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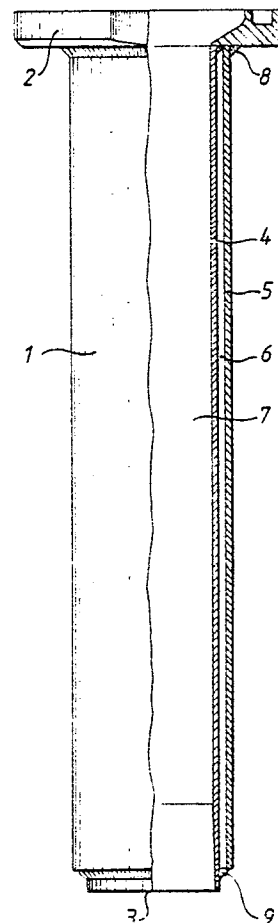
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54 A filling pipe on a packing machine.

57 The invention relates to a product filling pipe (1) to a packing machine for liquid contents such as milk. The filling pipe (1) consists of two concentric pipes (4,5) of metal which between them form a vacuum chamber (6). The double-walled filling pipe (1) is manufactured by the welding together in a vacuum chamber of two concentrically arranged pipes (4) and (5) along the annular weld joints (8) and (9). When a product which is considerably cooler than the surrounding atmosphere is supplied through the inner pipe (4) the outer pipe (5) will not be cooled down to an appreciable extent, since the evacuated space (6) in between constitutes a good thermal insulator.



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A FILLING PIPE ON A PACKING MACHINE

The present invention relates to a filling pipe on a packing machine consisting of two concentrically arranged metal pipes.

In modern high-capacity packing machines for products such as milk, the product is filled at a relatively low temperature, approx. 4-6 °C, into previously arranged packing containers or into a packing tube. Owing to the low temperature of the filled product, condensation occurs on the outside of the filling pipe, and such condensation is undesirable, since bacteria present in the air can adhere to the water drops which are formed by condensation and which subsequently can drop off from the outside of the filling pipe down into the packages. From a hygienic point of view any condensation on the outside of the filling pipe is thus undesirable and it is endeavoured to find means to prevent any formation of condensation.

One solution of the problem is offered by the present invention which relates to a double-walled filling pipe, consisting of two concentrically arranged metal pipes, which at their ends are welded together in a gas-tight manner so that a gas-tight chamber is formed between the pipes, which is evacuated. Owing to the evacuated chamber with annular cross-section between the inner and outer pipe of the filling pipe a very good thermal insulation is obtained, which means that the cold product which cools down the inner wall has no decisive cooling effect on the outer metal pipe, so that condensation is largely prevented.

The invention will be described in the following with reference to the attached schematic drawing which shows a filling pipe, half in section, in accordance with the invention.

The filling pipe shown in the Figure is designated 1 and it comprises an upper coupling part 2 and a lower outlet part 3. As is evident from the Figure the righthand part of the filling pipe is shown cut-through whereas the lefthand part is shown in uncut projection. The central part of the filling pipe 1 consists of two concentrically arranged pipes 4 and 5 and a chamber 6 formed between the said pipes 4 and 5. The inner filling channel of the filling pipe is designated 7.

The two concentric pipes 4 and 5, which between them accommodate the chamber 6, are welded together along the annular welds 8 and 9 in such a manner that the chamber obtains a gas-tight seal. The filling pipe 1, in the version which is shown in the Figure, is intended to be coupled together with a pipe system for the supply of contents, in that the coupling part 2 on the upper part of the filling pipe 1 is connected to the said pipe system, not shown here. When the contents

are supplied through the filling pipe 1 the contents will pass the inner duct 7 and leave the filling pipe 1 through its outlet 3. Since the contents, when they are constituted of dairy products such as e.g. milk, are relatively cold at the point of filling, approx. 4 °C, and large quantities of contents are pumped through the filling pipe 1, the inner pipe part 4 will be cooled down and assume the same temperature as the contents. Normally this would mean that the outside of the filling pipe would assume the same temperature, since the filling pipe 1 is made of metal, in particular stainless steel, so that moisture occurring in the atmosphere would condense on the outside of the filling pipe 1. This is prevented in the present case in that the filling pipe 1 consists of two concentrically arranged pipe portions 4 and 5 which are separated by the chamber 6 wherein a technical vacuum prevails. In practice it is not possible to achieve a total vacuum in the chamber 6, but practical experiments have shown that a pressure of max. 75 mm Hg is sufficient to provide a good insulating effect between the pipes 4 and 5.

