United States Patent

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[54] **GUM EXERCISE DEVICE**
7 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **128/360,**
128/222, 128/252, 424/81
[51] **Int. Cl.** **A61j 17/00,**
A61j 7/00, A61j 11/00
[50] **Field of Search** 128/222,
252, 360; 424/81

[56] **References Cited**

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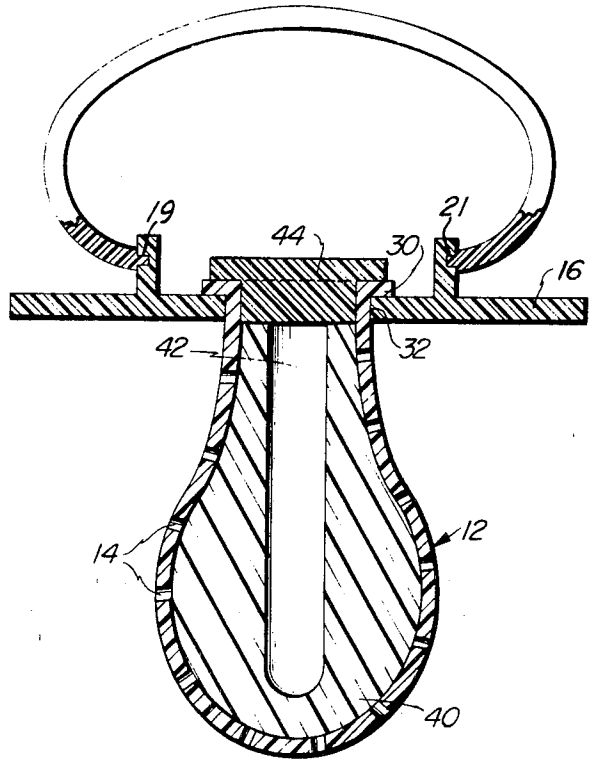
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ABSTRACT: A gum exercise device, such as a pacifier which is formed at least in part of a hydrophilic plastic and which has a material receiving cavity therein so that medicaments, flavors or the like can be conveniently released from the device upon normal chewing action.



