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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Nipple with non-return valve.**

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NL-A- 7 001 730
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Description

Nipples for baby feeding are used both in hospital surroundings and in private households, wherein in a hospital it is usually a matter of once-only use while at home the nipples can be boiled.

The present invention relates to a nipple comprising:

- a sucking end provided with one or more holes;
- a flange forming an entity therewith and extending in radial direction relative to the centre line of the nipple, in order to fix the nipple therewith onto a supply holder; and
- a non-return valve arranged in this flange, for passing air into the supply holder when an underpressure results therein.

Such a nipple is known from US-A-3 203 569.

The non-return valve of this known nipple shows a limited degree of flexibility, which is inherently due to the shape and structure of this non-return valve.

It is an object of the present invention to improve upon this known nipple with non-return valve.

The nipple according to the present invention is characterized in that said non-return valve is dish-shaped comprising a flat bottom part provided with a hole and a radially diverging side wall ending in a sealing edge which forms the edge of said dish-shape and which goes over into the flange so as to connect the valve to said flange.

Using the nipple according to the present invention prevents an underpressure being built up in a bottle or supply holder for baby food through the sucking of the baby, which makes sucking difficult, while it also prevents baby food being able to leak out of the supply holder in the absence of underpressure; a non-return valve is provided which gives a good sealing against a holder screw to be arranged on the supply holder in addition to a non-return valve which opens at a small underpressure.

The nipple is preferably injection moulded from synthetic, non-silicon holding rubber, also referred to as thermoplastic rubber, which has the same properties as rubber but which requires no vulcanizing. Tensile strengths of 1035-34.475 Pa (150-5000 psi) and a Shore A-hardness of 28-95 can be used with this material. A strong nipple is provided herewith, while because of the strength of the material the non-return valve can be embodied with a small thickness of this material. The non-return valve will therefore open easily, while the sealing edge gives good sealing against a holder screw if no under pressure is built up in the holder. It is moreover important that this material is absolutely safe for a baby.

Further advantages, features and details are elucidated in the light of the following description with reference to a drawing, in which:

fig. 1 shows a perspective view, partly broken away and partly in section, of a preferred embodiment of the nipple according to the present invention;

fig. 2 shows a schematic view of the operation of the embodiment of fig. 1.

Onto a supply holder or bottle 1 can be screwed a holder screw or closing means 2 between which a nipple (fig. 1) can be clamped. A sucking end 4 of the nipple 3 is provided with three conical holes 6. By moving insert pieces in an injection moulding die (not shown) penetration of cones can be adjusted wherewith the size of the passage opening from the interior of the sucking end 4 to a baby is determined.

Arranged in a flange or collar 7 which is injection moulded from one piece with the sucking end 4 is a non-return valve 8 which is injection moulded together with the nipple 3. If through the sucking of a baby an underpressure results in the bottle 1 (fig. 2), air can pass between the holder screw edge and the neck of the nipple into a dish 9 since the sealing edge 11 is released through the underpressure. From the dish 9 the underpressure passes into the interior of the bottle 1, whereafter the sealing edge 11 closes and prevents the liquid content leaking out of the bottle along the neck of the nipple.

A nipple according to the present invention is preferably injection moulded from a thermoplastic rubber such as commercially available under the names Kraton^{R} and Evoprene^{R}. This material has a high tensile strength with rubber-like properties without vulcanizing having to take place. In addition the material displays good temperature characteristics.

Claims

1. A nipple (3) comprising:
   - a sucking end (4) provided with one or more holes;
   - a flange (7) forming an entity therewith and extending in radial direction relative to the centre line of the nipple, in order to fix the nipple therewith onto a supply holder (1); and
   - a non-return valve (8) arranged in this flange, for passing air into the supply holder when an underpressure results therein,

   characterized in that said non-return valve (8) is dish-shaped comprising a flat bottom part provided with a hole and a radially diverging side wall ending in a sealing edge (11) which forms the edge of said dish-shape and which goes over into the flange so as to connect the valve to said flange.

