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54 Drain trap.

57 An easy to clean, spill-free cleanout type sink trap wherein a container (10) is sealingly and detachably connected to a cover (20). Inflow and outflow conduits (30,40) are connected to passages through the cover when mounted in situ. The container is designed to provide sufficient additional volume (50), free of liquid so as to accommodate all of the liquid, including that standing in the inflow and outflow conduits, when the seal between the cover and the container is broken, i.e. removal of the container to clean out the trap. In one embodiment both of the conduits project a selected amount beyond the cover downwardly into the container whereby during use there is an air pocket in the upper part of the container. This liquid free portion has sufficient volume as to hold the quantity of liquid normally retained in the inlet and outlet conduits. In another form the container extends upwardly beyond the cover and the volume of the extending portion is sufficiently large as to hold the liquid normally retained in the conduits. Another form constitutes a combination of the foregoing where a portion of the liquid free volume is internal of the trap and the remaining portion external.

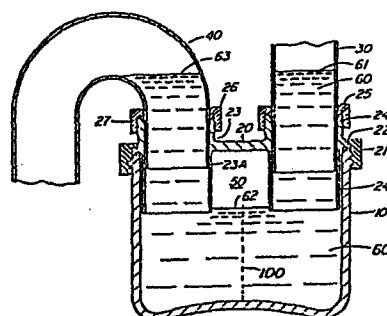


FIG. 1

DRAIN TRAP

This invention relates to a drain trap for
sinks and the like and particularly an easy-clean, no-spill
5 trap.

Easy-clean traps are known in the art, as
exemplified by the teachings in U.S. Patents 3,935,602
issued February 3, 1976 to H.D. Kale, 2,742,101 issued
10 April 17, 1956 to C. Stambaugh, and 1,210,201 issued
December 26, 1916 to W.H. Perkins. In each instance these
traps have a removable lower portion that can be quickly
and readily detached to retrieve any foreign objects that
have been collected therein. The problem with such traps
15 is that when the bottom is removed, liquid which is
normally retained in the inflow and outflow conduits, flows
out through the bottom of the trap making a mess unless it
is collected in a separate container. Removal of the
bottom of the trap often results in a spillage of the
20 liquid into the surrounding area even when using a separate
collecting container. Cabinets and other enclosures around
the sink limit the space and in many instances there is
insufficient room to get a container in (or requires a
specially designed container) to collect the liquid in the
25 conduits.

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Various types of traps are illustrated in the following references:

United States Patents

4,275,760 issued June 30, 1981 to B. Kessel
5 4,264,442 issued April 28, 1981 to D. Jackson
4,230,582 issued October 28, 1980 to A. Tuleja
4,158,897 issued June 26, 1979 to M. Cocherel
3,751,734 issued August 14, 1973 to R. Lumadue
3,725,964 issued April 10, 1973 to G. Whitsett
10 277,888 issued May 22, 1883 to P. Connolly

Canadian Patents

39,019 issued May 28, 1892 to J. Carroll
103,102 issued January 6, 1907 to J. Paddon
118,591 issued May 25, 1909 to J. Donovan
15 218,965 issued May 23, 1922 to E. Johansson

An object of the present invention is to provide an improvement to the foregoing traps such that the liquid in the pipes can be collected, without spillage, 20 in the removable portion of the trap hereinafter referred to as a container, thereby resulting in a spill free clean out trap.

In order to overcome the foregoing disadvantages, applicant has provided a trap wherein the container 25 is provided with additional liquid free volume (above the

normal water level therein when in use) to collect and hold the liquid in the conduits when the seal is broken between the container and cover therefor to which an inlet and outlet pipe is connected.

5 In keeping with the foregoing, there is provided in accordance with the present invention a spill free clean out type sink trap which, when mounted in situ and during normal operation, has liquid therein that extends upwardly into respective inflow and outflow
10 conduits comprising:

- (a) a cover having liquid inlet and outlet means therethrough, respectively for the inflow of liquid into the trap via said inflow conduit and outflow of such liquid from the trap via the outflow conduit; and
- 15 (b) a container detachably and sealingly connected to said cover, said container having sufficient volume above the normal water level therein during use so as to receive and hold the additional liquid normally retained in said conduit means, when the seal between the
20 cover and container is broken.

