PLUMBING DRAIN APPARATUS

An apparatus is disclosed for filtering and treating fluids within a drain. The apparatus includes a stopper component for controlling drain flow out of a basin and a filtering component for ensnaring foreign matter and debris. The filtering component includes a plurality of levels, each level configured to entrap foreign matter and enable fluid flow therepast. The levels include a plurality of openings and a plurality of spicule members adapted to contact an inner drain surface.

Related U.S. Application Data

Provisional application No. 61/669,148, filed on Jul. 9, 2012.
PLUMBING DRAIN APPARATUS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Provisional Application No. 61/669,148 filed on Jul. 9, 2012 which is hereby incorporated herein by reference.

TECHNICAL FIELD

[0002] This disclosure relates to plumbing devices, and more particularly to drainage control devices.

BACKGROUND

[0003] The statements in this section merely provide background information related to the present disclosure and may not constitute prior art.

[0004] Debris accumulation in pipes and plumbing apparatus can clog fluid flow, resulting in malfunction of the pipes and plumbing apparatus. Specifically, debris accumulation associated with a drain stopper including a support member that extends downward from the top portion of the drain stopper and often referred to as a stopper guide; the accumulation leading to the malfunction of the drain stopper. A clogged drain stopper is often caused by the accumulation of debris around the guide of stopper. Common types of debris found in clogged plumbing apparatus are hair, lint, and other fibrous material caught in the plumbing, which obstructs the flow of discharge from a basin.

[0005] Basins such as a sink or tub typically have an outlet containing a plumbing apparatus to regulate flow of liquids through the outlet such as the drain stopper depicted in FIG. 1. Common problems with these plumbing apparatus are the clogging of stopper, inability for stopper to fully close, or the inability for stopper to easily open. When the drain stopper is not functioning properly, other problems may arise. For example, when a clogged stopper does not close properly, water is wasted when filling the sink. Also, when drainage is not functioning properly, water drains from the basin sluggishly or worse, soiled water may overflow leading to damages of other fixtures or creating an environment for mold to grow. All these problems ultimately lead to an increase in costs.

[0006] Typical draining plumbing apparatuses include a stopper with a guide positioned within a basin. The guide often extends the length of stopper from the cap to the base where it connects to a horizontal pivot rod. The width of the guide spans the diameter of the top and functions as a support for stopper as it is raised and lowered to regulate liquid discharge from said basin. To clear the debris, stopper needs to be disassembled either from the top or may require one to disassemble the horizontal pivot rod from the drain body under the sink. Under some circumstances, the severity of the problem may require the entire plumbing fixture to be replaced. Additionally other known filtering mechanism are not capable of catching small items such as contact lens, ear rings, pills, and toys.

[0007] Therefore, there is a need in the art for a plumbing drain apparatus that controls clogging while catching mislaid items and enables one to easily clean accumulated debris, eliminating common problems with existing sink stopper devices and decreasing overall costs.

SUMMARY

[0008] An apparatus is disclosed for filtering and treating fluids within a drain. The apparatus includes a stopper component for controlling drain flow out of a basin and a filtering component for ensuring foreign matter and debris. The filtering component includes a plurality of levels, each configured to entrap foreign matter and enable fluid flow theretop. The levels include a plurality of spicule members adapted to contact an inner drain surface and a plurality of openings. Certain embodiments of the invention include a mechanical coupling means between the stopper component and the filtering component enabling the stopper component to be selectively attached to the filtering component.

[0009] Certain embodiments of the invention include a feature of a cross-shaped void configured to receive a cross-shaped fluid treatment tablet.

[0010] Certain embodiments of the invention include a stopper cap configured to receive a graphical image.

