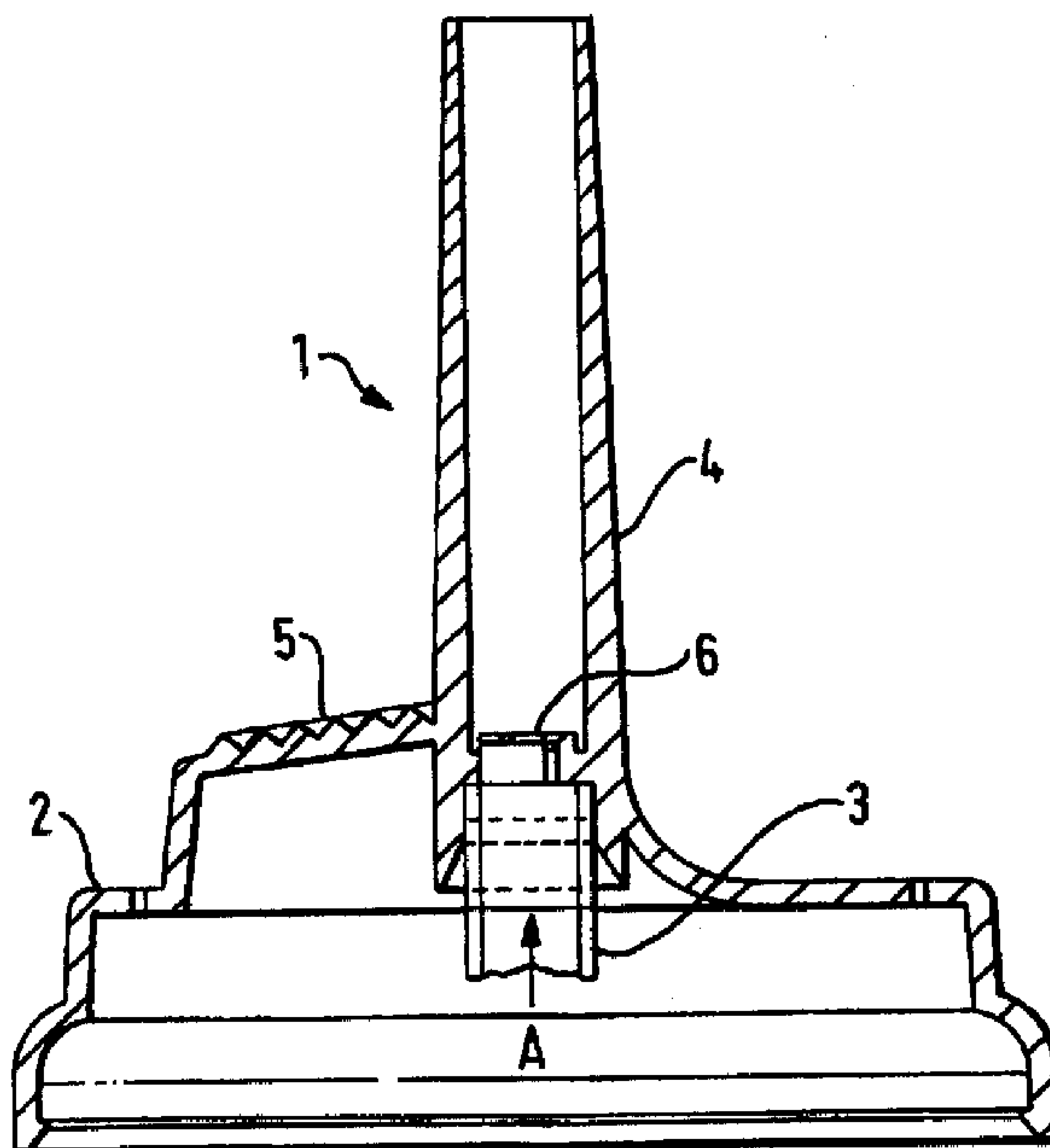




(72) KUEHNER, HOLGER, DE  
(72) WILD, OTTO-MICHAEL, DE  
(72) SCHWAN, MICHAEL, CH  
(72) HASLINGER, FRANZ, DE  
(71) SOCIETE DES PRODUITS NESTLE S.A., CH  
(51) Int.Cl.<sup>7</sup> B65D 83/14, B65D 83/16  
(30) 1997/09/24 (97202924.3) EP  
(54) **EMBALLAGE CONTENANT UN PRODUIT LACTE OU UN  
SUCCEDANE DU LAIT**  
(54) **MILK OR MILK SUBSTITUTE PRODUCT PACKAGING**



