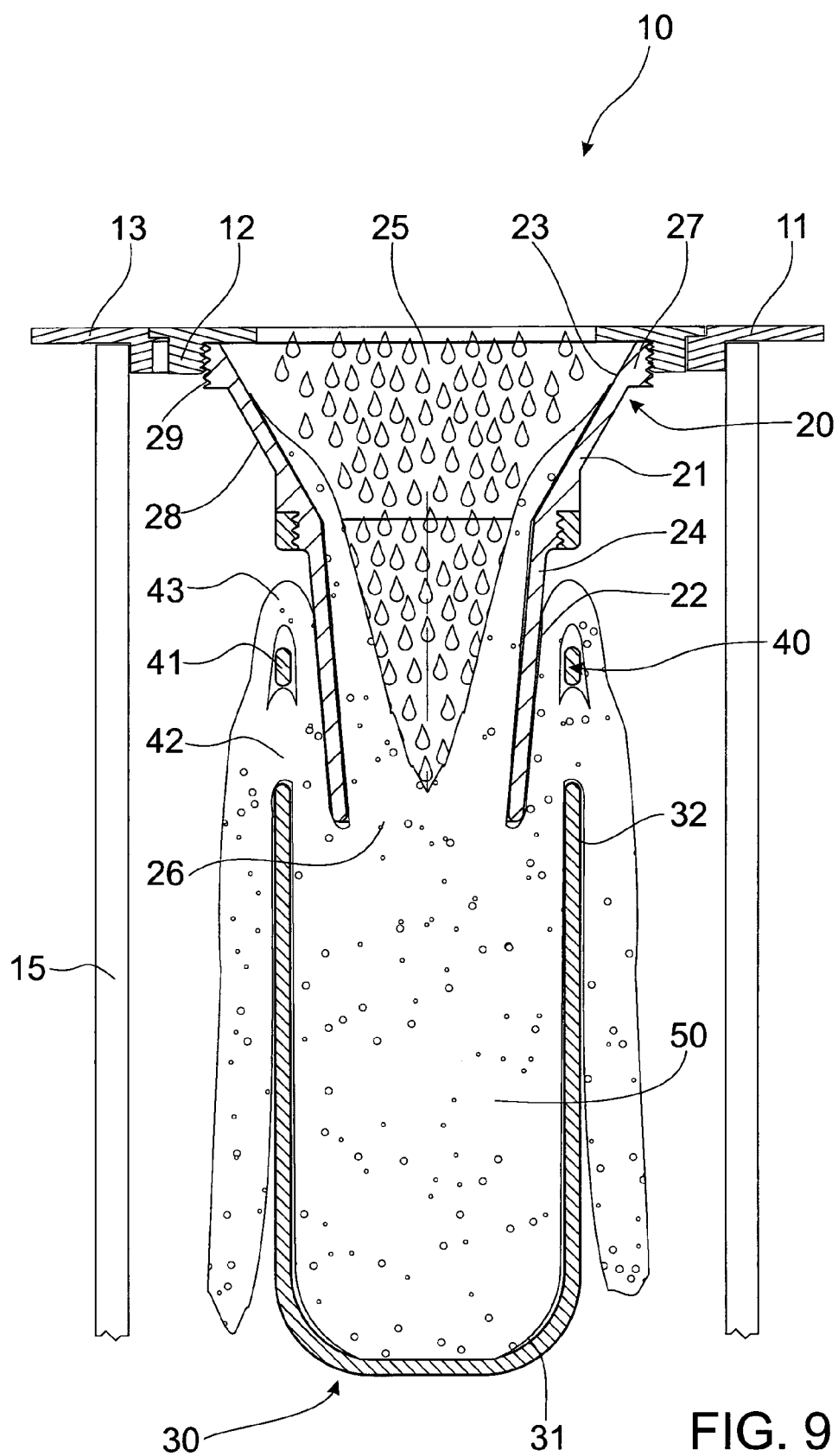


FIG. 9

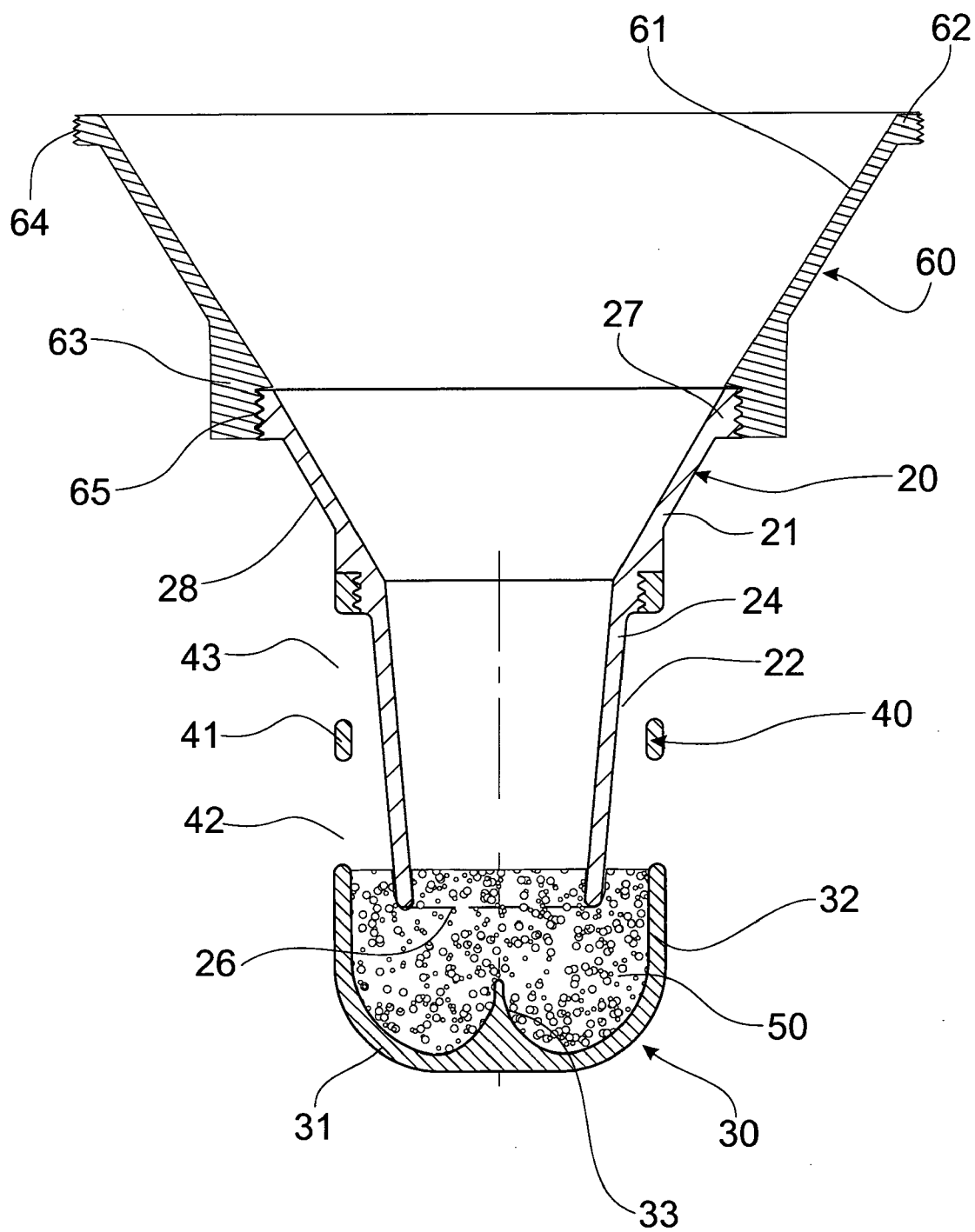


FIG. 10

DRAIN FITTING

FIELD OF THE INVENTION

[0001] This invention relates to a drain fitting. In particular, the invention relates to a drain fitting for use in floor and shower wastes for both commercial and domestic applications and will be described in this context. However, it should be appreciated that the drain fitting may be used for other applications.

BACKGROUND OF THE INVENTION

[0002] Waste water drain pipes have been around for thousands of years and still play an important part in most buildings throughout the world. A common problem with waste water drain pipes is that odours can be emitted from them that offend most people's olfactory senses. This is mainly due to debris, such as food, hair and/or detergent, passing into the waste water drain pipe, decomposing and creating putrid water.

