



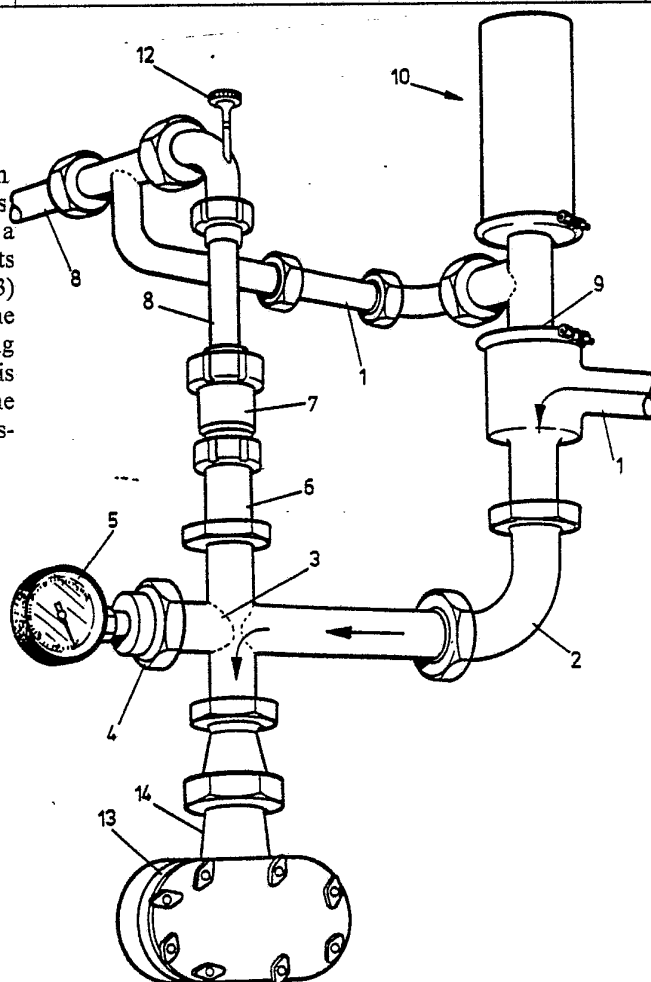
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification³ : B65B 3/04, 3/12, 37/06</p>	<p>A1</p>	<p>(11) International Publication Number: WO 84/ 00734 (43) International Publication Date: 1 March 1984 (01.03.84)</p>
<p>(21) International Application Number: PCT/AU83/00106 (22) International Filing Date: 9 August 1983 (09.08.83) (31) Priority Application Number: PF 5290 (32) Priority Date: 9 August 1982 (09.08.82) (33) Priority Country: AU</p> <p>(71) Applicant (for all designated States except US): GOLD-EN NORTH DAIRIES LIMITED [AU/AU]; 378-388 Main North Road, Clare, S.A. 5453 (AU).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only) : BLAKE, Graham, Murray [AU/AU]; O'Halloran Street, Laura, S.A. 5480 (AU). TAYLOR, Roderick, Charles [AU/AU]; West Terrace, Laura, S.A. 5480 (AU). EDMONDS, William, James [AU/AU]; Seven Hill, S.A. 5453 (AU).</p>		<p>(74) Agent: COLLISON & CO.; Savings Bank Building, 97 King William Street, Adelaide, S.A. 5000 (AU).</p> <p>(81) Designated States: AU, DE (European patent), FR (European patent), GB (European patent), US.</p> <p>Published <i>With international search report.</i> <i>With amended claims.</i></p>

(54) Title: ICE CREAM PACKAGE AND METHOD

(57) Abstract

Apparatus for the continuous packaging of ice cream the apparatus comprising a packaging machine having a positive pressure pump, and an ice cream churn incorporating a positive pressure delivery pump. An inlet pipe (2) connects the two pumps, the inlet pipe terminating in a T junction (3) so that the ice cream must turn to enter the inlet (14) to the packaging machine, the other arm of the T junction being connected to a pressure relief valve (7). As the ice cream is very viscous it acts as a solid in the inlet pipe and hence the ice cream by turning in the T junction (3) equalises the pressure throughout the T junction (3).



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1.

"ICE CREAM PACKAGE AND METHOD"

This invention relates to the packaging of ice cream and to the method and apparatus for packaging the ice cream in a convenient and attractive manner.

DESCRIPTION OF THE PRIOR ART

5 Ice cream which is sold for the domestic use is usually sold in containers, either in block form contained in a cardboard package, or in containers of one of the plastics materials, these containers either being square, round or of bucket form. While these are satisfactory in many
10 respects, for large quantities to be stored, a relatively large freezer unit has to be provided, and when once a package is opened, the ice cream therein is subject to deterioration in structure by crystal growth and by the ice cream becoming harder.