[0011] This summary is provided merely to introduce certain concepts and not to identify key or essential features of the claimed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] One or more embodiments will now be described, by way of example, with reference to the accompanying drawings, in which:

[0013] FIG. 1 shows a prior art drain apparatus;

[0014] FIG. 2 shows overview diagram of a drain stopper system, in accordance with the present disclosure;

[0015] FIGS. 3 and 4 show side views of an embodiment of a drain stopper apparatus rotated, in accordance with the present disclosure;

[0016] FIG. 5 shows a cross-sectional view of the drain stopper apparatus from a bottom view toward a stopper component of the drain stopper apparatus, in accordance with the present disclosure;

[0017] FIG. 6 shows a top perspective view of the drain stopper apparatus, in accordance with the present disclosure;

[0018] FIGS. 7 and 7A show a top perspective and a bottom view of a stopper component of the drain stopper apparatus, in accordance with the present disclosure;

[0019] FIG. 8 shows an exemplary level of the drain stopper apparatus, in accordance with the present disclosure;

[0020] FIG. 9 shows an exemplary embodiment of the drain stopper apparatus having a single hook, in accordance with the present disclosure;

[0021] FIGS. 10-14 show various view of an embodiment of a stopper component of the drain stopper apparatus, in accordance with the present disclosure; and

[0022] FIGS. 11-21 show various view of a second embodiment of a filtering component of the drain stopper apparatus, in accordance with the present disclosure.

DEDICATED DESCRIPTION

[0023] Referring now to the drawings, wherein the depictions are for the purpose of illustrating certain exemplary embodiments only and not for the purpose of limiting the same, FIG. 1 depicts an overview diagram of a drain stopper system 100 including a drain stopper apparatus 10 which controls accumulation of debris in a plumbing system by implementing a series of filter levels as described herein below. The drain stopper apparatus 10 is preferably adapted to fit securely within an outlet of a basin 110. The drain stopper...
The basin 110 is generally a substantially circular vessel with slopping or curving sides for holding water for washing, or a bowl for washing, often affixed to a wall. The basin 110 may be washbasin, for example a basin in a bathroom sink that is permanently installed and connected to a water supply and drain pipe—where you can wash your hands and face, or a large basin such as a bathtub, or any other type of basin or container that includes some type of plumbing, such as an outlet that allows liquid or fluid to pass through, accumulate, and drain. In the shown embodiment, the basin 110 is a sink with a faucet 102 that regulates the flow of liquid into basin 110.

The stopper 101 is configured to retain water or prevent fluid from entering or exiting a particular outlet. The stopper 101 may be constructed of any rigid material, such as any type of metal, or may be constructed of a resilient material such as a flexible plastic or rubber material, without deviating from the scope of the present disclosure. The stopper 101 is preferably adapted to selectively prevent fluid flow from exiting the basin 110 when in a closed position, thereby retaining water in the basin 110, when for example a user decides to turn on the faucet 102 and fill the basin 110. The stopper 101 includes in one embodiment, a top surface configured to receive a graphical image such as a logo or trademark.

The horizontal pivot 105 is controlled by the clevis 106 attached to a rod 107, which moves the horizontal pivot rod 105 upward or downward and thereby raising or lowering the stopper 101 to regulate drainage and filling of the basin 110. In one embodiment, a pivot ball 103 may be used as a pivoting mechanism and a flow sealor. In operation, a user actuates the stopper between open and closed positions by raising or lowering the lift rod 107. When lowered, the stopper 101 rests flushed to the outlet and against a flange 108 to prevent water leakage; when raised, the stopper 101 is raised to permit drainage through the basin outlet.

FIGS. 3 and 4 show side views of the drain stopper apparatus 10 rotated 90-degrees, respectively. FIG. 6 shows a top perspective view of the drain stopper apparatus 10. As FIGS. 3, 4, and 6 show, the drain stopper apparatus 10 preferably includes a stopper component 14 and a filtering component 16. The stopper component 14 and the filtering component 16 may be integrally connected or selectively coupled in any manner without deviating from the scope of the present disclosure. For example, in one embodiment, the stopper component 14 and the filtering component 16 are coupled by snap-on mechanism. In one embodiment, the stopper component 14 and the filtering component 16 are threadably coupled. In one embodiment, the stopper component 14 and the filtering component 16 are coupled magnetically. Decoupling is desirable so that a user may remove the filtering component for cleaning or replacement. In one embodiment, a sealing washer such as a rubber washer is used to seal the stopper component to the drain basin. As one skilled in the art will readily recognize, washers or other known coupling components may be used to seal the apparatus to the basin.