(57) L'invention concerne un emballage avec son contenu, constitué de l'association suivante: une phase liquide dans laquelle est dissous un gaz propulseur, un aérosol muni d'une soupape (3) et contenant cette phase liquide, et un bec verseur (1) situé immédiatement après la soupape et permettant la pulvérisation et le moussage de la phase liquide. Ce bec verseur présente un trou central et au moins un orifice latéral. Cette phase liquide est choisie dans le groupe du lait concentré pur, du lait condensé, d'un succédané partiel du lait et d'un succédané total du lait présentant une teneur en matière grasse comprise entre 0 et 20 % et un extrait sec dégraissé compris entre 6 et 25 %.

(57) The invention relates to packaging and the contents thereof comprised of the following combination: A liquid phase in which a driving gas is dissolved, an aerosol can provided with a valve (3) and containing said liquid phase, and a nozzle (1) located directly after the valve enabling the spraying out and foaming of the liquid phase. Said nozzle has a central hole and at least one side opening. The liquid phase is selected from the group of pure, concentrated milk, condensed milk, partial milk substitute products and total milk substitute products having a fat content between 0 and 20 % and a non-fat dry portion between 6 and 25 %.

**ABSTRACT**

The invention relates to packaging and the contents thereof comprised of the following combination: A liquid phase in which a driving gas is dissolved, an aerosol can provided with a valve (3) and containing said liquid phase, and a nozzle (1) located directly after the valve enabling the spraying out and foaming of the liquid phase. Said nozzle has a central hole and at least one side opening. The liquid phase is selected from the group of pure, concentrated milk, condensed milk, partial milk substitute products and total milk substitute products having a fat content between 0 and 20 % and a non-fat dry portion between 6 and 25 %.

WO 99/15434

PCT/EP98/05907

## MILK OR MILK SUBSTITUTE PRODUCT PACKAGING

The invention relates to a package containing a milk product or milk substitute product in the liquid phase.

It is already known to produce milk in pressurized cans. Patent WO 96/33618 relates to a pressurized milk package which comprises, for example, CO<sub>2</sub> in the dissolved state. This patent relates to a drink similar to a sweetened and carbonated drink. The WO Patent 97/33813 relates to an aerosol can having a valve and a nozzle. Using this can it is not possible to achieve a satisfactory foam effect.

The object underlying the invention is to have a package containing milk concentrate or milk without fat, in the use of which package a foam is generated by spouting.

The invention relates to a package together with its contents which consists of the following combination:

- a liquid phase in which a propellant gas is dissolved,
- an aerosol can which is provided with a valve and contains this liquid phase,
- and a nozzle which is immediately downstream of the valve, makes possible the spraying and foaming of the liquid phase and has a central borehole and at least one lateral orifice,

in which the liquid phase is selected from the group consisting of pure concentrated milk, evaporated milk, partial milk substitute product and total milk substitute product having a fat content between 0 and 20% and a solids-not-fat content between 6 and 25%.

In the present description, all percentages are by weight.

The type of propellant gas is not critical. Any gas can be used which is compatible in the food sector. For example, N<sub>2</sub>O, HFC, HCFC or CO<sub>2</sub> is used. The use of

WO 99/15434

- 2 -

PCT/EP98/05907

N<sub>2</sub>O is preferred. The ratio propellant gas/liquid phase is customary, i.e. in the range from 1:40 to 1:50.

The aerosol can is dimensioned so as to contain a weight of liquid phase of from 100 to 500 g. The valve used is likewise customary. The nozzle preferably has a specific geometry which is described in more detail hereinafter: this valve permits a satisfactory foam to be prepared. Satisfactory is taken to mean a foam having a good expansion ratio and having a good persistence.