[0003] A reasonably effective way in which to overcome offensive smells that are emitted from waste water drain pipes is to install an S-bend. An S-bend provides a water seal in the pipe to prevent odours from passing from upwardly from below the water seal. This water that forms the water seal is changed every time water passes through the pipe.

[0004] A difficulty with the S-bend is it is generally located a long way from the floor waste. Therefore, debris can become stuck within the drain pipe between the floor waste and S-bend to create an unpleasant odour. Further, a substantial proportion of the debris that creates odour floats in water. Therefore, it becomes trapped in the water in the S-bend. The trapped debris, as described above, creates putrid water and an offensive smell.

[0005] International Patent Application No. WO 99/27199 shows a drain fitting that is used in floor and shower wastes to assist in preventing odours from passing out of the floor and shower wastes. The drain fitting includes a conduit, a cage and a base cap. The cage is attached to the conduit and the base cap. The conduit extends through the cage such that an outlet of the conduit is located within the base cap. Apertures extend through the cage.

[0006] In order to install the drain fitting, a grate is attached to the drain fitting and the grate is placed within a waste body so that the drain fitting is located within a drain pipe. In use, water passed through the conduit to fill the base cap with water. Any excess water passes out of the base cap, through the apertures and down the drain pipe. When water stops passing through the floor waste into the conduit, water located within the base cap covers the outlet to provide a water seal to prevent odours from passing through the drain pipe and out of the grate. The water located within the base cap is replaced every time the water passes through conduit.

[0007] Unfortunately, the drain fitting disclosed in WO 99/27199 has an inherent problem. Debris that passes through the floor and shower wastes often become lodged in the base cap and/or the apertures. This debris, as it decomposes, creates putrid water in base cap which can be smelt through the floor or shower waste.

OBJECT OF THE INVENTION

[0008] It is an object of the invention to overcome and/or alleviate one or more of the above disadvantages and/or provide the consumer with a useful or commercial choice.

SUMMARY OF THE INVENTION

[0009] In one form, the invention resides in a drain fitting comprising:

[0010] a cage having a plurality of apertures extending through the cage;

[0011] a conduit having an inlet and an outlet, the conduit extending at least partially through the cage; and

[0012] a base cap attached to the cage, the outlet located within the base cap;

[0013] wherein the conduit includes an internal surface that extends from the inlet to the outlet, the internal surface increasing the velocity of the water substantially the length of the internal surface as the water **50** passes from the inlet to the outlet.

[0014] The cage is normally a tube. The tube is typically cylindrical in shape. The surface area of the apertures is normally larger than the surface area of the remainder of the cage.

[0015] The conduit may be a funnel. The funnel may have an upper portion and a lower portion.

[0016] The internal surface may be in the form of a number of internal walls. Typically the internal walls are inclined. Preferably, the internal walls are inclined at an angle of at least 30 degrees. More preferably, the internal walls are inclined at an angle of at least 45 degrees. Still more preferably, the internal walls are inclined at an angle of at least 60 degrees.

[0017] An internal wall of the upper portion is preferably between 50 degrees and 70 degrees. More preferably, the internal wall of the upper portion is between 55 degrees and 65 degrees. Most preferably, internal wall of the upper portion upper portion is between 57.5 degrees and 62.5 degrees.

[0018] An internal wall of the lower portion is preferably at least 75 degrees. More preferably, the internal wall of the lower portion is between at least 80 degrees. Most preferably, internal wall of the upper portion upper portion is at least 82.5 degrees.

[0019] The base cap usually includes a floor. Preferably the floor is arcuate. The base cap may also include a stem which extends upwardly from the floor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] An embodiment of the invention will be described with reference to the accompanying drawings in which:

[0021] FIG. 1 shows a perspective view of a drain fitting according to a first embodiment of the invention;

[0022] FIG. 2 shows a further perspective view of the drain fitting of FIG. 1;

[0023] FIG. 3 shows a top view of the drain fitting of FIG. 1;

[0024] FIG. 4 shows a front view of the drain fitting of FIG. 1;

[0025] FIG. 5 shows a side sectional view of the drain fitting of FIG. 1;

[0026] FIG. 6 shows an exploded side sectional view of the drain fitting of FIG. 1;

