

[54] STRAINER

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[58] Field of Search 210/172, 220, 242.1, 210/406, 416.1, 416.4, 416.5, 459, 460, 461, 482, 484, 497.01

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[57] ABSTRACT

A strainer for a liquid sucking device and adapted to be attached to the end of a flexible liquid sucking tube of the device. The strainer has an outlet tube adapted to be connected to the flexible liquid sucking tube of the device, a spherical shell integral with the outlet tube, a strainer element attached to the outer surface of the spherical shell and a weight accommodated by the internal cavity of the spherical shell.

16 Claims, 1 Drawing Sheet

FIG. 1

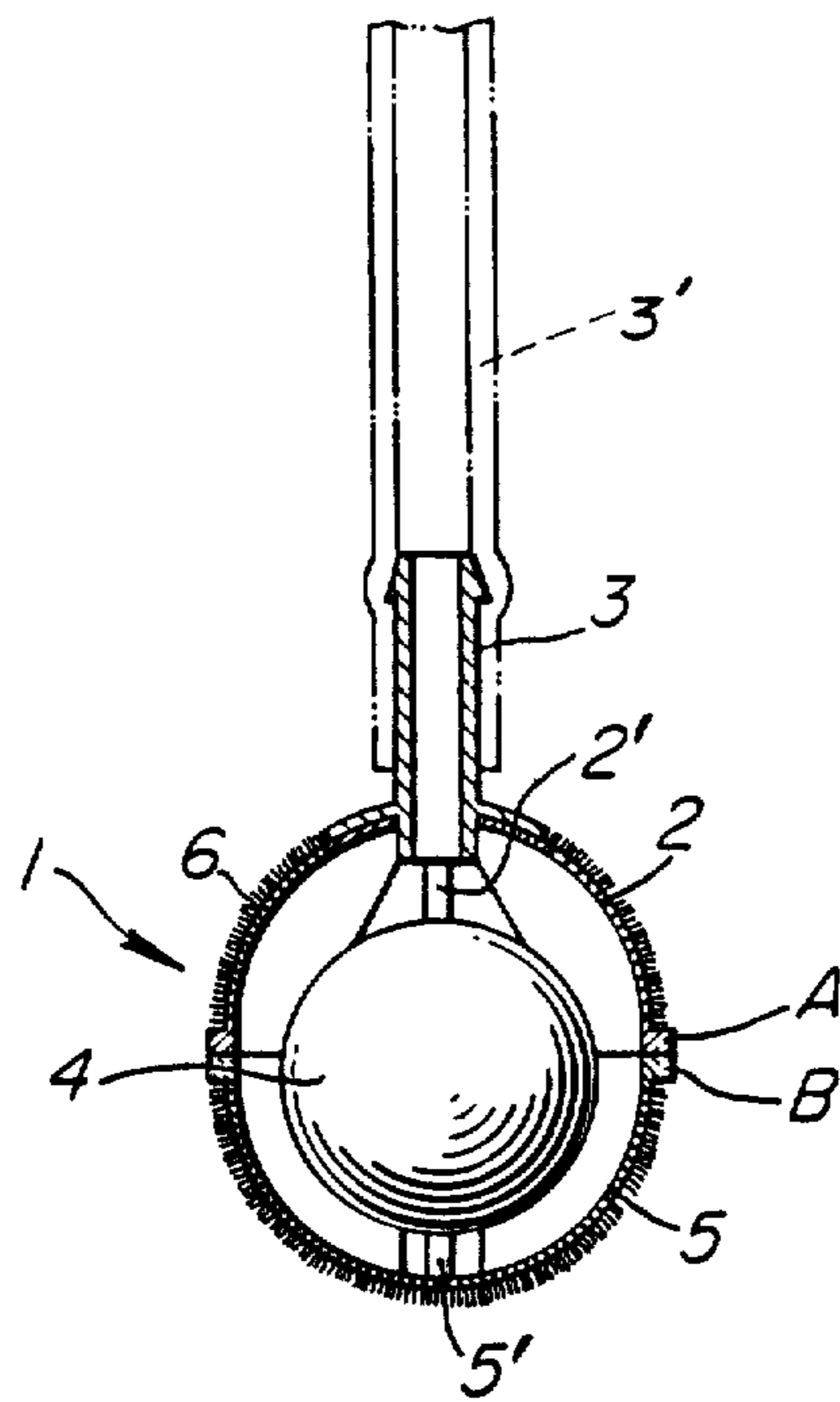
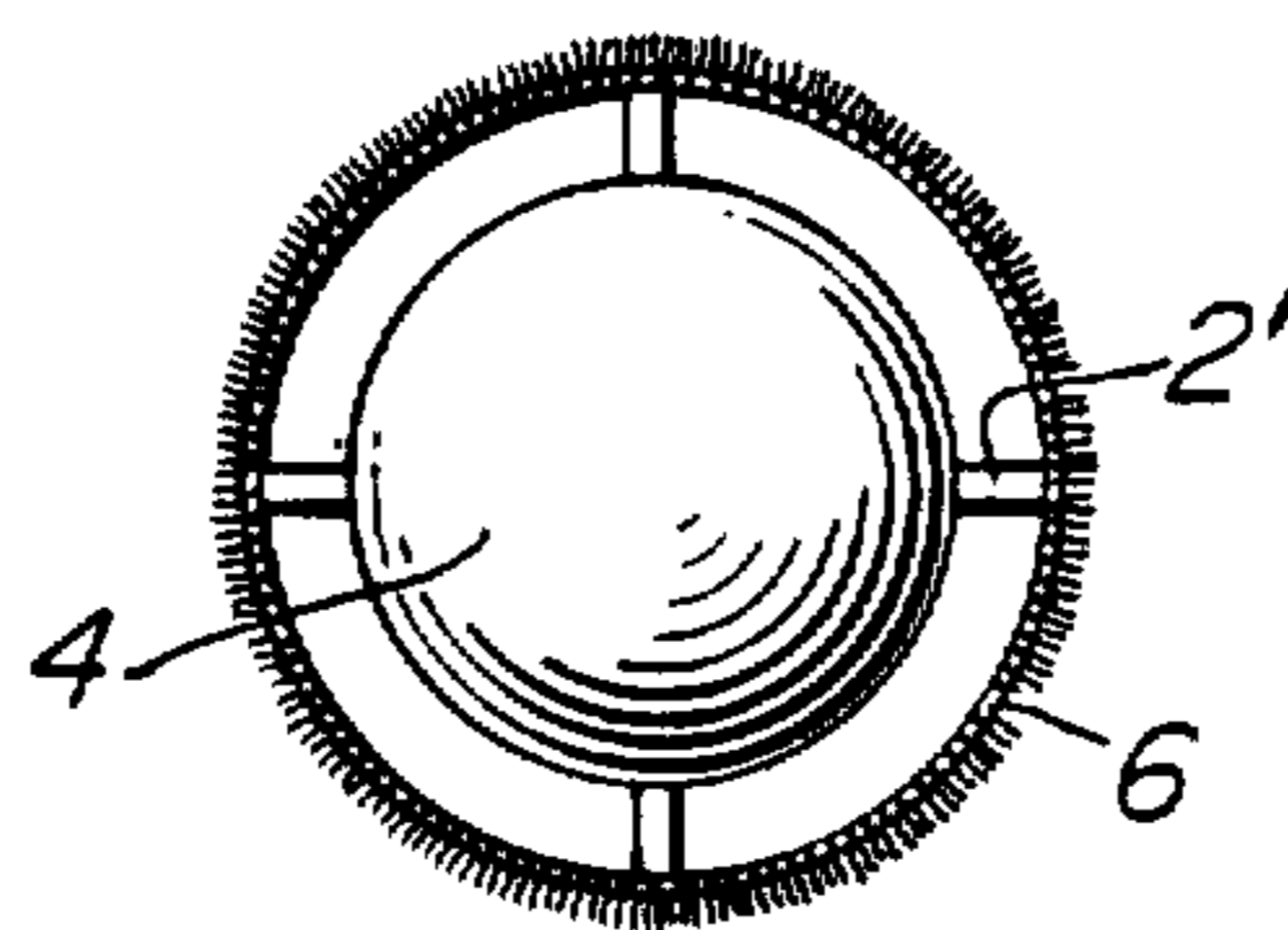


FIG. 2



STRAINER

Matter enclosed in heavy brackets [] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This application is a continuation, of application Ser. No. 824,212, filed Jan. 30, 1986, now abandoned.

BACKGROUND OF THE INVENTION

The present invention relates to a strainer attached to the end of a flexible liquid sucking tube of a liquid sucking device such as a pump.

