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(54) **TRAP WITH EMBEDDED STRAINER**

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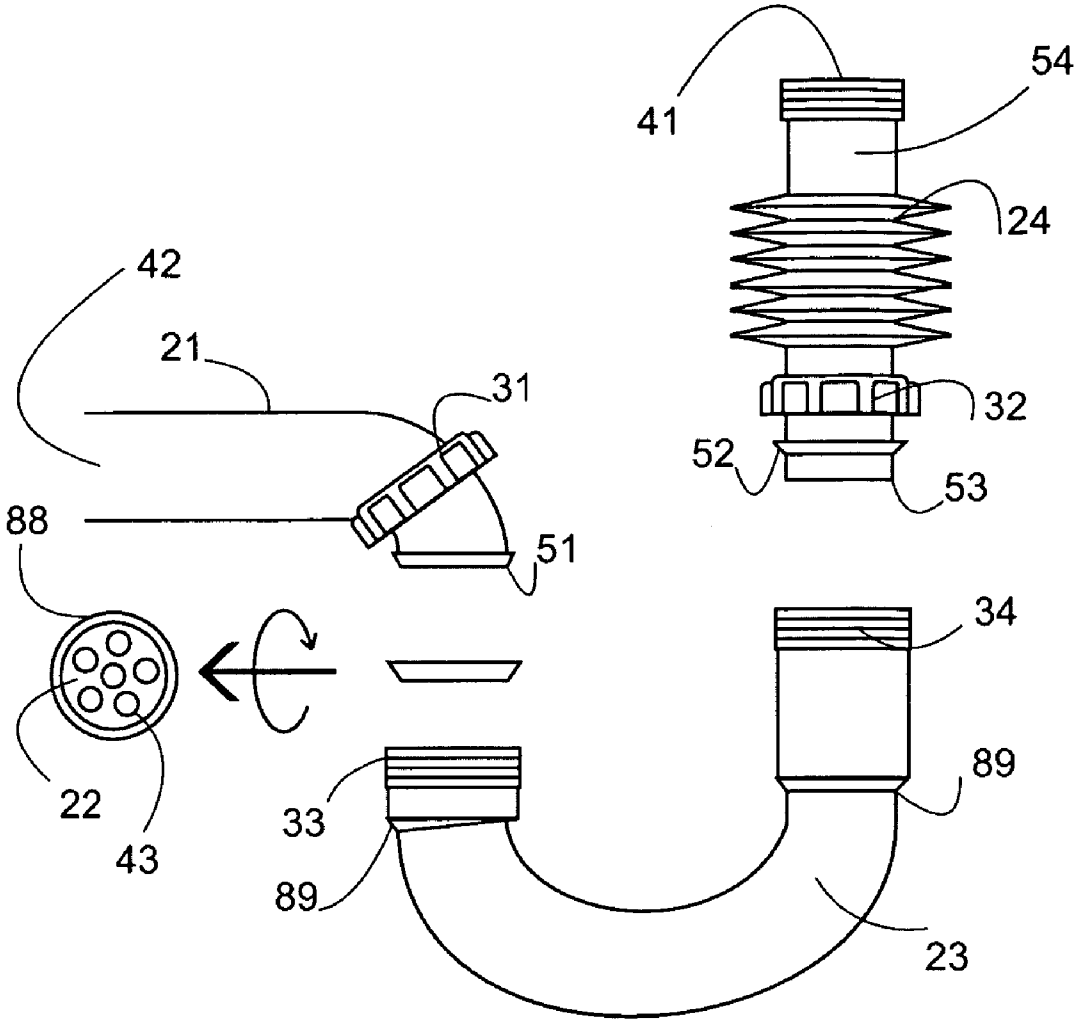
(57) **ABSTRACT**

A trap with embedded strainer includes a water input; an upper vertical section receiving water from the water input; a flexible tailpiece below the upper vertical section, receiving water from the upper vertical section; a J bend below the flexible tailpiece, receiving water from the flexible tailpiece at a J bend water input portion, and discharging water at a J bend water output portion. A J bend flare is sized to fit over a lower vertical section of the flexible tailpiece. A J bend locknut fits over the J bend flare and engages a J bend thread disposed on a J bend top portion so as to bias the lower vertical section of the flexible tailpiece against the J bend top portion. The J bend flare seats to provide a waterproof seal.