The invention is illustrated by way of example in the accompanying drawings wherein:

Figure 1 is a vertical cross-sectional view of
25 a sink trap provided in accordance with the present invention wherein there is an air space in the upper part of

the trap;

Figure 2, similar to Figure 1, illustrates a modification where the container of the sink trap extends above the cover;

5 Figure 3 is a cross-sectional view of a sink trap wherein the inlet and outlet conduits have a common opening in the container;

Figure 4 is a vertical cross-sectional view of a still further embodiment;

10 Figure 5 is an exploded view illustrating minor modifications to the trap;

Figure 6 is a view similar to Figure 5, illustrating further modifications to the trap;

15 Figure 7 is a partial cross-sectional view of the trap shown in Figure 6 when assembled including an over centre hold down clamp;

Figure 8 is a top plan view of a sink trap of the type illustrated in Figure 6 with further modifications thereto;

20 Figure 9 is a partial cross-sectional view taken essentially along line 9-9 of Figure 8; and

Figure 10 is a cross-sectional view taken essentially along line 10-10 of Figure 8, and additionally includes an over-centered clip for holding the components
25 of the trap in an assembled condition.

Referring to the drawings, there is illustrated in Figures 1 to 3, a sink trap comprising a container 10 detachably and sealingly connected to a cover 20. Liquid inflow to the trap is via inlet conduit 30 and liquid outflow via outlet conduit 40. In each of the embodiments illustrated in Figures 1 and 3 the effective open end of the conduits 30 and 40 in container 10 are located a selected distance downwardly from the cover (i.e. the upper end of the container) providing a liquid free space 50 in the container thereabove during use of the trap. During normal use of the trap, the liquid 60 has a level designated 61 in the inlet conduit, a level designated 62 in the container and a level designated 63 in the outlet conduit. The liquid free volume 50 in the container, above liquid level 62, is at least equal to and preferably greater than the volume of the portion of liquid 60 contained in the inlet and outlet conduits 30 and 40 so that when the seal between the container 10 and cover 20 is broken, the liquid in the conduits will flow into the volume 50 in the container. This results in collecting all of the liquid in the container with no spillage occurring when removing the container 10 to clean out the trap.

In the embodiment illustrated in Figure 1,

the container 10 is detachably connected to the cover 20 by a threaded ring nut 21 and for sealing purposes there is provided a gasket 22 between the container and the cover. The cover 20 is also provided with threaded
5 spigots 23 and 24 on the upper side of the cover and continuations thereof, designated 23A and 24A, project from the opposite side of the cover downwardly into the container. Conduits 30 and 40 project into respective ones of the spigots 24 and 23 and sealing is provided in
10 a conventional manner by respective ring or gland nuts 25 and 26 having flanges cooperating with packing material 27.

In the embodiment illustrated in Figure 2, the projecting portions 23A and 24A shown in Figure 1 are
15 dispensed with and in place thereof inlet and outlet conduits 30 and 40 may, if desired pass through the respective spigots 24 and 23 and project downwardly a selected amount into the container to provide the necessary liquid free space in the upper portion of
20 the container.

Figure 2 also illustrates another important variant in that the liquid free volume is located exteriorly of the trap. As will be noted from Figure 2, the container 10 is provided with internal threads 11 at
25 a position spaced downwardly from the upper edge 12 of

the container so that the volume 50, provided for collecting the excess liquid, i.e. the liquid in the conduits, is located entirely exteriorly of the trap. The cover 20 is provided with external threads 21 that
5 mate with the threads 11 on the container. A gasket 22 is interposed between the lower edge of a peripheral rim on the cover and a ledge on the container. The advantage of this embodiment is that seal 22 need only prevent the egress of liquid from the container as opposed to air.
10 If desired in the Figure 2 embodiment, inlet and outlet conduits 30 and 40 could project a selected amount into the container such that the liquid free volume is partially interiorly and partially exteriorly of the trap.