In the liquid sucking device, particularly in the device for sucking fuel or lubrication oil from a tank in a small-sized machine driven by an internal combustion engine, a strainer is attached to the end of the sucking tube connected to the liquid sucking device, in order to prevent dusts or other foreign matters from being sucked together with the fuel or lubrication oil. The liquid sucking tube is usually flexible so that it may flex freely to keep the strainer in the best posture for sucking, regardless of the change in the posture of the machine mounting the engine.

Hitherto, the strainers of the kind described are made to have generally cylindrical forms which are quite impractical from the view points of treatment and design of the strainer element. In addition, the conventional cylindrical strainers require a large number of steps [of] in the production process and a high cost of production and, hence, are quite uneconomical although they are small in size.

SUMMARY OF THE INVENTION

Accordingly, it is a primary object of the invention to provide a simple and less-expensive strainer thereby to obviate the above-described problems of the prior art.

More specifically, the invention aims at providing an improved strainer capable of functioning well responding to the change in the posture of the machine while decreasing the tendency of attaching of the dusts or the like foreign matters thereto.

The invention aims also at increasing the self cleaning effect through enhancing the rolling contact between the strainer and the inner surface of the tank to improve the durability of the strainer.

The invention is intended also to facilitate the cleaning and renewal of the filter.

The invention further aims at reducing the material cost and production cost of the strainer.

To this end, according to the invention, there is provided a strainer comprising: an outlet tube adapted to be connected to a flexible liquid sucking tube of a liquid sucking device, a spherical shell integral with the outlet tube and having a cavity communicating with the outlet tube, a strainer element attached to the outer surface of the spherical shell, and a ball-like weight accommodated by the cavity in the shell.

The above and other objects, features and advantages of the invention will become clear from the following description of the preferred embodiment taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical sectional view of a strainer in accordance with an embodiment of the invention; and

FIG. 2 is a cross-sectional view of the strainer shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, a strainer in accordance with an embodiment of the invention, generally designated at a reference numeral 1, has a pair of hemispherical shell parts 2 and 5. An outlet tube 3, adapted to be connected to a flexible liquid sucking tube 3' of a liquid sucking device, is integrally attached to one 2 of the hemispherical shell parts so as to communicate with the inside of the latter. The two hemispherical shell parts 2 and 5 in cooperation define a cavity for receiving a metallic ball-like weight 4 such as of a steel. The ball-like weight 4 is supported by ribs 2' and 5'. After placing the ball-like weight 4, the two hemispherical shell parts 2 and 5 are brought together and are joined to each other at their joint surfaces A and B to form a spherical shell. Then, a strainer element 6 is attached to the outer surface of the spherical shell to complete the strainer 1.

The hemispherical shell parts 2 and 5 are made of a synthetic resin, while the strainer element 6 is preferably made of a synthetic resin although it may be formed by a metallic gauze wire. Although the spherical shell and the strainer element [have small weights] are light in weight, the strainer 1 as a whole has a suitable weight because of the presence of the metallic ball-like weight 4 in the spherical shell. The strainer 1 as a whole, therefore, can take the optimum posture by flexing the liquid sucking tube, in response to the change in the posture of the machine.

The spherical form of the strainer 1 permits the strainer 1 to roll freely in contact with the inner surface of the tank in response to the change in the posture of the machine, to increase the frequency of the mutual contact between the strainer element 6 and the tank surface, which in turn enhances the dust removing effect for detaching the dusts or the like foreign matters from the strainer surface. The spherical form of the strainer 1 provides another advantage that the total surface area of the strainer 1 is increased as compared with the conventional strainers to enhance the liquid sucking capacity of the strainer while reducing the tendency of clogging due to attaching of dusts or the like foreign matters thereto. In consequence, the cleaning of the strainer is very much facilitated. The strainer of the invention, having the construction heretofore described, can be produced easily and at a low cost as compared with the conventional strainers having cylindrical forms.

Although the invention has been described through a specific embodiment, it is to be noted here that the described embodiment is not exclusive and various changes and modifications may be imparted thereto without departing from the scope of the invention which is limited solely by the appended claims.

What is claimed is:

1. A strainer comprising an outlet tube adapted to be connected to a flexible liquid sucking tube of a liquid sucking device; a perforated spherical shell integral with said outlet tube and having an internal cavity communicating with said liquid sucking tube; a strainer element attached to said spherical shell; and a ball-like weight [disposed and] supported by ribs [in] so that the weight is substantially entirely within said cavity of said spherical shell.