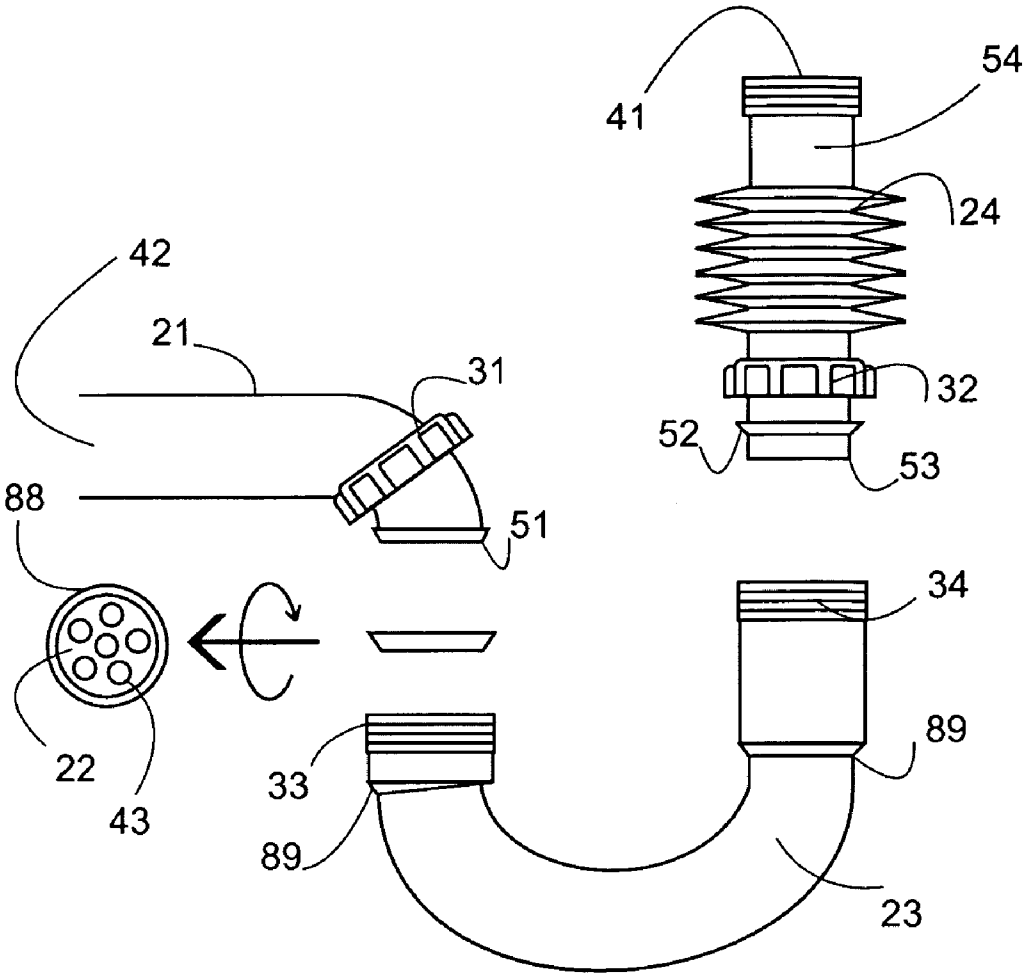


Fig. 1

TRAP WITH EMBEDDED STRAINER

FIELD OF THE INVENTION

[0001] The present invention is related to the field of plumbing.

BACKGROUND

[0002] The U-bend trap was invented by Thomas Crapper in 1880. It soon became the plumbing industry's standard due to the viability of maintaining a water seal, which prevents sewage gas from entering into the living quarters. U-bend was later replaced by J-bend for ease of installation.