The embodiment illustrated in Figure 3 is
15 similar to the embodiment illustrated in Figure 1 and differs therefrom by having conduits 30 and 40 communicating with the interior of the container by way of a common opening 70. The common opening 70 is provided by a funnel-like element 71 located in the container and
20 having an upper outwardly directed flange 72 clampingly engaged between the upper peripheral edge of the container and the cover 20.

In Figure 4, there is illustrated a still further embodiment wherein the inlet and outlet conduits
25 are concentric. Inlet conduit 30 projects into a further

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conduit 30A (larger in diameter than conduit 30) to an extent such that the lower open end thereof is below the normal liquid level 80. Conduit 30A projects sufficiently downwardly into the container such that the liquid free
5 volume 50 is greater than the volume of liquid contained in the lower end of inlet conduit 30 and the further conduit 30A.

In the embodiment illustrated, in Figure 1, the conduits 30 and 40 project preferably an equal amount
10 into the container. Also, if desired, a screen or strainer 100 may be placed in the container to prevent the through flow of accidentally dropped possessions. The height of the screen need be no more than the normal water level 62 in the container.

15 In the embodiments of Figures 1 to 4, the container 10 is circular and in some instances may take up more space than available wherein it is to be installed. In Figures 5, 6, and 8 to 10 there is illustrated an embodiment, with various modifications
20 thereto, wherein the container is generally rectangular in cross-section, minimizing the space required for the trap. Referring to Figure 5, the sink trap as shown therein comprises a molded plastics container 10B having a cover 20B detachably held thereon by one or more
25 (preferably 2 or 4) over-center draw down clamps 200,

(See Figures 7 and 10). The container 10B has a lug 91 secured to the wall thereof (or molded integrally therewith) for each clamp. On the lower edge of lug 91 there is a groove 92 for receiving the free end of the latch portion of the draw down clamp (or a shaft on the free end thereof). In the event there is a shaft on the end of the hold down clamp, lip 95 of the groove 92 may be partially flexible so that the shaft can be pressed into the groove and held therein by the lip 95.

10 The cover 20B has passages therethrough for inflow of liquid into the container and outflow of liquid therefrom through respective conduits 30 and 40 connected to such passages. In the embodiment illustrated spigots 23A and 24A are formed integrally with the cover as in the embodiment illustrated in Figure 1. Alternatively, the inflow and outflow conduits may project downwardly into the container as per the embodiment illustrated in Figure 2.

20 In the embodiments illustrated in Figure 6 the container 10B is provided with a ledge 10C, on the internal surface, spaced downwardly from the upper edge 10D of the container so that when the cover is mounted on the container it is spaced downwardly from the upper edge of the container. This provides an embodiment corresponding to the embodiment illustrated in Figure 2

wherein the additional volume 50 for the container, i.e. liquid free volume, is located exteriorly of the trap. If spigots 23A and 24A are dispensed with, the liquid free volume 50 would be entirely exteriorly of the trap or if short spigots were used then a portion of the liquid free volume would be interiorly of the trap and the remaining portion exteriorly of the trap.

Various constructional details are illustrated in Figure 7 to 10 which are believed self-evident therefrom and thus will only be described briefly. It will be noted in Figure 6 the ledge 10C is flat, while the corresponding ledge 10E in the embodiment illustrated in Figure 9 slopes inwardly, downwardly into the container. The cover 20C illustrated in Figures 6 and 7 has a flange 20D projecting downwardly therefrom into the container reinforcing the cover to evenly distribute the force from the tie-down clamp 200 in compressing the gasket 203 disposed between the cover and the ledge 10C. In the embodiment illustrated in Figure 9, an o-ring seal 204 is interposed between the sloping shoulder 10E and a groove around the periphery of the cover. The cover designated 20D has upstanding flanges 20F serving as an abutment for the bent-over loop of the tie-down clamp 200 and reinforcement of the cover. The over centre tie down clamp 200 shown in Figures 7 and 10 consists

of a bent-over loop 201 which pivotally attaches to a
latch 202 by way of lugs projecting into respective ones
of a pair of apertures in the latch. The latch member
202 is a short length of an extrusion of plastics material
5 having a cross-sectional shape clearly illustrated in
Figures 7 and 10.