The possible liquid phases are mentioned above. Pure concentrated milk is taken to mean either a fresh milk which has been subjected to an evaporation in order to reduce the water content, or a recombined milk in which the dry matter content can be set. Recombined milk is envisaged to be milk from both skimmed milk powder and whole milk powder. This pure concentrated milk can comprise sugars, sweeteners or flavourings. The content of these additives is in the range of at most 5%. The sweeteners are a sugar substitute, for example saccharin or cyclamate. The flavourings are present in the range of less than 1% and can be selected within broad limits. Chocolate, cocoa, coffee, aroma substances, strawberry extract, vanilla and spices are used, for example.

The evaporated milk is similar to pure concentrated milk, except that this milk additionally comprises stabilizers, for example disodium hydrogenphosphate. This evaporated milk can likewise comprise sugars, sweeteners or flavourings.

A partial milk substitute product is taken to mean a milk in which the fat content consists of a milk fat portion and vegetable fat and the solids-not-fat consists of milk, whey protein concentrate and foam stabilizers. This partial milk substitute product can also comprise sugars, sweeteners and/or flavourings. The foam stabilizers are gelatin, carrageenans, guar seed flour, carob bean meal or mono- and diglycerides.

WO 99/15434

- 3 -

PCT/EP98/05907

The vegetable fat is selected from the group consisting of coconut fat, palm oil, soya oil, corn oil.

A total milk substitute product is taken to mean a product having a fat portion which consists of vegetable fat and a solids-not-fat content which consists of carbohydrates, caseinates and foam stabilizers. The carbohydrates are selected from the group consisting of maltodextrin and glucose syrup. The vegetable fat and the foam stabilizers are the same as those already mentioned above. This total milk substitute product can also comprise sugars, sweeteners or flavourings.

The package of the invention preferably contains a liquid phase which has a fat content between 4 and 12% and a solids-not-fat content between 15 and 20%.

The nozzle has at least one lateral orifice. The number of these lateral orifices is preferably between 1 and 5. In the figure the nozzle has three lateral orifices. The central borehole usually has a diameter of approximately 1 mm and a borehole area of approximately 0.8 mm<sup>2</sup>. The lateral orifices are usually rectangular and each orifice has an orifice area of approximately 0.27 mm<sup>2</sup>. The ratio of the central borehole area to the lateral orifice area is between 1:0.3 and 1:1.5.

The central borehole, on injection, gives the force and the energy and the lateral orifices give the foaming effect. It is possible to achieve an overrun of 350% by means of the lateral orifices.

The novel package containing a liquid phase of pure concentrated milk is produced according to the following principle. The raw milk is skimmed by a conventional process and pasteurized. This milk is then standardized to achieve the desired fat/solids-not-fat content and concentrated by a conventional process. If appropriate, the remaining formula components are admixed in a conventional mixing process. In the case

WO 99/15434

- 4 -

PCT/EP98/05907

of variants not containing milk the addition is performed in water. It is also possible to recombine the portion added at mixing. The product is then UHT sterilized using the following heating parameters:

- 5 - temperature between 125 and 150°C for a time between 1 second and 5 minutes.

The product is then homogenized at pressures of from 30 to 350 bar. Finally, the product is aseptically packaged into aerosol cans with addition of propellant  
10 gas. A spray nozzle, which enables the product to be injected into the coffee with formation of a smooth fine-pored foam, is mounted on the valve of the aerosol can. This sterile packaging can achieve a shelf life of at least 6 months with refrigerated or unrefrigerated  
15 storage.

A foam can be generated using the novel package. The foam can be used in coffee or in conjunction with another food, for example in the dessert sector, as a topping on fruits or fruit salads.  
20 The foam corresponds to the foam on cappuccino. The product is present in the can in liquid form; on spraying by means of the propellant gas, the foam is generated in the nozzle. Owing to the possible injection into the coffee, a certain temperature  
25 equilibration between foam and coffee can occur. This foaming and the injection into the coffee are enabled by a special spraying nozzle. The nozzle is described in more detail in connection with the figure below.