[0003] Contradictory to common perceptions, the "trap" serves to trap water to form the water seal. It does not trap solid debris. Small objects and hair are flushed downstream into the main pipe. Most of plumbing clogs happen at joints in the main line. Millions of dollars worth of jewelry have been lost in the drain every year. Main sewage line obstruction calls for expensive plumber services.

[0004] Numerous types of strainers and filters have been invented since 1929 (Izquierdo, U.S. Pat. No. 1,817,376). The common denominator is an insert of wire mesh or other straining element into the bottom of the trap. An access hole with a screw-on cap is imposed on either side or bottom of the trap. Such devices increase the complexity and manufacturing cost, while leakage and pests can cause additional problems.

[0005] Thanks to the availability of plastic plumbing materials, it is now possible and practical to make an integrated P-trap with a translucent J-bend where a detachable beveled washer-strainer disc is installed at the discharge end of the J-bend connecting to the elbow (extension tube). Small objects and hair cannot pass beyond the strainer disc and hence remain in the trap, which is visible from the outside. The plastic nuts are finger tightened therefore requires no tools for installation and services.

DISCUSSION OF RELATED ART

[0006] There are a number of the sink drain strainer systems. Each retains solids at a different stage and using a different configuration. After water comes from the faucet, it then flows to the sink, then the drain, then below the drain, and then the drain trap (Scannell U.S. Pat. No. 394,213 issued Dec. 11, 1888, the disclosure of which is incorporated by reference, uses a basket strainer at the drain for capturing large solids. This is a basket type of solid filter which captures solids before it goes down the drain. Ritter in U.S. Pat. No. 3,874,006 issued Apr. 1, 1975, the disclosure of which is incorporated herein by reference, uses a drain to a tub that is underneath the sink. There is a screen basket in the tub for straining out solid waste material before discharging to a sink drain outlet. This is the next stage; the solids have passed down the drain, but there is a screen basket in a tub immediately after the drain under the sink for straining out solids. Canelli in U.S. Pat. No. 4,949,406, issued Aug. 21, 1990, the disclosure of which is incorporated herein by reference, has a filter that is immediately before the drain trap. The filter is removable and allows capture of objects such as wedding rings in a tray. Izquierdo U.S. Pat. No. 1,817,376 patented Aug. 4, 1931, the disclosure of which is incorporated herein by reference, also uses a drain strainer immediately before the bend but provides a tray with sidewalls that can be removed after removing a cap.

[0007] A drain trap that has a removable bottom is disclosed in Griffin U.S. Pat. No. 5,715,550, issued Feb. 10, 1998, the disclosure of which is incorporated by reference. The removable bottom is secured by a latch that allows easy swivel opening, but unfortunately is prone to leaks. The Griffin invention would be good for clumsy people who drop things in the drain trap on a weekly basis. The Griffin drain trap has a removable bottom portion so that one can clean up the filter that is slightly before the lowest portion of the bend.

[0008] Also, Marchionda U.S. Pat. No. 6,308,350 issued Oct. 30, 2001, the disclosure of which is incorporated herein by reference, provides for a drain trap having a U-shaped portion a removable filter. The removable filter is placed inside the drain trap at the lowest portion of the bend. Related application Marchionda U.S. Pat. No. 5,525,215 issued Jun. 11, 1996, the disclosure of which is also incorporated herein by reference, shows the same filter in the drain trap which uses a filter in a cartridge which retains drain gunk. The Marchionda patents have a structure that is particularly well-suited for keeping the drain clean from soft material such as semi dissolved toothpaste and the like. Barnhardt U.S. Pat. No. 4,179,762 issued Dec. 25, 1975, the disclosure of which is incorporated by reference, seems to be the earlier version of the Marchionda device since it also provides for a trap filter at the same location that Marchionda uses, which is at the bottom of the U shaped bend. However the Barnhardt has the filter set further back than the Marchionda after the lowest portion of the bend. Both are probably equally effective at getting these viscous 'accumulations'. The drawback to the above referenced sink drain systems are that they all require frequent handling and servicing. The frequent handling and servicing of plumbing risks leaks, is inconvenient, and unpleasant.