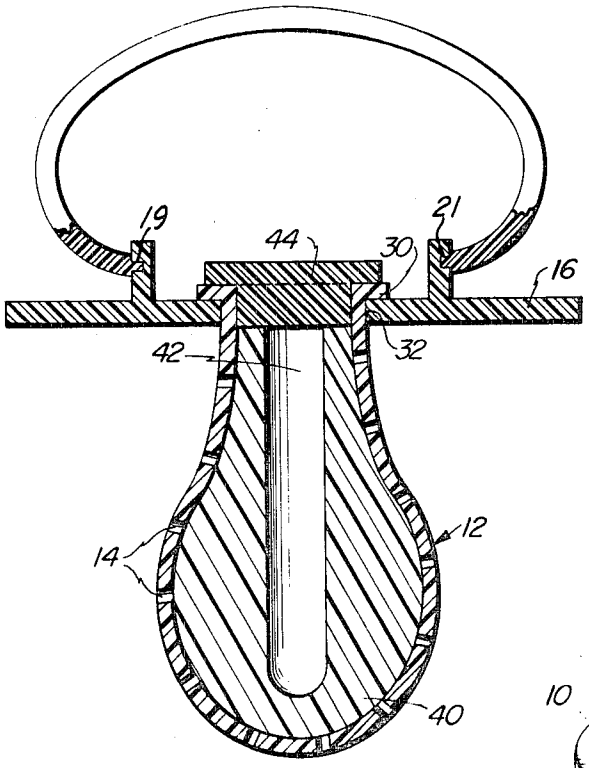


FIG. 2

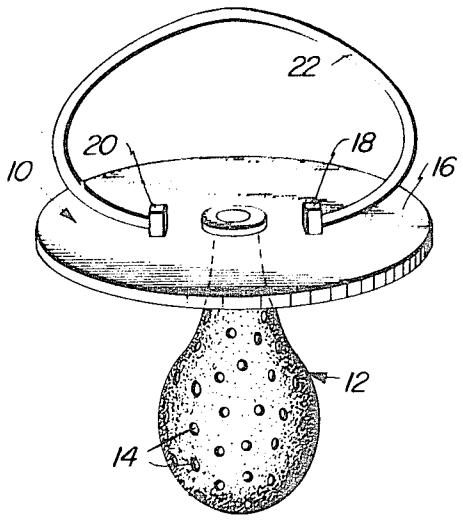


FIG. 1

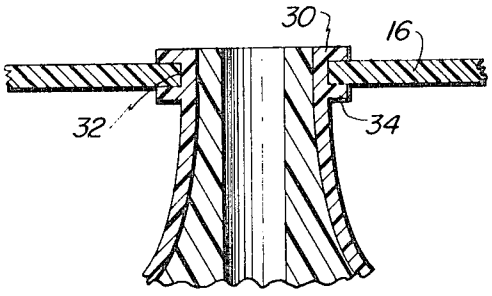


FIG. 3

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GUM EXERCISE DEVICE

BACKGROUND OF INVENTION

This invention relates to gum exercise devices, and in particular to that type of gum exercise device commonly known as a "pacifier." The invention is specifically concerned with a pacifier which can be used in the conventional manner, or which, if desired, can be further used for conveniently transmitting to the user some medicament, such as aspirin or the like.

For many years, it has been common practice to provide gum-exercising devices. Initially, such devices appeared to take the form of teething rings or soft rubber members that a young child could chew upon. In more recent years, however, so-called "pacifiers" have become rather popular. These pacifiers normally include a base means and some type of a nipple projecting therefrom. In common practice, the base means takes the form of a ring plate having a handle attached thereto, and the nipple is secured to the ring plate so as to project from one side thereof.

The user, usually a young child, chews upon the nipple much in the same manner that he would chew upon the nipple on a conventional baby bottle. The term "pacifier" probably became associated with this type article because it was commonly employed to quiet a child who wanted to chew on something, or who was hungry, but it was not yet feeding time. The idea was to pacify the child without adversely affecting his health.

Although pacifiers have commonly served the pacification function, it has now been found that they can be advantageously employed as well for other purposes, and in particular, this invention is concerned with the use of a pacifier for a multiplicity of purposes. A specific object of the present invention is to provide a pacifier which can be used to perform its normal function and which can also be used to dispense a medicament if desired.

The hydrophilic monomer employed preferably is a hydroxy lower alkyl acrylate or methacrylate, or hydroxy lower alkoxy lower alkyl acrylate or methacrylate, e.g. 2-hydroxyethyl acrylate, 2-hydroxyethylene methacrylate, diethylene glycol monacrylate, diethylene glycol monomethacrylate, 2-hydroxypropyl acrylate, 2-hydroxypropyl methacrylate, 3-hydroxypropyl acrylate, 3-hydroxypropyl methacrylate and dipropylene glycol monomethacrylate. The preferred monomers are the hydroxyalkyl acrylates and methacrylates, most preferably 2-hydroxyethyl methacrylates.

While homopolymers can be employed in the invention, for best results a cross-linked copolymer is employed. Preferably, the cross-linking agent is present in an amount of 0.1 to 2.5 percent, most preferably not over 2.0 percent, although from 0.05 to 15 percent, or even 20 percent, of cross-linking agents can be used. Of course, care should be taken that cross-linking agents are not used in an amount which renders the product toxic. Ideally the polymer is infrequently cross-linked.