2. A strainer for removing impurities from a liquid being transferred from a body of the liquid to a liquid sucking device, said strainer comprising:
a perforate shell having an inside surface defining an internal cavity and exposed surface means on the shell to facilitate free rolling of the outer surface of the shell in contact with a surface on a tank confining the body of liquid;
a single flexible liquid sucking tube means for delivering liquid to a liquid sucking device and for attaching the shell to a liquid sucking device so that the shell changes its posture readily in response to a change in posture of the liquid sucking device;
outlet means for communicating said cavity with the liquid sucking tube means;
a strainer element associated with the perforate shell to capture and thereby prevent impurities in a body of liquid from reaching said internal cavity;
a weight having an outer surface; and
means mounting the weight substantially entirely within the cavity and in spaced relationship to at least a portion of the inside surface of the shell and the outlet means for the cavity so that the outer surface of the weight and inside surface portion of the shell cooperatively establish a flow path through said cavity communicating with said outlet means for conducting strained liquid through the shell and to the sucking device.

3. The strainer according to claim 2 wherein said surface means comprises an outer surface that is at least partially spherical to facilitate rolling of the straining as the posture of an apparatus with a liquid sucking device changes to best situate the strainer for liquid sucking.

4. The strainer according to claim 2 wherein said shell has spherical outer and inner surfaces, the weight is ball-like, the outer surface of the weight is at least partially spherical and the means mounting the weight mount the weight in substantially centered relation to the inner shell surface.

5. The strainer according to claim 2 wherein said shell comprises at least two joinable shell parts each having inner and outer surfaces which cooperatively define the internal cavity, the outer surfaces of each of the at least two joinable shell parts having an exposed portion defining said surface means and the means mounting the weight comprises at least one rib associated with the inner surface of at least one of the shell parts, whereby the weight can be placed and supported on the rib prior to joining the shell parts to facilitate assembly of the strainer.

6. The strainer according to claim 5 wherein the means for communicating the cavity with the liquid sucking tube comprises an outlet tube having a portion integrally formed with at least one of the two shell parts.

7. The strainer according to claim 2 wherein the strainer element comprises gauze attached to the perforate shell to

block the passage of impurities in the liquid into the internal cavity.

8. The strainer according to claim 7 wherein the gauze comprises metallic wire.

9. The strainer according to claim 7 wherein the gauze comprises synthetic resin.

10. The strainer according to claim 2 wherein the shell is made from a synthetic resin.

11. A strainer for removing impurities from a liquid being transferred from a body of the liquid to a liquid sucking device, said strainer comprising:
a shell having a substantially fixed shape and defining an internal cavity, an inner surface, and exposed surface means on the shell for facilitating free rolling of the outer surface of the shell in contact with a surface of a tank containing a liquid supply to be sucked by a liquid sucking device;
flexible liquid sucking tube means for delivering liquid to a liquid sucking device and for attaching the shell to a liquid sucking device so that the shell changes its posture readily in response to a change in posture of the liquid sucking device;
means for communicating the internal cavity with the liquid sucking device;
means on the shell for admitting liquid from a supply into the cavity and for preventing impurities in the tank from reaching the internal cavity;
a weight having an outer surface; and
means mounting the weight so that the weight is substantially entirely within the cavity and so that at east a portion of the outer surface of the weight is in spaced relationship to the inner surface of the shell to establish a path between the weight outer surface and inner surface portion of the shell for communication of strained liquid through the shell and to the sucking device.

12. The strainer according to claim 11 wherein said means for admitting liquid comprises a gauze material defining at least a portion of the shell.

13. The strainer according to claim 12 wherein the gauze comprises metallic wire.

14. The strainer according to claim 12 wherein the gauze comprises a synthetic resin.

15. The strainer according to claim 11 wherein the surface means comprises a spherical exposed outer surface on the shell to facilitate shifting of the strainer as the posture of an aperture with the liquid sucking device changes to best situate the strainer for liquid sucking.

16. The strainer according to claim 11 wherein said shell comprises at least two joinable shell parts each having inner and outer surfaces which cooperatively define the internal cavity and the means mounting the weight comprises at least one rib associated with the inner surface of at least one of the shell parts, whereby the weight can be placed and supported on the rib prior to joining the shell parts to facilitate assembly of the strainer.

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