[0009] Generally, in the field of plumbing strainer systems, a variety of different configurations can be used for different purposes. Tuleja in U.S. Pat. No. 4,199,827 issued Apr. 29, 1980, the disclosure of which is incorporated herein by reference, shows a pair of filters mounted on a stick for easy removal and cleaning of the trap.

[0010] There are a wide variety of sink trap filters for specialized capturing of things such as valuables as seen in U.S. Pat. No. 5,638,557 to Ida, issued Jun. 17, 1997, the disclosure of which is incorporated herein by reference. The Ida device has a container for holding captured valuables which would fall into the container for easy removal. There is also a device for capturing hair, as described in U.S. Pat. No. 3,935,602, and some separation methods that do not require a strainer such as seen in U.S. Pat. No. 5,413,705. Some of the convenient benefits added include the window to see inside the trap area as shown in Marchionda U.S. Pat. Nos. 5,525,215 and 6,308,350.

[0011] U.S. Pat. No. 7,531,088 to Gurmu, issued May 12, 2009, the disclosure of which is incorporated herein by reference, has an extensive discussion on prior inventions and is useful for reviewing the history of sink strainer devices.

SUMMARY OF THE INVENTION

[0012] In a sink or tub drain line, there is drain trap assembly. This is usually a P-trap which is made up of a "tailpiece" that connects up to the sink of tub, a "J-bend", and an "elbow" going into the wall connecting to the main sewage line.

[0013] This "trap" is in place to trap water inside the J-bend with the objective to form a water seal preventing sewage gas from entering the living quarters. It is not capable of trapping solid objects and hair from being flushed down into the main sewage line. In order to retain such objects inside the J-bend, a strainer is mandatory.

[0014] This invention incorporates a gooseneck type flexible tailpiece for easy alignment during installation. A translucent plastic J-bend makes it easy and convenient to observe the objects trapped inside the trap. And a removable beveled washer-strainer disc installed at the discharge end of the J-bend that also serves as a flexible seal between the J-bend and the elbow.

[0015] The beveled washer-strainer disc has a number of holes on it. The holes can be between ⅛' and ¼" in diameter. They allow waste water to flow through freely while solid debris and fibrous matters will be retained in the J-bend.

[0016] The strainer does not affect the water flow, but serves as a first line of defense preventing objects from flowing down into the main sewage line. This measure prevents the main sewage line from clogging while enable the user to retrieve valuable objects such as jewelry that accidentally fell down the sink.

[0017] The J-bend to elbow joint and the J-bend to tailpiece joint are both secured with plastic thumb nuts that do not require any tools for installation and disassembly. Hence it is easy and trivial for laymen to take it apart either retrieving objects or cleaning out debris from the trap.

[0018] The trap with embedded strainer includes a water input; an upper vertical section receiving water from the water input; a flexible tailpiece below the upper vertical section, receiving water from the upper vertical section; a J bend below the flexible tailpiece, receiving water from the flexible tailpiece at a J bend water input portion, and discharging water at a J bend water output portion. A J bend flare is sized to fit over a lower vertical section of the flexible tailpiece. A J bend locknut fits over the J bend flare and engages a J bend thread disposed on a J bend top portion so as to bias the lower vertical section of the flexible tailpiece against the J bend top portion. The J bend flare seats to provide a waterproof seal. An elbow receives water from the J bend water output portion, and the elbow further comprises an elbow water inlet. A strainer of generally circular configuration has a washer portion of generally circular configuration circumferentially bonded around the strainer, and the strainer has a plurality of openings. The washer portion is mounted to a J bend water output portion. An elbow flare is formed on the elbow water inlet, so that the washer portion is seated between the elbow flare and the J bend water output portion.