Typical examples of cross-linking agents include ethylene glycol diacrylate, ethylene glycol dimethacrylate, 1,2-butylene dimethacrylate, 1,3-butylene dimethacrylate, 1,4-butylene dimethacrylate, propylene glycol diacrylate, propylene glycol dimethacrylate, diethylene glycol dimethacrylate, dipropylene glycol dimethacrylate, diethylene glycol diacrylate, dipropylene glycol diacrylate, divinyl benzene, divinyl toluene, diallyl tartrate, allyl pyruvate, allyl malate, divinyl tartrate, triallyl melamine, N,N'-methylene bis acrylamide, glycerine trimethacrylate, diallyl maleate, divinyl ether, diallyl monoethylene glycol citrate, ethylene glycol vinyl allyl citrate, allyl vinyl maleate, diallyl itaconate, ethylene glycol diester of itaconic acid, divinyl sulfone, hexahydro-1,3,5,-triacryltriazine, triallyl phosphite diallyl ester of benzene phosphonic acid, polyester of maleic anhydride with triethylene glycol, polyallyl glucose, e.g. triallyl glucose, polyallyl sucrose, e.g. pentaallyl sucrose, sucrose diacrylate, glucose dimethacrylate, pentaerythritol tetraacrylate, sorbitol dimethacrylate, diallyl aconitate, divinyl citraconate, diallyl fumarate.

More specifically, it is an object of the present invention to provide a pacifier which can be employed in the conventional manner, and which further can be utilized to hold and selectively release some medicine, flavor, or other item to the user with the normal chewing action.

Consistent with the invention, the pacifier includes a base means and a handle associated therewith, and also a nipple which is formed at least in part of a hydrophilic plastic material. The term hydrophilic plastic material refers to a material which, when wet, serves to transmit liquid therethrough but which, when dry acts as an effective barrier to the transmission of solid contents.

Particular hydrophilic materials which are plastic in nature and which are useful in accordance with the invention are disclosed in U.S. Pat. Nos. 2,976,576 and 3,220,960 issued to Otto Wichterle on Mar. 28, 1961, and Nov. 30, 1965, respectively, and also in application Ser. No. 567,856, filed July 26, 1966, in the names of Thomas H. Shepherd and Francis E. Gould.

Although these particular hydrophilic materials are believed to be preferred, the invention is not expressly limited to these particular materials, and instead any hydrophilic material having the desired characteristics can be used.

The invention will be better understood and objects other than those specifically set forth above will become apparent when attention is given to the following detailed description. Such description makes reference to the annexed drawings presenting preferred and illustrative embodiments of the invention, and in which:

FIG. **1** is a prospective view of a pacifier constructed in accordance with the present invention;

FIG. **2** is a transverse sectional view of the pacifier shown in FIG. **1**; and

FIG. **3** is a fragmental view of a modified embodiment of the invention.

Referring first to FIG. **1**, it will be noted that the pacifier shown therein comprises a base means generally designated by the numeral **10**, and a hollow membrane generally designated by the numeral **12**, which membrane has a plurality of apertures **14** therein or extending therethrough.

The base means **10** includes a ring-shaped plate member **16** having a pair of upstanding integrally molded posts **18** and **20**. The posts **18** and **20** cooperate with pins **19** and **21** projecting from a handle member **22** so that the handle member **22** is pivotally mounted. To this end, the base means **10**, as shown, is but one form of base means which can be employed, although this is generally a conventional form of base means, and accordingly further detailed description thereof appears unnecessary.

The membrane **12** comprises a plastic or rubber nipple-shaped membrane which can be made of any material now commonly employed for pacifiers. However, as opposed to being continuous or impervious to liquid flow therethrough, the preferred embodiment of a pacifier formed in accordance with the present invention includes the plurality of apertures **14** therein which provide passageways therethrough. Preferably these apertures are distributed over the entire periphery of the membrane or nipple **12** so that the same communicates with the interior of the nipple itself.

As shown in FIG. **2**, the nipple or membrane **12** is formed with a projecting flange **30** at the upper end thereof. This flange abuts against the top side edges of the ring plate member **16** adjacent an aperture **32** in such ring plate member. The nipple or membrane **12** is thus held in its desired position. In some instances, where desired, the membrane can be provided with a further ring or bead cooperating with the underside of the ring plate member so as to fix the nipple in desired location. This modification is shown in FIG. **3** wherein the additional bead **34** is incorporated. The flange **30** and bead **34** serve to lock the nipple on the ring plate member **16**, thus maintaining the same in desired position. However, with the invention, the additional bead **34** can be unnecessary because, as shown in FIG. **2**, the hollow membrane or nipple

12 is filled with a hydrophilic plastic material generally designated by the numeral 40. The hydrophilic material 40 assumes a conforming shape to the interior surface of the nipple or membrane and further is provided with a recess or cavity 42 therein, which cavity extends upwardly opening through the central opening within the aperture 32 and the ring plate member 16. The cavity 42, as also shown in FIG. 2, can be closed by a suitable cap member 44 which cooperates with the upper end portion of the nipple 12 thereby frictionally engaging the same.

