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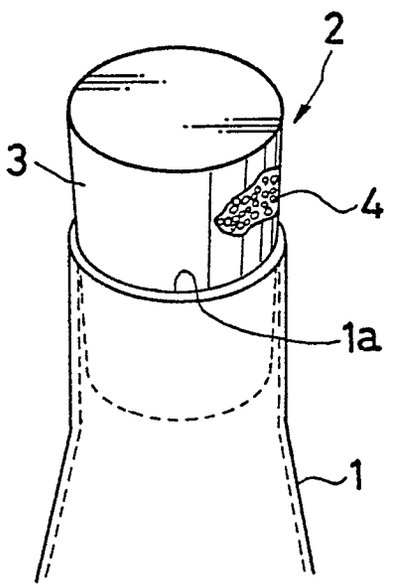
(54) Sealing plug.

(57) A sealing plug (2) for sealing an opening (1a) of a vessel (1) to block air and water is disclosed. The sealing plug is formed by foaming a rubber or polymer material such that it has numerous independent pores (4).

FIG.1



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SEALING PLUG

This invention relates to a sealing plug and, more particularly, to a sealing plug for sealing the opening of a vessel such as a test tube or a beaker to block air or water flow between the inside and outside of the vessel.

Heretofore, sealing plugs for sealing the opening of such vessels as test tubes, flasks, beakers and and so forth used for scientific experiments are generally made of cork, which occurs naturally, light in weight and very elastic.

However, since cork occurs naturally, its production is limited. In addition, with the progress of techniques of synthesis and method of mass production and also versatile needs for chemical stability and so forth, other materials than cork such as rubber, synthetic rubber, glass and polymers, e.g., vinyl chloride, nylon, silicone, are gradually extensively used for the sealing plug.

However, such polymer sealing plugs are heavy in weight and inconveniently require great labor in daily handling and transportation.

Besides, these heavy polymer materials are inferior in processibility. Fig. 3 shows a prior art sealing plug 2 for sealing an opening 1a of a vessel 1. As is shown, the plug 2 should be formed with bores 2, through which glass tubes 6 are inserted to transfer liquid W contained in the vessel 1 to the outside. It is, however, considerably difficult to form the bores 6.

Further, polymers, including silicone, are considerably expensive, leading to high cost of the sealing plug.

This invention seeks to solve the above problems.

According to the invention, there is provided a sealing plug for sealing the opening of a vessel to block air and water, which sealing plug is made of rubber or polymer foam having numerous independent pores.

In the above construction, the numerous independent pores of the sealing plug have an effect of blocking flow of air or water owing to their own independency.

Further, since air in each of the numerous independent pores has very small specific gravity, the sealing plug itself can be light in weight.

Furthermore, the independent pores permit the sealing plug to be flexibly fitted to the size and shape of the opening of the vessel owing to the elasticity of themselves and their contained air. The sealing plug thus can seal the vessel in close contact therewith and by filling even very slight gaps with the vessel opening.

Fig. 1 is a perspective view showing an embodiment of the invention;

Fig. 2 is a view for explaining the processibility of the same embodiment; and

Fig. 3 is a view showing a prior art sealing plug.

Now, a preferred embodiment of the invention will be described in conjunction with the constitution and function thereof with reference to the drawings.

Fig. 1 is a perspective view showing an embodiment of the invention. In the Figure, reference numeral 1 designates a glass vessel. An opening 1a of the glass vessel 1 is sealed with a sealing plug 2.

The sealing plug 2 has a tapered perhpheral surface 3 with the diameter reduced toward the front end so that it can be readily inserted into the opening 1a.

The sealing plug 2 is made of a synthetic rubber or polymer material. This material is foamed to form numerous independent pores 4.

Since the pores 4 are independent of one another, air in a pore can not be moved to other pores. The sealing plug 2 thus does not permit passage of air or water, that is, it has a sealing property.

Therefore, the sealing plug 2 can be effectively used to seal a vessel for culturing anaerobic bacteria for it can block air.

Further, since air having very low specific gravity is in the pores and the sealing plug 2 having numerous independent pores 4 contains considerable air in the inside, although the sealing plug 2 is made of synthetic rubber or polymer material which is heavy in weight, it may be very light in weight for it has numerous independent pores.

Thus, the light-weight sealing plug 2 requires small labor at the time of its transportation and can be handled conveniently.

Further, since air is sealed in each of the independent pores 4, it is possible to produce a sponge-like soft sealing plug by making use of the elasticity and cushioning property of the sealed air.

Thus, the soft sealing plug 2 has extended adaptability with respect to the shape and size of the opening 1a of the vessel. It can softly fit itself to the vessel opening even where the slope of the taper 3 is made slightly sharper. It can seal the opening 1a of the vessel 1 in close contact therewith without any gap formed therewith.