Owing to the presence of the evacuated chamber 6 the outer pipe 5 of the filling pipe 1 is not cooled down, therefore, since the evacuated space constitutes a very good thermal insulator but the outside of the pipe 5, in principle, assumes the same temperature as the surrounding air which means that moisture occurring in the atmosphere does not condense on the outside of the pipe 5.

The problem in the manufacture of the filling pipe in accordance with the invention lies in being able to evacuate the narrow gap between the concentric pipes 4 and 5 and a solution of this problem which is put into practice is that the welding is carried out in a vacuum chamber with an automatic welding unit which joins the two pipes 4 and 5 to one another along two annular welds 8 and 9 situated at a distance from one another. Since the welding is carried out in a vacuum chamber where a pressure of max. 75 mm Hg prevails, the pressure inside the chamber 6 will attain approximately the same value.

The filling pipe in accordance with the invention presents many advantages as against known filling pipes, and it has been found too that when the filling pipe is used for hot filling it functions in the same thermally insulating manner, that is to say, the outer filling pipe wall does not assume the same high temperature as the inner filling pipe, which may be an advantage. The main technical effect with the filling pipe in accordance with the invention, though, is that the design prevents the forming of condensation on the outside of the filling

pipe and such a condensation, as pointed out earlier, is particularly troublesome, since water drops may fall down into the packages intended for filling, which is unhygienic and quite unacceptable in the filling of so-called aseptic packages.

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Claims

1. A filling pipe on a packing machine consisting of two concentrically arranged metal pipes, **characterized in that** the outer pipe (5) at its ends (8,9) is joined in a gas-tight manner to the inner pipe (4) in such a way that between the inner and outer pipe (4,5) a closed chamber (6) is formed, and that the said chamber formed is evacuated.

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2. A filling pipe in accordance with claim 1, **characterized in that** the pressure inside the said evacuated chamber (6) is less than 75 mm Hg.

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3. A method for the manufacture of the filling pipe (1) in accordance with claim 1, **characterized in that** the said inner and outer pipes (4,5) are welded together in a vacuum chamber.

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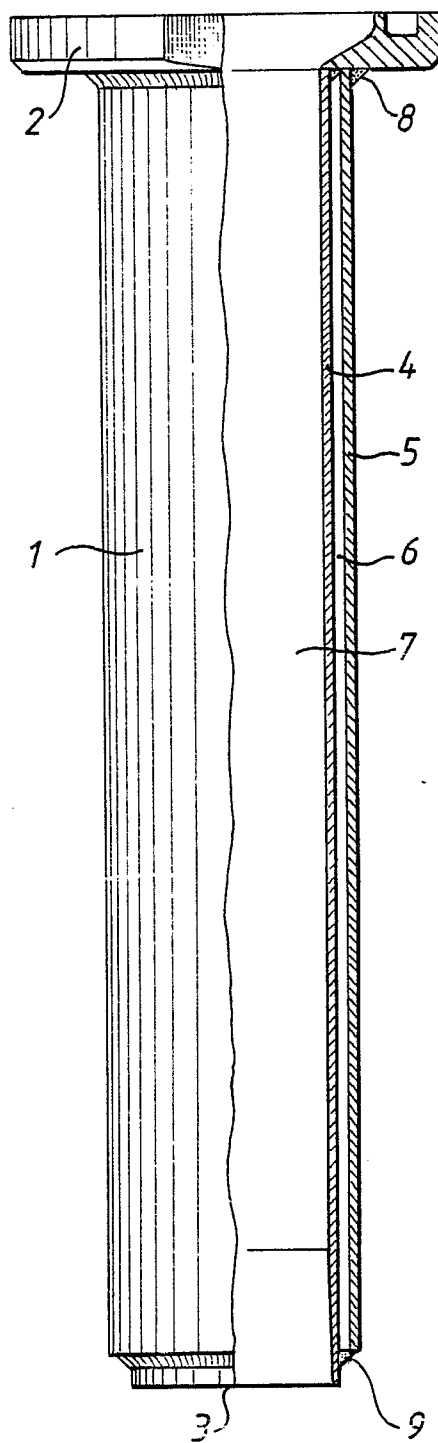
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
A	GB-A- 1 337 546 (THE BRITISH OXYGEN COMPANY LTD) - - -	1	B 65 B 3/04 39/00 B 05 B 1/00
A	GB-A- 788 358 (THE BRITISH OXYGEN COMPANY LTD) - - -	1	
A	SE-B 431 186 (TETRA PAK INTERNATIONAL AB) - - -	1	
A	SE-B- 454 167 AB TETRA PAK) - - -	1	
A	EP-A1- 0 278 560 (SHIKOKU KAHOKI CO LTD) - - -	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			B 65 B B 21 C B 05 B F 16 L
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
STOCKHOLM		30.11.1989	NORDSTRÖM H.
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