CLAIMS

1. A spill free cleanout type sink trap which, when mounted in situ and during normal operation, has liquid therein that extends upwardly into the respective inflow and outflow conduits comprising:

5 (a) a cover having liquid inlet and outlet means therethrough respectively for the inflow of liquid into the trap via said inflow conduit and outflow of such liquid from the trap via the outflow conduit; and

10 (b) a container detachably and sealingly connected to said cover, said container having sufficient volume above the normal water level therein during use so as to receive and hold the additional liquid normally retained in said conduit means, when the
15 seal between the cover and container is broken.

2. A sink trap having a container with a cover thereon in which there are respective liquid inlet and outlet apertures having connected thereto
20 respective inlet and outlet conduit means when mounted in situ, said trap having liquid in the container and respective ones of the inlet and outlet conduit means during normal operation, characterised by a container which is only partially filled with
25 liquid during normal use leaving additional volume, above the normal liquid level therein, at least equal to the volume of liquid normally retained in the inlet and outlet conduit so as to receive and retain the same when the seal between the cover
30 and container is broken thereby providing a spill free cleanout trap.

3. A sink trap as claimed in Claim 1 or Claim 2 wherein the cover is sealingly attached to the
35 container at a position spaced downwardly from an upper peripheral edge of the container thereby providing said additional volume exteriorly of the trap.

4. A sink trap as claimed in Claim 1 or Claim 2 wherein each of the inlet and outlet conduit means project downwardly into the container a selected amount below the cover whereby an air chamber exists
5 above the liquid level in the container during normal operation, said air chamber providing said additional volume.

5. A sink trap as claimed in Claim 1 or Claim
10 2 wherein the cover rests on the upper edge of the container.

6. A sink trap as claimed in any of Claims
15 1 to 5 wherein the container is cylindrical.

7. A sink trap as claimed in any of Claims
1 to 5 wherein the container is elliptical.

8. A sink trap as claimed in Claim 1 or Claim
20 2 wherein the inlet and outlet conduit means project an equal amount downwardly into the container.

9. A sink trap as claimed in Claim 1 or Claim
25 2 wherein said liquid inlet and outlet conduit means are concentric.

10. A sink trap as claimed in Claim 1 or Claim 2 wherein said liquid inlet and outlet conduit means slip fit into respective ones of a pair of threaded
30 spigots on the cover and including threaded ring nuts and O-ring seals cooperating with the spigots and conduits.

11. A sink trap as claimed in any of Claims
35 1 to 10 including a screen in the container arranged so that liquid flowing through the container from one conduit means to the other must pass through the screen.

12. A sink trap as claimed in Claim 1 or Claim 2 wherein the inlet and outlet conduit means have a common opening into the container spaced downwardly from the cover.

5.

13. A sink trap as claimed in Claim 1 or Claim 2 wherein the inlet conduit means is a straight vertical conduit and the outlet conduit means is an inverted U-shaped conduit.

10

14. A sink trap as claimed in Claim 1 or Claim 2 wherein the cover and container are threadingly interconnected.

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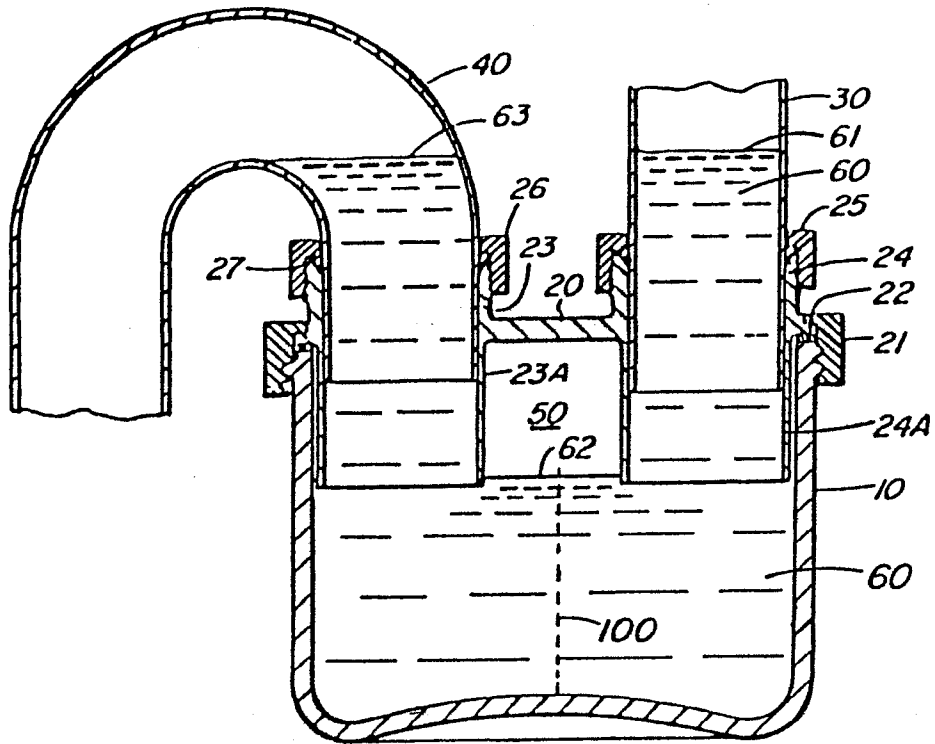