15 U.S. Patent No. 2,563,278 discloses apparatus and method for forming frozen confections, in which cylindrical bags are formed into which metered quantities of a product of an ice confection in semi-plastic form are fed by a reciprocating piston pump into the bag which is then sealed,
20 the mixture being about 2⁰F above freezing point.

 Australian Patent No. 439,425 is directed to the sterilisation of a web of plastic material which is then formed into a tube to be fed to a-forming and welding apparatus to form tetrahedral packages for the liquid
25 to be packaged.

 Australian Patent No. 256,049, similar to 439,425 is also directed to the sterile packaging of sterile products.



2.

Australian Patent No. 479,097 is concerned with the sterilisation of packaging, the level of the liquid being packaged being float controlled.

5 Australian Patent Specification No. 54735/73 is directed to the filling of packages with viscous materials, to fill preformed tubes which are placed on a filling head, the invention being directed to the cutting off of the viscous material to avoid drips and consequent fouling of the container with product. This also discloses the relieving of pressure in the filling head, the pressure relieving tube being open at all times through a restricted opening.

15 Products such as meats and sausages and the like are known to be packaged in a tubular package formed of plastic film having gathered ends and secured by metal closures.

20 Conventionally in such packaging machines the packaging film is fed from a roll over a forming cylinder and is sealed into a continuous tube. The product can then be introduced through the tube by a variable speed positive displacement metering pump which controls the flow of rate of the product. The control of flow and tube formation rates maintains accurate weight and package length.

25 The film containing the product is propelled by drive wheels to voider wheels which are timed to void the product from the plastic tube. Closure plates then gather the voided tube and install the top closure clip on one package and the lower clip on the following package while simultaneously a knife cuts the plastic tube midway between the two clips whereby the lower package is then complete and slides down an exit chute into a container or take-away conveyor. Such a machine is typified by a KARTRIG PAK CHUB machine, model 43.



3.

However for the continuous packaging of ice cream by this method, the ice cream must be fed continuously to the inlet to the positive displacement pump and it is to this feed to which the present invention relates.

5 BRIEF STATEMENT OF THE INVENTION

It is an object of this invention to provide a feed means to a packaging machine for the packing of ice cream.

It is a further object to provide a packaging of ice cream.

10 Thus there is provided according to the invention the continuous packaging of ice cream supplied from continuously operating churns positively feeding the ice cream to a packaging machine having a positive packaging pump, the ice cream at a temperature below 0°C having
15 high viscosity being fed to the inlet to the packaging machine through an inlet pipe via an angular junction, there being a pressure relief valve connected to the angular junction operating to maintain the desired pressure and flow of ice cream to the packaging machine.

20 Preferably the junction is a T junction with the flow from the churns being connected to the stem of the T, so that the ice cream must turn to flow to the packaging machine connected to one arm of the T, the relief valve being connected to the other arm.

25 The ice cream at this temperature in its highly viscous state acts as a solid as it flows through a pipe, and thus for pressure regulation, the flow must turn to both the inlet to the machine or to the relief valve, for if



4.

the connections were otherwise, the ice cream would flow past the respective inlet to the packaging machine or the pressure relief valve. Thus the T junction causes equalisation of pressure in the T junction between the pressure relief valve and the inlet to the packaging machine.

The ice cream is supplied to the packaging machine 1 which is a KARTRIG PAK CHUB machine, model 43, in a continuous process from one or more ice cream churns (not shown). These churns rely on a positive feed mix into the barrels and a positive ice cream extrusion pump to deliver the ice cream.

Thus for a continuous process the output from the ice cream churn or churns must be coterminus with the feed to the inlet to the pump of the packaging machine.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to more fully describe the invention reference will now be made to the accompanying drawings in which:

FIG. 1 shows a package of ice cream,

FIG. 2 shows the feed from the churn to the packaging machine, and

FIG. 3 shows further detail of the fitting.

DESCRIPTION OF PREFERRED EMBODIMENT

The pipe 1 receives ice cream from the positive pumps of the ice cream churns (not shown), the ice cream then passing through pipe 2 and a T junction 3 to the inlet 14 of the packaging machine 13.



5.

The pipe 2 extends to the T junction 3, the end of the pipe 2 being closed by a fitting 4 having a pressure gauge 5.

5 To the other arm of the T junction 3 there is provided a pipe 6 leading to a pressure relief valve 7 connected to pipe 8 leading to a waste container.

10 At the inlet pipe 1 there is provided a bypass valve 9 being controlled by an air operated bypass mechanism 10. Behind the bypass valve 9 a pipe 11 is connected to the discharge pipe 8.

The air operated bypass valve 9 is actuated during the starting up and closing down of the run, so that during these periods of time the ice cream will pass from pipe 1 through pipe 11 to the discharge pipe 8.