The filtering component 16 may be constructed of light, durable, plastic polymers including biodegradable embodiments. However, other materials such as PVC, metals, acrylics, or any other type of material may be used without deviating from the scope of the present disclosure. In one embodiment, the stopper component 14 is made of a light aluminum alloy that does not rust when in constant contact with water and the filtering component 16 is constructed of a light durable plastic.

The drain stopper apparatus 10 includes at least one hook 18 configured to couple to the horizontal pivot rod 105. In one embodiment, a first and a second hook are included on the drain stopper apparatus 10 to accommodate various standard sized drain stopper systems. The hooks are configured to engage the horizontal pivot rod 105 by rotating around into the pivot rod 105. In one embodiment, the hooks are off-center to enable rotation engagement and disengagement. In this way, the drain stopper apparatus 10 may be easily removed from the drain basin by a user rotating the drain stopper apparatus 10 from above the basin, avoiding significant known disassembly procedures that require under-basin operation.

The drain stopper apparatus 10 includes a plurality of levels 12 configured to entrap foreign matter, and particularly hair, flowing within a drain pipe. Multiple levels provide redundancy in the event the unique ensuring action of the levels 12 is circumvented by flowing materials. In a preferred embodiment, there are three levels 12 as shown in the figures. The levels 12 are configured arranged to enable the flow of water therethrough. In one embodiment, the levels 12 are rotationally positioned so that so that the spicule members in adjacent upper layers extend over and above different radial positions of the drain. In this way, foreign matter flowing at different positions within the drain is directed by the levels 12 to flow across spicule members of each layer. Thus if water passes downwardly in a vertical path through all three levels 12, it will not have the opportunity to unobstructively flow through each of the openings on the levels 12. By this means, the foreign matter trap is effective in entrapping foreign matter.

FIGS. 7 and 7A show a top perspective and a bottom view of a stopper component 14 of the drain stopper apparatus 10. As FIGS. 7 and 7A show, the stopper component 14 includes a void 20 configured to receive a fluid treatment tablet. The void 20 is preferably cross-shaped configured to receive a cross-shaped fluid treatment tablet. The cross-shape tablet and void 20 are cross-shaped for preferential contact with flowing fluids. The tablet inserted in the void 20 may be formed of fragrance materials, anti-bacterial treatment materials, and/or plumbing treatment materials such as degreasing and below-ground well treatment materials.

In one embodiment wherein the stopper component and the filtering component are not integrally formed, the stopper component 14 additionally includes a mechanical fastener connection means configured to fasten to the filtering component 16. As FIG. 7A shows, the stopper component 14 includes hooks 21 configured to insert into a receiving void on the filtering component 16. In one embodiment, the hooks 21 are directed to insert into the receiving void on the filtering component in a counter-clockwise direction.

FIG. 8 shows a top view of a filtering level 12 of the drain stopper apparatus 10. As described herein above, the drain stopper apparatus 10 comprises a plurality of filtering levels 12. Each level 12 is configured to entrap foreign matter, and particularly hair. Each level includes openings to allow for the free passage of water down into the drain, and has a plurality of outward projections to entangle hair and debris. The outward projections 22 are spaced apart from each other a distance so as to effectively impede and entrap foreign matter contained in water passing between them.
The outer ends of the spicule members 22 are either in close proximity to or in engagement with the drain pipe in which they are positioned. Preferably, the spicule members 22 have a length that permits the level 12 to make contact with the inner drain walls to stabilize the drain stopper apparatus 10 in its inserted position in the vertical drain pipe. The spicule members 22 may be formed from a rigid material generally known in the art. In one embodiment, the spicule members 22 are integrally formed of the same material as the drain stopper apparatus 10. In one embodiment, the spicule members 22 are secured to the levels and formed of a rigid material whereat the drain stopper apparatus 10 is formed of a rigid material.

In an exemplary embodiment, rotating the drain stopper apparatus 10 within the drain will detach the apparatus from the horizontal pivot rod 105. This is desirable so that instead of reaching inside a drain for cleaning the drain stopper apparatus 10 may be removed and cleaned more thoroughly outside drain body. The drain stopper apparatus 10 may be cleaned by pulling the trapped matter from each of the levels of spicule members or, if the trap is inexpensively constructed, (it can be formed of biodegradable plastic as described hereinabove) it can be discarded and replaced. This maintenance procedure can be exceedingly expeditiously performed and if done on a routine basis will serve to capture foreign matter which might ultimately collect and clog a plumbing system in some remote and inaccessible area.