FIG. 1

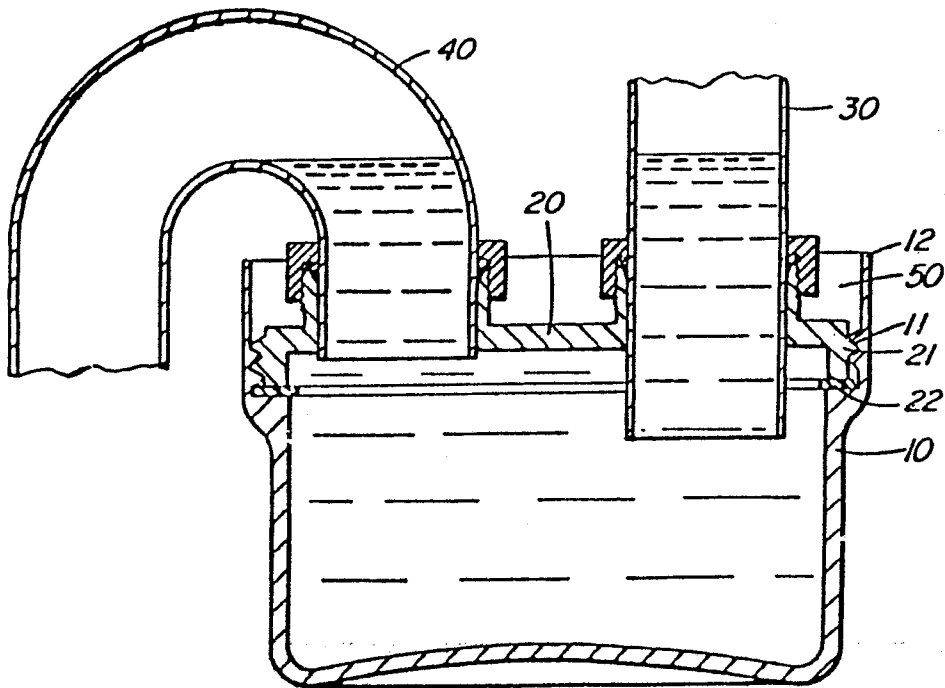


FIG. 2

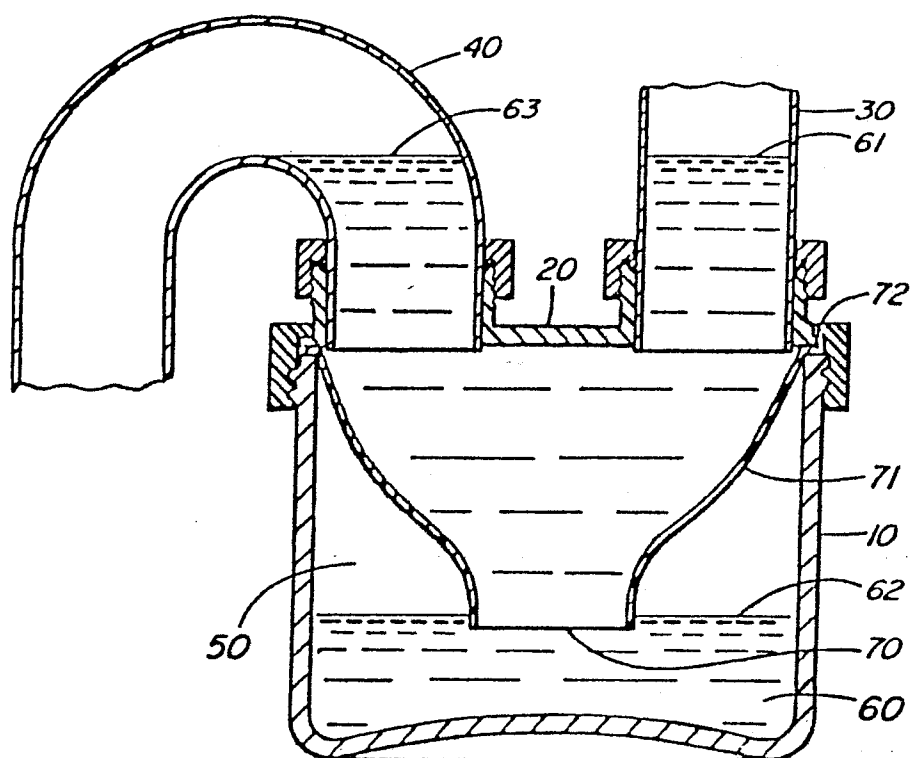


FIG. 3