[0027] FIG. 7 shows a section view of the drain fitting of FIG. 1 when attached to a shower waste;

[0028] FIG. 8 shows a sectional view of the drain fitting of FIG. 1 when water is passing through a shower waste;

[0029] FIG. 9 shows a sectional view of the drain fitting of FIG. 1 with an alternative base cap; and

[0030] FIG. 10 shows a sectional view of the drain fitting of FIG. 4 with an attached expansion member.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0031] FIGS. 1 to 7 show a drain fitting 10 for use in a shower waste 11 to assist in preventing odours from passing out of the shower waste 11. A typical shower waste 11 includes a grate 12 and a waste body 13 as shown in FIG. 7. The grate 12 normally fits within the waste body 13 using a bayonet type attachment.

[0032] The drain fitting 10 includes a conduit 20, a base cap 30 and a cage 40. The conduit 20, base cap 30 and cage 40 are all made from plastic. However, it should be appreciated that the conduit 20, base cap 30 and cage 40 may be made from other materials such as a metal.

[0033] The conduit 20 is used to increase the velocity of water 50 that flows through the conduit 20. The conduit 20 is in the form of funnel that has an upper portion 21 and a lower portion 22. The upper portion 21 of the conduit 20 has an internal wall 23 that is inclined at an angle of approximately 60 degrees. The lower portion 24 of the conduit 20 has an internal wall 24 that is inclined at approximately 85 degrees. An inlet 25 to the conduit 20 is located adjacent an end of the upper portion 21 and an outlet 26 of the conduit 20 is located adjacent an end of the lower portion 24.

[0034] A grate attachment lip 27 is located adjacent the inlet on an external wall 28 of the upper portion 21. A lip thread 29 extends around the grate attachment lip 27. The grate 12 is fitted to the grate attachment lip 27 via an internal thread located on the grate 12.

[0035] The base cap 30 is located adjacent the outlet 26 of the conduit 20 such that the outlet 26 is located within the base cap 30. The base cap 30 is made from a foot 31 and a depending skirt 32. The foot 31 is arcuate in shape. The depending skirt 32 extends upwardly from the foot 31. A stem 33 extends up from the foot 31.

[0036] The base cap 30 is integrally formed with the cage 40. However, it should be appreciated that the base cap 30 and cage 40 may be attached to each other by different methods. For example, the base cap 30 may be attached to the cage 40 via an internal thread formed in the depending skirt.

[0037] The cage 40 is used to hold the base cap 30 so that the outlet 26 is located within the base cap 30. The cage 40 is a cylindrical tube 41 having a series of apertures 42 and 43 that extend through the tube 41. There are a first set of four apertures 42 extending through the tube 41 adjacent one end of the tube and a second set of four apertures 43 extending through the tube 41 adjacent the opposite end of the tube 41. The first set of apertures 42 are offset with respect to the second set of apertures 43. The apertures 42 and 43 are sized and arranged so that water can easily pass from one side of the tube 41 through to the other side of the tube 41. It should be appreciated that the number, size and orientation of the apertures 42 and 43 may be varied. An internal thread 44 is located adjacent the end of the tube 41 for attachment of the base cap 30.

[0038] FIG. 7 shows a cross-sectional view of the drain fitting 10 attached to the shower waste 11 at rest. As is shown, water 50 is located within the base cap 30. The water 50 in the base cap 30 covers the outlet 26 and provides a water seal. This assists in preventing odours from passing up a drain pipe 15 and out of the shower waste 11.

[0039] FIG. 8 shows a cross-sectional view of the drain fitting 10 when water is flowing through the drain fitting 10. In use, water 50 travels along a shower floor before it passes through the grate 12 of the shower waste 11. Hence, the water is travelling relatively slowly in a horizontal direction. When the water passes through the grate 12 and through the inlet 25 of the conduit 21, it contacts the internal wall 23 of the upper portion 21 of the conduit 20.

[0040] As the internal wall 23 of the upper portion 21 is angled at 60 degrees, the velocity of the water 50 increases as it passes through the upper portion 21 under the force of gravity. The water 50 then passes onto the internal wall 24 of the lower portion 22 of the conduit 20. As the internal wall 22 of the lower portion 22 is angled at 85 degrees, the velocity of the water 50 increases further under the force of gravity.