[0019] Optionally, the J bend flare is of compression fitting type such that it has an annular profile made of a separate piece of material. The washer portion of the strainer can be seated on the terminal periphery of an elbow thread such that a water tight seal is formed. The J bend locknut is made of PVC. The J bend locknut further includes a plurality of protrusions for gripping of the J bend locknut. Under the J bend locknut, a reduction arises at the J bend reduction. The reduction leads to the main body of the bend. Preferably, a terminal reduction after the J bend leads to an elbow thread which receives an elbow lock nut that is threaded onto the elbow thread. Preferably, six openings are formed on the strainer arranged in a pentagonal orientation. The flexible tailpiece is preferably formed in an accordion configuration to allow extension, bending or moving in an accordion like manner for easy installation of the sink to the drain.

BRIEF DESCRIPTION OF THE DRAWING

[0020] FIG. **1** is an exploded view of the present invention.

[0021] The following callouts are used consistently herein.

[0022] **21** Elbow

[0023] **22** Strainer

[0024] **23** J Bend

[0025] **24** Flexible Tailpiece

[0026] **31** Elbow Lock Nut

[0027] **32** J Bend Locknut

[0028] **33** Elbow Thread

[0029] **34** J Bend Thread

[0030] **41** Water Input

[0031] **42** Water Output

[0032] **51** Elbow Flare

[0033] **52** J Bend Flare

[0034] **53** Lower Vertical Section

[0035] **54** Upper Vertical Section

[0036] **43** Strainer Opening

[0037] **88** Washer Portion

[0038] **89** J Bend Reduction

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0039] The present invention strainer trap has a water input **41** that is connected to a sink or tub. The water input leads to an upper vertical section **54** that directs water downward into a flexible tailpiece **24**. The flexible tailpiece can be extended, bent or moved in an accordion like manner for easy installation of the sink to the drain. Previously, installation of a J bend **23** such as the one shown would require precise measurement and would not allow for an offset left or right of the upper vertical section from the lower vertical section **53**.

[0040] The lower vertical section **53** can be to the right or left, or forward or backward relative to the upper vertical section **54**. The lower vertical section **53** and the upper vertical section **54** need not be coaxial in orientation. The flexible tailpiece **24** provides a margin of error and allows more flexible installation.

[0041] The flexible tailpiece **24** is preferably made of a flexible plastic such as high-density polyethylene.

[0042] At the bottom end of the flexible tailpiece, a J bend flare **52** is sized to fit over the lower vertical section **53**. The J bend flare can be made as a fitting of a compression fitting type such that it has an annular profile made of a separate piece of plastic, or alternatively it can be made integrally formed to the lower vertical section **53** as the same piece of plastic. The J bend locknut **32** fits over the J bend flare **52** and biases the J bend flare **52** into the top portion of the J bend where the J bend flare seats onto the top portion to provide a waterproof seal. The J bend thread **34** receives the J bend locknut **32**. The J bend locknut **32** can also be made of PVC, high-density polyethylene or other suitable plumbing material. The J bend locknut **32** could further include a plurality of protrusions for gripping of the J bend locknut **32** which is preferably tightened by hand according to the right-hand rule.

[0043] Below the J bend locknut **32**, a reduction arises at the J bend reduction **89**. The reduction leads to the main body of the bend **23**. After the bend, there is another reduction **89**, or expansion depending upon the orientation.

[0044] The second reduction **89** leads to an elbow thread **33** which receives an elbow lock nut **31** that is threaded onto the elbow thread **33** preferably by hand. The elbow flare **51** preferably is seated on a washer portion **88** of the strainer **22** and the strainer **22** is seated on the terminal periphery of the elbow thread **33** such that a water tight seal is formed. During actual use, large articles are not passed through the strainer opening **43**. The strainer opening **43** has a set diameter, and preferably there are six of them arranged in a pentagonal orientation.

[0045] The water that passes through strainer opening **43** then passes through the elbow **21** and exits by the water outlet **42**.