The foam can also be introduced first and the  
30 coffee poured on later; this achieves the same effect in the finished coffee. The coffee is whitened by the foam as with evaporated milk.

The invention is described with reference to the accompanying drawings, in which

35

Fig. 1 shows a section of the nozzle and

Fig. 2 shows a view from below according to arrow A.

The nozzle (1) consists of an attachment (2), which sits above the mouth of the valve (3), and an outlet tube (4). On the attachment is a pressure point (5) which permits the actuation of the valve. The outlet tube has on the inside a spider (6). This spider has a central borehole (7) and three lateral orifices (8). The central borehole has a diameter of 1 mm and each lateral orifice has a width of 0.6 mm and a height of 0.42 mm, which leads to a central area of 0.800 mm<sup>2</sup> and a total lateral area of 0.830 mm<sup>2</sup>.

It functions in the following manner: the consumer presses on the point (5) which opens the valve. The milk phase then flows in the central borehole (7) and from the lateral orifices (8) in the form of a foam. The flow in the centre produces an injection effect, that is to say a motion effect, while the lateral borehole permits rather a greater foaming effect. The ratio of the central to the lateral amount of the foam is approximately 2:1. The injection effect produces a good diffusion in the coffee, which leads to a temperature equilibration.

The invention is now described in more detail with reference to the examples.

#### 25 **Example 1**

The raw milk is standardized, i.e. fat was added in order to achieve a fat content of 10%. The resultant milk is then concentrated in order to obtain a solids-not-fat content of 17%. UHT sterilization at 148°C for 5 seconds is carried out and aseptic packaging into an aerosol can then takes place. A nozzle according to Figures 1 and 2 is mounted.

The minimum shelf life for this product is approximately 6 months. The foam height on coffee is to be 1-2 cm with a foam persistence of 3 minutes. The propellant gas is N<sub>2</sub>O having a weight of approximately 2 g in approximately 250-260 g of milk.

WO 99/15434

- 6 -

PCT/EP98/05907

**Example 2**

A similar experiment to that in Example 1 was carried out except that the fat content was set to 8%, with a solids-not-fat content of 17%.

5 As regards the foam, a similar result was achieved.

- 7 -

**Claims**

1) Package together with its contents which consists of the following combination:

- 5 - a liquid phase in which a propellant gas is dissolved,
- an aerosol can which is provided with a valve and contains this liquid phase,
- 10 - and a nozzle which is immediately downstream of the valve, makes possible the spraying and foaming of the liquid phase and has a central borehole and from 1 to 5 lateral orifices,

in which the central borehole and the lateral orifices open out into one and the same outlet tube and the liquid phase is selected from the group consisting of  
15 pure concentrated milk, evaporated milk, partial milk substitute product and total milk substitute product having a fat content between 0 and 20% and a solids-not-fat content between 6 and 25%.

2) Package according to Claim 1, characterized in  
20 that the propellant gas is selected from the group consisting of N<sub>2</sub>O, HFC, HCFC and CO<sub>2</sub>.

3) Package according to Claim 1 or 2, characterized in that the liquid phase has a fat content between 4 and 12% and a solids-not-fat content  
25 between 15 and 20%.

4) Package according to Claims 1 to 3, characterized in that the liquid phase also comprises sugars, sweeteners or flavourings.

5) Package according to Claims 1 to 4,  
30 characterized in that the partial milk substitute product, as regards the fat portion, consists of a milk fat portion and vegetable fat, and as regards the solids-not-fat, consists of milk, milk protein concentrate, whey protein concentrate and foam  
35 stabilizers.

6) Package according to Claims 1 to 4, characterized in that in the total milk substitute product the fat portion consists of vegetable fat and

- 8 -

the solids-not-fat content consists of carbohydrates, caseinates and foam stabilizers.

7) Package according to Claim 5 or 6, characterized in that the vegetable fat is selected from the group consisting of coconut fat, palm oil and corn oil.