[0041] The water 50 then passes out of outlet 26 travelling at a relatively high velocity. The water 50 then crashes into the base cap 30. The stem 33 directs the water 50 from the outlet along the arcuate floor 31 of the base cap 30 upwardly adjacent the depending skirt 32 and into the tube 41. The water 50 then passes through the first and second set of apertures 42 and 43 of the tube 41. Any water 50 that is forced adjacent the external wall 28 of the upper portion 21 and is deflected out of the apertures 42 and 43.

[0042] The drain fitting 10 is less likely to have debris becoming lodged in the base cap 30 and/or the cage 40 due to the velocity of the water 50 being increased as it passes through the conduit 20. If debris does become lodged in the base cap 30 and/or cage 40, the next time the drain fitting is used and water passes through the drain fitting 10, the increased velocity of the water 50 generally flushes any old debris from the base cap 30 and/or cage 40. Hence, the likelihood of any decomposing debris causing an odour problem is unlikely.

[0043] FIG. 9 shows an alternative base cap 30 that is large in size than the base cap 30 shown in FIGS. 1 to 3. This base cap 30 may be used when debris is wanting to be captured. After the debris is captured in the large base cap 30, the drain fitting 10 can be removed and cleaned. This is especially helpful if any hazardous materials, such as heavy metals or medical waste, are used on a floor that should not be washed down in the sewage system.

[0044] FIG. 10 shows an extension member 60 that is used when a larger grate 12 is required. The extension member 60 has an extension body 61, an extension grate attachment lip 62 and a conduit attachment lip 63. The extension grate attachment lip 61 has an external thread 64 and is used to attach a grate 12 to the extension member 60. The conduit attachment lip 63 has an internal thread 65 and is used to attach the extension member 60 to the conduit 20. Once the extension member 60 is attached to a grate 12 and to the conduit 20, the drain fitting 10 operates as described above.

[0045] It should be appreciated that various other changes and modifications may be made to the embodiment described without departing from the spirit or scope of the invention.

1. A drain fitting comprising:

- a cage having a plurality of apertures extending through the cage;
 - a conduit having an inlet and an outlet, the conduit extending at least partially through the cage; and
 - a base cap attached to the cage, the outlet located within the base cap;
- wherein the conduit includes an internal surface that extends from the inlet to the outlet, the internal surface

increasing the velocity of the water substantially the length of the internal surface as the water passes from the inlet to the outlet.

2. The drain fitting of claim 1 wherein the cage is a tube.
3. The drain fitting of claim 2 wherein the tube is typically cylindrical in shape.
4. The drain fitting of claim 1 wherein a surface area of the apertures is normally larger than a surface area of the remainder of the cage.
5. The drain fitting of claim 1 wherein the conduit is a funnel.
6. The drain fitting of claim 1 wherein the internal surface is in the form of a number of internal walls.
7. The drain fitting of claim 6 wherein the internal walls are inclined.
8. The drain fitting of claim 7 wherein the internal walls are inclined at an angle of at least 30 degrees.
9. The drain fitting of claim 7 wherein the internal walls are inclined at an angle of at least 45 degrees.
10. The drain fitting of claim 7 the internal walls are inclined at an angle of at least 60 degrees.

11. The drain fitting of claim 1 wherein the base cap includes an arcuate floor.

12. The drain fitting of claim 12 wherein the base cap includes a stem which extends upwardly from the floor.

13. The drain fitting of claim 6 wherein the funnel has an upper portion and a lower portion.

14. The drain fitting of claim 13 wherein an internal wall of the upper portion is preferably between 50 degrees and 70 degrees.

15. The drain fitting of claim 13 wherein the internal wall of the upper portion is between 55 degrees and 65 degrees.

16. The drain fitting of claim 13 wherein internal wall of the upper portion upper portion is between 57.5 degrees and 62.5 degrees.

17. The drain fitting of claim 13 wherein an internal wall of the lower portion is preferably at least 75 degrees.

18. The drain fitting of claim 13 wherein the internal wall of the lower portion is between at least 80 degrees.

19. The drain fitting of claim 13 wherein internal wall of the upper portion upper portion is at least 82.5 degrees.

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