With the arrangement as shown and described, the cap member or closure means 44 can be removed, and either a liquid or a solid medicament, flavor or the like can be placed within the cavity 42. Suppose, for example, that powdered aspirin is to be used. The cap member 44 would be removed and powdered aspirin would be placed in the cavity 42. The cap member 44 would then be replaced, as shown in FIG. 2, and thereafter the item could be used by an infant.

As the infant exerted its chewing action on the pacifier or, in particular, the nipple or member 12, the saliva would pass through the apertures 14 in the wall thereof thereby moistening the hydrophilic material 40. As the hydrophilic material became moistened, the material would be wetted into the central cavity 42, and any material therein would be dissolved, if in solid form, so that it could pass through the membrane upon subsequent chewing and into the mouth of the user. Alternatively, if a liquid was put in the cavity 42, it would tend to spread outwardly under the chewing action toward the nipple or membrane 12, being thus extractable or mixable with the saliva. In this manner, and by way of an example, a medicament would be transmitted to the young child all while he was chewing on the membrane, and all in a relatively controlled manner so that the child would not choke on the medicine or the like.

As a further alternative to the embodiments shown on the drawings, the hydrophilic material can possess sufficient shape retaining properties in which event the membrane 12 could be eliminated, and the hydrophilic material 40 could be formed as a nipple or other suitable member. It would then be directly carried by the base means 16 in the same manner as the membrane. In this instance, the pacifier still could be used for its normal operation, namely pacification, but additionally it could be used with some medicament, flavor or the like therein so as to transmit the same to the user as desired.

In view of the foregoing description, it should be apparent that the objects set forth at the outset of the present specification have been successfully achieved.

Accordingly, what is claimed is:

1. A pacifier comprising a disclike base member having an aperture therein, a hollow nipple member having a flange attached to the base member adjacent said aperture to secure the same in position and having a plurality of perforations therein, a filling of a hydrophilic plastic material within the nipple, a cavity within the filling communicating with the aperture in the base, and closure means within the aperture for closing said cavity, whereby a soluble material can be placed in said cavity and saliva will cause said material to diffuse through said body portion into the mouth upon chewing on said device.

2. A pacifier according to claim 1 wherein the hydrophilic plastic is an infrequently cross-linked hydrophilic acrylate or methacrylate.

3. A pacifier according to claim 2, wherein the acrylate or methacrylate is selected from the group consisting of hydroxyethyl acrylate, hydroxypropyl acrylate, hydroxyethyl methacrylate and hydroxypropyl methacrylate.

4. A pacifier comprising a body portion formed at least in part of a hydrophilic plastic, said hydrophilic plastic having as a characteristic the capability of transmitting liquids therethrough when wet and barring the transmission of solids therethrough when dry, a cavity defined within said hydrophilic plastic part of said body portion, said cavity being adapted for reception and retention of a material when said hydrophilic plastic is dry, said material passing from said cavity through said hydrophilic plastic to the surface thereof when said hydrophilic plastic is wet with saliva or the like.

5. A pacifier according to claim 4 including a base means, a hollow membrane carried by said base means and having apertures therethrough, said hollow membrane being at least partially filled by said hydrophilic plastic.

6. A pacifier according to claim 4 wherein the hydrophilic plastic is an infrequently cross-linked hydrophilic acrylate or methacrylate.

7. A pacifier according to claim 6, wherein the acrylate or methacrylate is selected from the group consisting of hydroxyethyl acrylate, hydroxypropyl acrylate, hydroxyethyl methacrylate and hydroxypropyl methacrylate.