8) Package according to Claim 5 or 6, characterized in that the foam stabilizers are selected from the group consisting of gelatin, carrageenans, guar seed flour, carob bean meal and mono- and diglycerides.

9) Package according to Claims 1 to 8, characterized in that the nozzle has 3 lateral orifices.

1/1

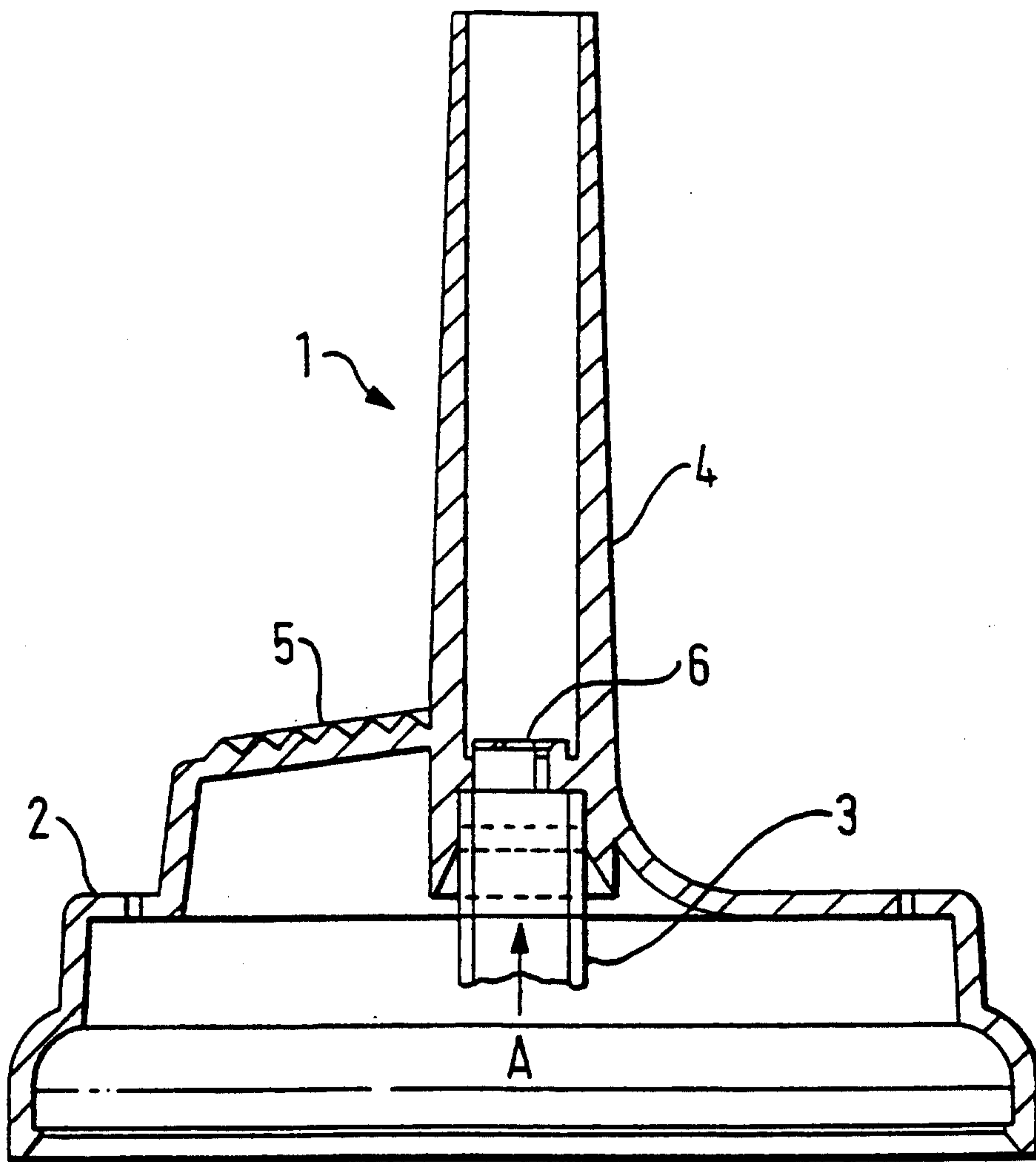


FIG. 1

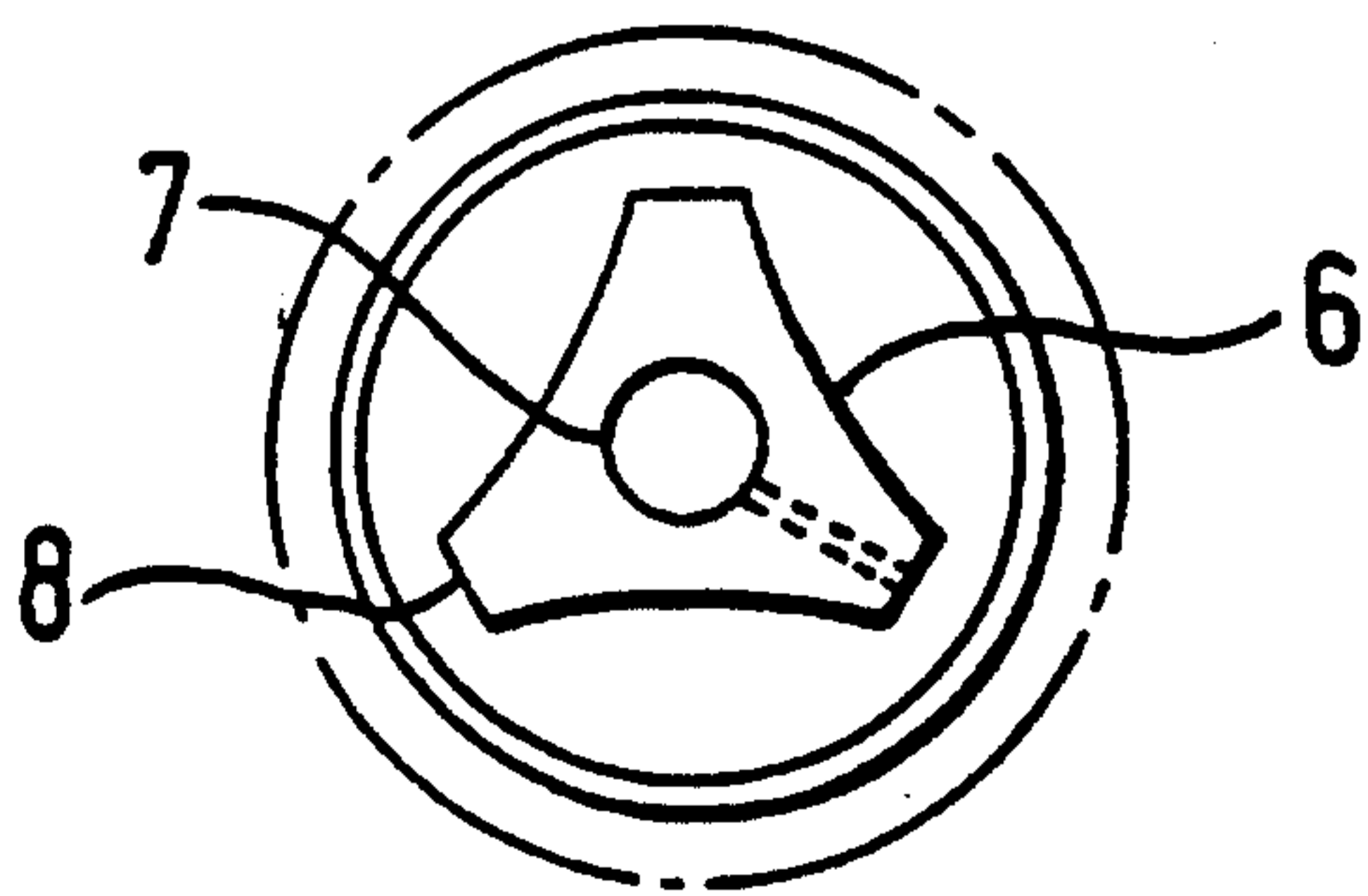


FIG. 2