2. A nipple (3) according to claim 1, made from thermoplastic rubber.

3. A nipple (3) according to claim 1 or 2, wherein said

hole is conical, the broad end of which conical wall is remote from the sucking end (4) and wherein the sealing edge (11) of the dish shape is tapered relative to the thickness of the flange (7).

4. A nipple (3) according to claim 1, 2, or 3, wherein two or more conical holes (6) are provided in said sucking end (4).

Patentansprüche

1. Sauger (3) bestehend aus:
   - einem Saugende (4), das mit einem oder mehreren Löchern versehen ist;
   - einem Flansch (7), der mit dem Saugende einstückig ausgebildet ist, der sich in radialer Richtung relativ zur Mittellinie des Saugers erstreckt, um den Sauger damit auf einem Versorgungsbehälter (1) zu befestigen; und
   - einem Rückschlagventil (8), das in diesem Flansch (8) angeordnet ist, zum Passierenlassen von Luft in den Versorgungsbehälter, wenn in diesem ein Unterdruck erzeugt ist; dadurch **gekennzeichnet**, daß das Rückschlagventil (8) schalenförmig ist, einen flachen Bodenteil aufweist, der mit einem Loch und einer radial divergierenden Seitenwand versehen ist, die in einer Dichtkante (11) endet, welche die Kante der Schalenform bildet und in den Flansch übergeht, um das Ventil mit dem Flansch zu verbinden.

2. Sauger (3) nach Anspruch 1 , dadurch **gekennzeichnet**, daß der Sauger aus thermoplastischem Gummi hergestellt ist.

3. Sauger (3) nach Anspruch 1 oder 2 , dadurch **gekennzeichnet**, daß das Loch konisch ist, wobei das weite Ende der konischen Wand zum Saugende (4) abge- wandt liegt und die Dichtkante (11) der Schalenform relativ zur Dicke des Flansches (7) spitz zuläuft.

4. Sauger (3) nach Anspruch 1, 2 oder 3 , dadurch **gekennzeichnet**, daß im Saugende (4) zwei oder mehr konische Löcher (6) ausgebildet sind.

Revendications

1. Tétine (3) comprenant :
   - une extrémité de succion muni d'un ou plusieurs trous ;
   - une collerette (7) formant une entité avec celle-ci et s'étendant suivant une direction radiale par rapport à la ligne centrale de la tétine, de manière à pouvoir fixer la tétine avec celle-ci sur un support d'alimentation ; et
   - une valve (8) anti-retour agencée sur cette collerette, afin que de l'air passe dans le support d'alimentation lorsqu'une dépression a lieu dans celui-ci,

   caractérisée en ce que la valve anti-retour (8) a une forme de cuvette comprenant une partie de fond plat munie d'un trou et une paroi de côté divergente radialement se terminant en un bord de fermeture étanche (11) qui forme le bord de la forme en cuvette et qui s'étend dans la collerette de manière à raccorder la valve à la collerette.

2. Tétine (3) selon la revendication 1, fabriquée avec du caoutchouc thermoplastique.

3. Tétine (3) selon la revendication 1 ou 2, dans laquelle le trou est conique, l'extrémité large de cette paroi conique étant éloignée de l'extrémité (4) de succion et dans laquelle le bord de fermeture étanche (11) de la forme en cuvette est effilé par rapport à l'épaisseur de la collerette (7).

4. Tétine (3) selon la revendication 1,2 ou 3, dans laquelle deux ou plusieurs trous coniques (6) sont prévus dans l'extrémité de succion (4).