1. A trap with embedded strainer comprising:
a. a water input;
b. an upper vertical section receiving water from the water input;
c. a flexible tailpiece below the upper vertical section, receiving water from the upper vertical section;
d. a J bend below the flexible tailpiece, receiving water from the flexible tailpiece at a J bend water input portion, and discharging water at a J bend water output portion;
e. a J bend flare sized to fit over a lower vertical section of the flexible tailpiece;
f. a J bend locknut that fits over the J bend flare and engages a J bend thread disposed on a J bend top portion so as to bias the lower vertical section of the flexible tailpiece against the J bend top portion, wherein the J bend flare seats to provide a waterproof seal;
g. an elbow receiving water from the J bend water output portion, wherein the elbow further comprises an elbow water inlet; and
h. a strainer having a washer portion circumferentially bonded around the strainer, wherein the strainer has a plurality of openings, wherein the washer portion is mounted to a J bend water output portion.

2. The trap with embedded strainer of claim **1**, wherein the J bend flare is of compression fitting type such that it has an annular profile made of a separate piece of material.

3. The trap with embedded strainer of claim **1**, further comprising: an elbow flare formed on the elbow water inlet, wherein the washer portion is seated between the elbow flare and the J bend water output portion.

4. The trap with embedded strainer of claim **1**, wherein the washer portion of the strainer is seated on the terminal periphery of an elbow thread such that a water tight seal is formed.

5. The trap with embedded strainer of claim **1**, wherein the J bend locknut is made of PVC.

6. The trap with embedded strainer of claim **1**, wherein the J bend locknut further includes a plurality of protrusions for gripping of the J bend locknut.

7. The trap with embedded strainer of claim **1**, wherein below the J bend locknut, a reduction arises at the J bend reduction, wherein the reduction leads to the main body of the bend, further comprising a terminal reduction after the J bend that leads to an elbow thread which receives an elbow lock nut that is threaded onto the elbow thread.

8. The trap with embedded strainer of claim **1**, wherein six openings are formed on the strainer arranged in a pentagonal orientation.

9. The trap with embedded strainer of claim **1**, wherein: the flexible tailpiece is formed in an accordion configuration to allow extension, bending or moving in an accordion like manner for easy installation of the sink to the drain.

10. A trap with embedded strainer comprising:
a. a water input;
b. an upper vertical section receiving water from the water input;
c. a flexible tailpiece below the upper vertical section, receiving water from the upper vertical section;
d. a J bend below the flexible tailpiece, receiving water from the flexible tailpiece at a J bend water input portion, and discharging water at a J bend water output portion;
e. a J bend flare sized to fit over a lower vertical section of the flexible tailpiece;
f. a J bend locknut that fits over the J bend flare and engages a J bend thread disposed on a J bend top portion so as to bias the lower vertical section of the flexible tailpiece against the J bend top portion, wherein the J bend flare seats to provide a waterproof seal;
g. an elbow receiving water from the J bend water output portion, wherein the elbow further comprises an elbow water inlet; and
h. a strainer of generally circular configuration having a washer portion of generally circular configuration circumferentially bonded around the strainer, wherein the strainer has a plurality of openings, wherein the washer portion is mounted to a J bend water output portion; and an elbow flare formed on the elbow water inlet, wherein the washer portion is seated between the elbow flare and the J bend water output portion.

11. The trap with embedded strainer of claim **10**, wherein the J bend flare is of compression fitting type such that it has an annular profile made of a separate piece of material.

12. The trap with embedded strainer of claim **10**, wherein the washer portion of the strainer is seated on the terminal periphery of an elbow thread such that a water tight seal is formed.

13. The trap with embedded strainer of claim **10**, wherein the J bend locknut is made of PVC.

14. The trap with embedded strainer of claim **10**, wherein the J bend locknut further includes a plurality of protrusions for gripping of the J bend locknut.

15. The trap with embedded strainer of claim **10**, wherein below the J bend locknut, a reduction arises at the J bend reduction, wherein the reduction leads to the main body of the bend, further comprising a terminal reduction after the J bend that leads to an elbow thread which receives an elbow lock nut that is threaded onto the elbow thread.

16. The trap with embedded strainer of claim **10**, wherein six openings are formed on the strainer arranged in a pentagonal orientation.

17. The trap with embedded strainer of claim **10**, wherein: the flexible tailpiece is formed in an accordion configuration to allow extension, bending or moving in an accordion like manner for easy installation of the sink to the drain.

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