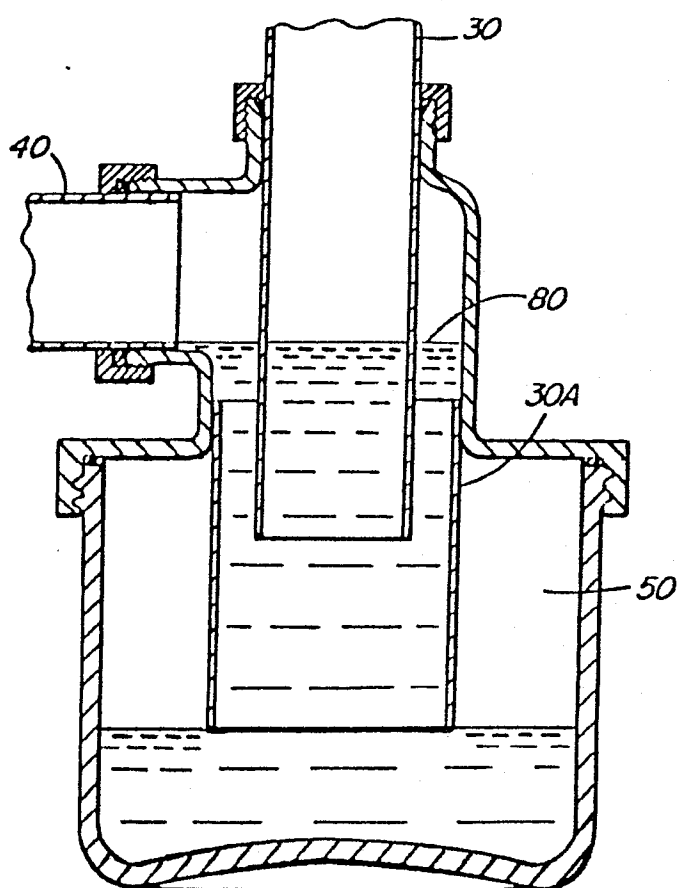


FIG. 4

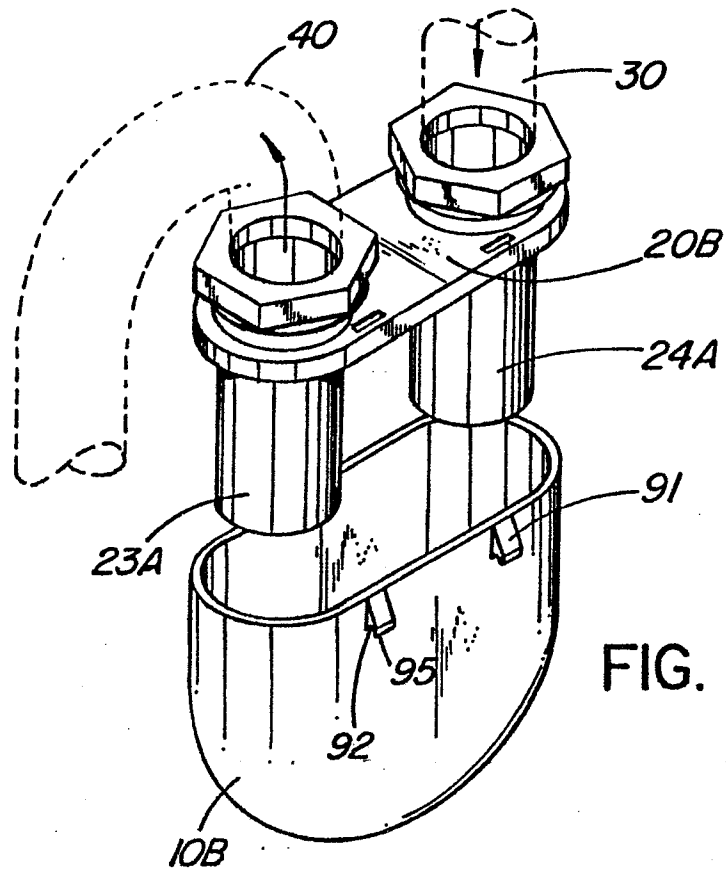


FIG. 5

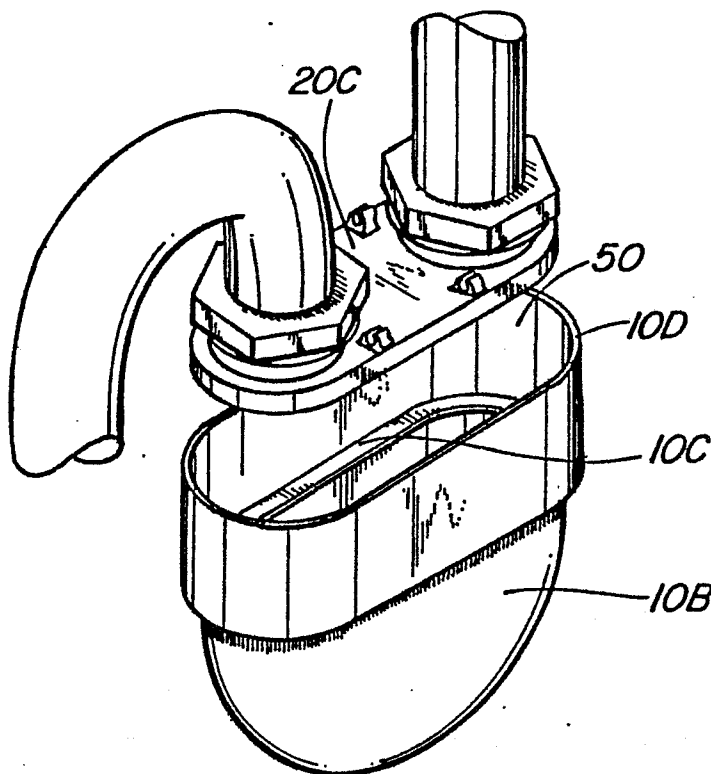