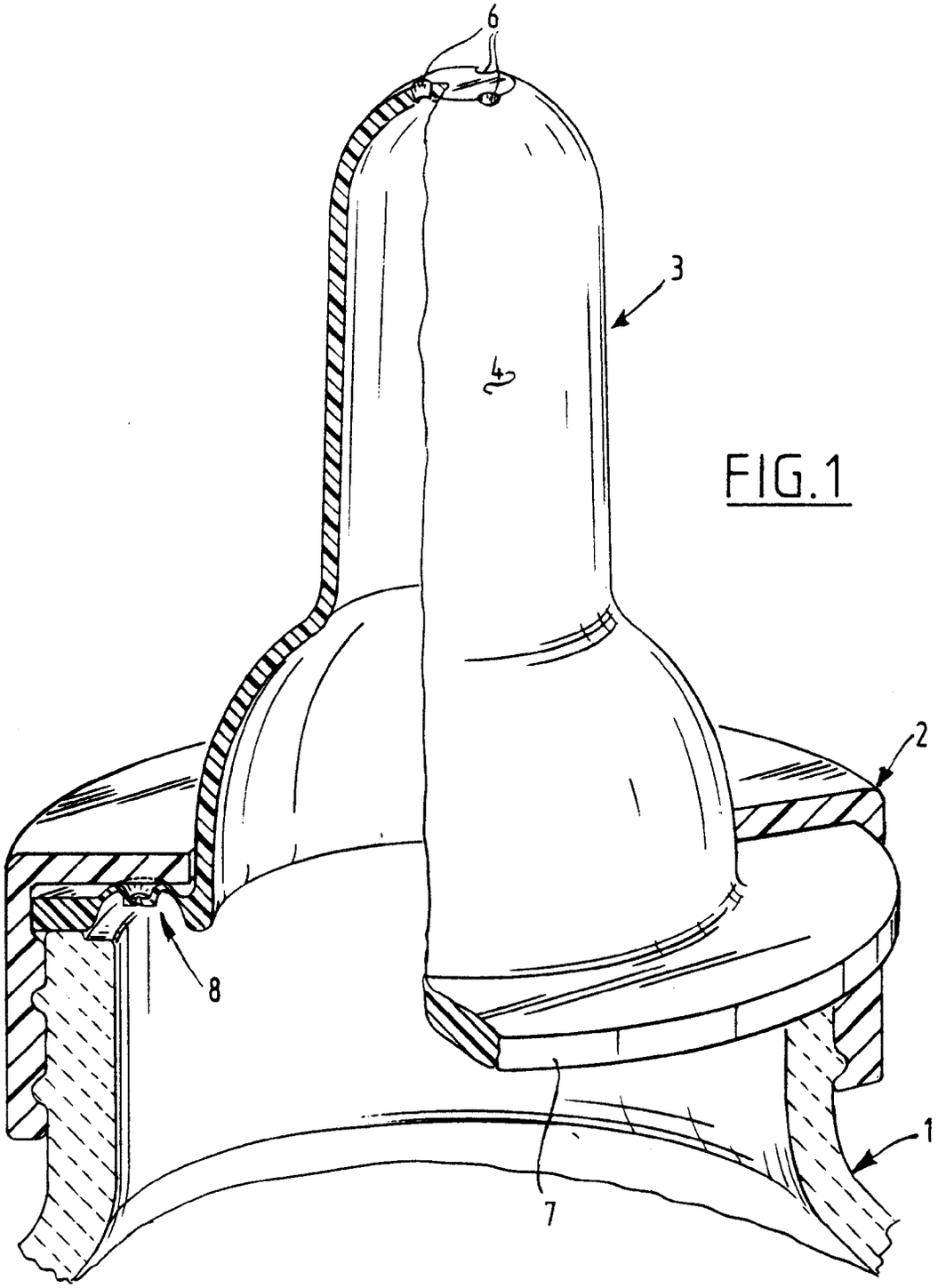

FIG.1

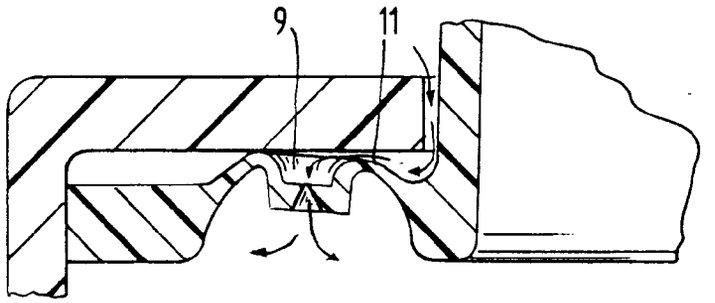

FIG.2