By making use of the extended adaptability of the manufacture and storage of the sealing plug 2 can be readily controlled by simplifying the size and shape standards of the sealing plug 2 fn the prior art.

Further, since the sealing plug 2 has numerous independent pores 4 formed by foaming rubber or polymer material, actually it consists of its material and air and has a reduced material density, so that its processing can be facilitated.

For this reason, the sealing plug 2 may be readily formed with bores 6 for mounting pipes 5 therein as shown in Fig. 2.

Further, since the material density is reduced by the foaming, sealing plug 2 using silicone or like expensive material requires comparatively low material expenditures, thus permitting cost reduction.

As has been described in the foregoing, the sealing plug according to the invention has numerous independent pores formed by foaming rubber or polymer material, it is possible to maintain the function of sealing the vessel.

In addition, since the sealing plug can be made lighter in weight with numerous independent pores, its transportation and other handling can be facilitated and carried out more conveniently.

Further, since the sealing plug has rich elasticity because of its numerous independent pores, it has extended adaptability with respect to the size and shape of the vessel opening, and the manufacture and storage of sealing plugs can be controlled more easily by simplifying the size and shape standards.

In addition, since the sealing plug is formed by foaming rubber or polymer material, it can be more readily machined to form, for instance, bores for passing glass pipes.

Furthermore, since the sealing plug is formed by foaming rubber or polymer, it requires a reduced amount of material, so that its cost can be reduced.

Claims

A sealing plug (2) for sealing an opening (1a) of a vessel (1) to block air and water, said sealing plug being formed by a rubber or polymer material such that it has numerous independent pores (4).

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FIG.1

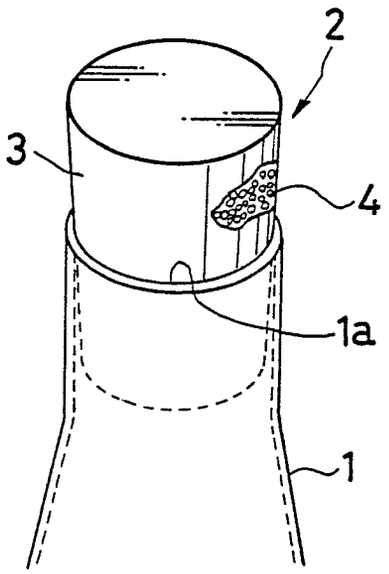


FIG.2

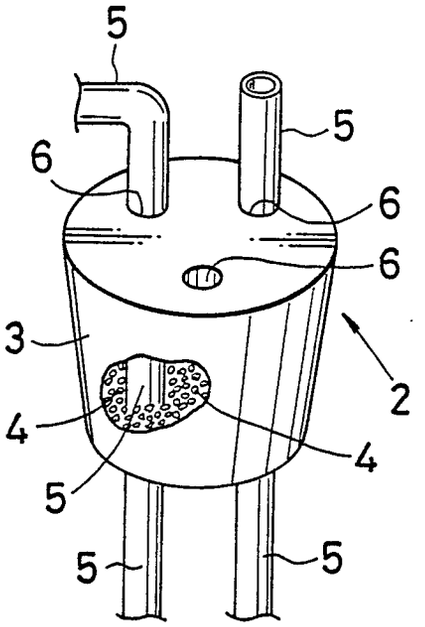
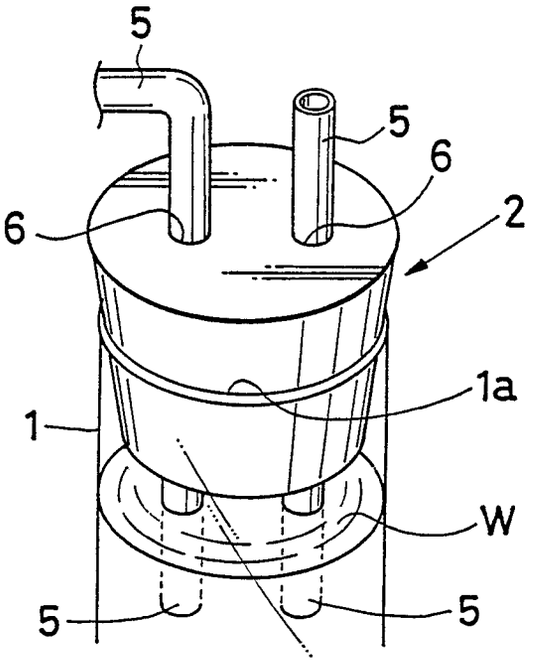


FIG.3



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EUROPEAN SEARCH REPORT

Application Number

EP 89 11 0827

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	WO-A-8 001 559 (METAL BOX) * Page 3, line 14 - page 4, line 12 *	1	B 65 D 39/00
X	FR-A-2 307 843 (SIMFLEX) * Page 1, lines 1-24 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14-09-1989	BRIDAULT A.A.Y.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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& : member of the same patent family, corresponding document

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