FIG. 6

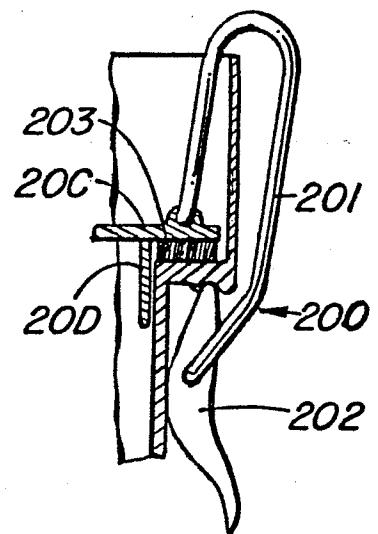


FIG. 7

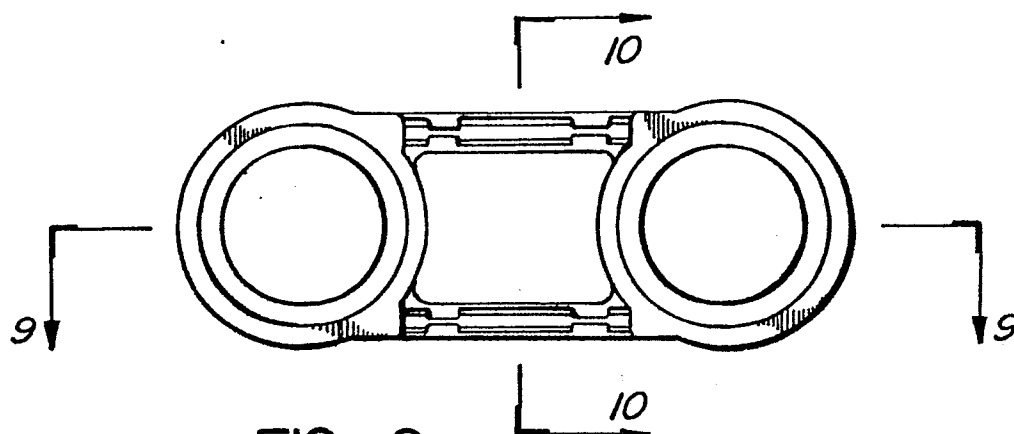