FIGS. 10-14 show various views of an embodiment of a stopper component for use with an embodiment of the filtering component shown in FIGS. 11-21. As FIGS. 10-14 show, the drain stopper component 14 is configured to rotatably engage the filtering component 16. As FIGS. 11-21 show, the filtering component 16 includes a plurality of octagram-shaped levels configured to entrapp foreign matter. The octagram-shaped levels each include eight points, the points may be flexibly formed so to engage walls of the drain pipe. The second embodiment may be implemented using a single hook or multiple hooks as shown.

As illustrated in FIGS. 19 and 20, the second embodiment includes a porous void space configured to receive a fluid treatment tablet. The porous void space is defined by a porous, cylindrical-shaped wall and a porous, circular bottom. The bottom is shown as including openings along corner. Upon a careful reading of the teachings here, one skilled in the art will recognize that various porous bottoms may be formed alternatively to the embodiment shown.

The disclosure has described certain preferred embodiments and modifications thereto. Further modifications and alterations may occur to others upon reading and understanding the specification. Therefore, it is intended that the disclosure not be limited to the particular embodiment(s) disclosed as the best mode contemplated for carrying out this disclosure, but that the disclosure will include all embodiments falling within the scope of the appended claims.

1. A drain apparatus for installation in a basin having a drain stopper system, the apparatus comprising:
   a drain cover configured to selectively seal the basin;
   a filtering component configured to collect debris; and
   a hook configured to rotatably engage a component of the drain stopper system.
2. The apparatus of claim 1, further comprising: a porous void space configured to receive a fluid treatment tablet.
3. The apparatus of claim 2, wherein the porous void space is downstream of the drain cover and wherein the void space is further configured for fluid pass through.
4. The apparatus of claim 2, wherein the porous void space is defined by a cylindrical-shaped wall and a porous, circular bottom configured to retain the fluid treatment tablet and pass through fluids.
5. The apparatus of claim 1, wherein the filtering component is removably connectable to the drain cover.
6. The apparatus of claim 1, wherein the filtering component comprises a plurality of levels configured to entrapp foreign matter.
7. The apparatus of claim 6, wherein each of the plurality of level comprises a plurality of spicule members.
8. The apparatus of claim 1 wherein the plurality of level comprises a plurality of spicule members.
9. The apparatus of claim 8 wherein the filtering component is configured to rotatably engage the drain cover.
10. The apparatus of claim 8 wherein the porous void space is defined by a cylindrical-shaped wall and a porous, circular bottom configured to retain the fluid treatment tablet and pass through fluids.
11. The apparatus of claim 8 wherein each of the plurality of level comprises a plurality of spicule members.
12. The apparatus of claim 11 wherein the filtering component is integrally formed.
13. The apparatus of claim 11 wherein the spicule members are pliable.
14. The apparatus of claim 8, further comprising a second hook.
15. The apparatus of claim 8 wherein each of the plurality of level comprises a plurality of triangle-shaped outer projections.
16. The apparatus of claim 8, further comprising: a porous, cylindrical-shaped wall connecting the plurality of levels.
17. The apparatus of claim 8 wherein each of the plurality of level is octagram-shaped.
18. A drain apparatus for installation in a basin having a drain stopper system, the apparatus comprising:
   a drain cover configured to selectively seal the basin; and
   a filtering component integrally formed and configured to selectively connect to the drain cover, wherein the filtering component comprises:
   a porous void space configured to receive a fluid treatment tablet, wherein the porous void space is defined by a porous, cylindrical-shaped wall and a porous, circular bottom;
   a plurality of octagram-shaped levels configured to entrapp foreign matter; and
   a hook configured to rotatably engage a component of the drain stopper system.
19. The apparatus of claim 18 wherein the octagram-shaped levels each comprise eight points, the points being flexibly formed.
20. The apparatus of claim 18, further comprising a second hook.

21. The apparatus of claim 18, wherein the outer surface of the drain cover includes a graphical image.