FIG. 8

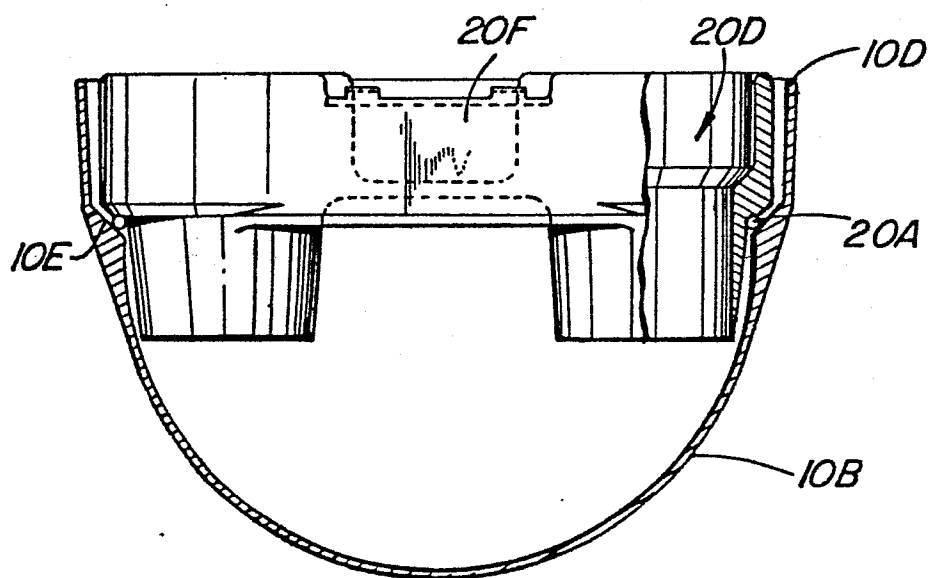


FIG. 9

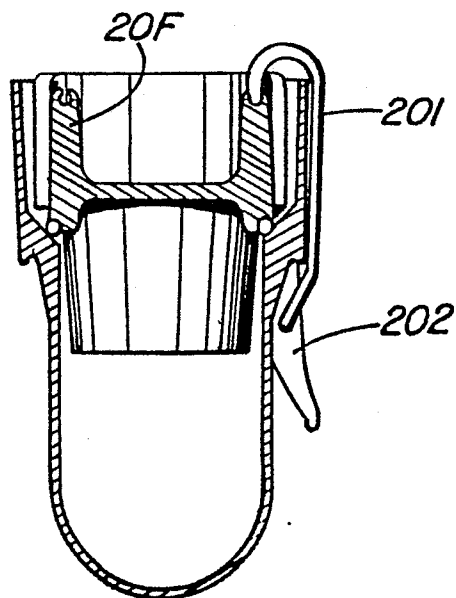


FIG. 10