15 The pressure relief valve 7 is controlled by a control screw 12.

20 It is to be realised that ice cream delivered from the churns is below freezing, preferably at a temperature of -5°C , and at this temperature while it is in a condition to be pumped as a fluid, in practice as it is passing through the pipes it could be considered to be a solid. Hence for this reason it has been found necessary to place the pressure relief valve 7 at the T junction 3 for it has been found that if the inlet valve 7 were situated
25 prior to the T junction 3, and if for some reason there is a pressure build up in the T junction 3 due to either a malfunction or not correct correlation between the rate of feed from the churns to the packaging pump, that the ice cream tends to flow past the pressure relief valve
30 due to it behaving as a solid and thus increasing the pressure in the T junction 3 without it being adequately



6.

released. Similarly if the connection to the pressure relief valve were in line with the pipe 2, with an angular junction to the inlet to the packaging machine, the ice cream would tend to flow to the relief valve without passing into the inlet to the packaging machine.

Thus by positioning the relief valve 7 at the T junction 3, and opposite to the inlet to the packaging machine, the ice cream must turn and pass into the inlet to the packaging machine as it is stopped by the T junction 3, and to equally turn to the pipe 6 to the relief valve 7. If an increase in pressure does occur in the T junction 3, or if the feed rate is slightly higher, this pressure is immediately applied to the relief valve 7 without there being an undue increase in pressure in the T junction 3.

Hence the relief valve diverts excess product from between the two positive pressure pumps, one on the churn and the other on the packaging machine.

It has been found for satisfactory packaging of the ice cream that the ice cream be delivered from the churns at a lower temperature than the ice cream packaged in larger containers, the temperature of the present invention ice cream being -5°C while that of the conventional ice cream is at a temperature of $3\frac{1}{2}^{\circ}\text{C}$. Also the speed of the churns is reduced thus giving an ice cream quality suitable for such packaging.

While in the preferred embodiment a T junction is shown, it is to be realised that other angular junctions can be used, as long as the ice cream does not have a straight through passage, but must turn through an angle to the inlet to the package machine and to the pressure relief valve.



7.

The general formulation of the ice cream can be varied as desired from that of conventional ice cream, and can have an overrun of 110, compared with the usual overrun of 130.

5 It is realised of course that overrun is the volume of ice cream obtained in excess of the volume of mix and is usually expressed as "% overrun". The increased volume is composed mainly of air incorporated during the freezing process and is regulated to give the proper body, texture
10 and palatability necessary to give the desired quality of ice cream.

The film for forming the package to contain the ice cream is a flexible film, and is preferably a laminated film being constructed with at least a single layer of
15 a metalised surface, this being such that the film is relatively tough so that it is not readily punctured or ruptured. The packaging machine forms the film into a tube, the ends of the filled tube 15 being closed by clips 16
in the packaging machine.

20 The film for the package is fed from a roll over a forming cylinder and heat sealed to form a continuous tube. The ice cream is fed into the tube, by a variable speed positive displacement metering pump, the control
25 of the flow and the tube formation rates maintaining the accurate weight and package length. Closure clips are applied and the knife cuts between the two clips, the completed package sliding away.

Although one form of the invention has been described
in some detail it is to be realised that the invention
30 is not to be limited thereto but can include various modifications falling within the spirit and scope of the invention.



8.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. The method of continuous packaging of ice cream supplied from a continuously operating ice cream churn positively feeding the ice cream to a packaging machine having a positive pressure packaging pump, the ice cream
5 being at a temperature below 0°C and having a high viscosity, characterised by feeding the ice cream from the churn to the inlet to the packaging machine through an inlet pipe via an angular junction, there being a pressure relief valve connected to the angular junction operating to maintain
10 the desired pressure and flow of ice cream to the packaging machine.

2. Apparatus for the continuous packaging of ice cream in tubular containers, the apparatus comprising a packaging machine having a positive pressure pump for feeding the ice cream into the tubular packages formed by
5 passing a packaging film over a tubular former, a churn for mixing the ice cream and feeding it under pressure from a positive pressure pump in the churn to the inlet of the positive pressure pump in the packaging machine, characterised in that the ice cream is conveyed by an
10 inlet pipe terminating at an angular junction connected to the inlet to the positive pressure pump of the packaging machine, a pressure relief valve connected to the angular junction whereby excess pressure and rates of flow are relieved from the angular junction.

3. Apparatus as defined in Claim 2 characterised in that the angular junction is a T junction, the inlet pipe joining to the stem of the T junction, one arm of the T junction being connected to the inlet of the positive
5 pressure pump of the packaging machine, the other arm being connected to the pressure relief valve.



9.

4. Apparatus as defined in Claim 3 wherein a pressure gauge is connected to the T junction.

5. Apparatus as defined in any one of Claims 2 - 4 characterised by a bypass valve connected to the inlet pipe, the bypass valve bypassing ice cream during start up and close down of the packaging machine.

6. Apparatus for the continuous packaging of ice cream substantially as hereinbefore described and is illustrated in the accompanying drawings.

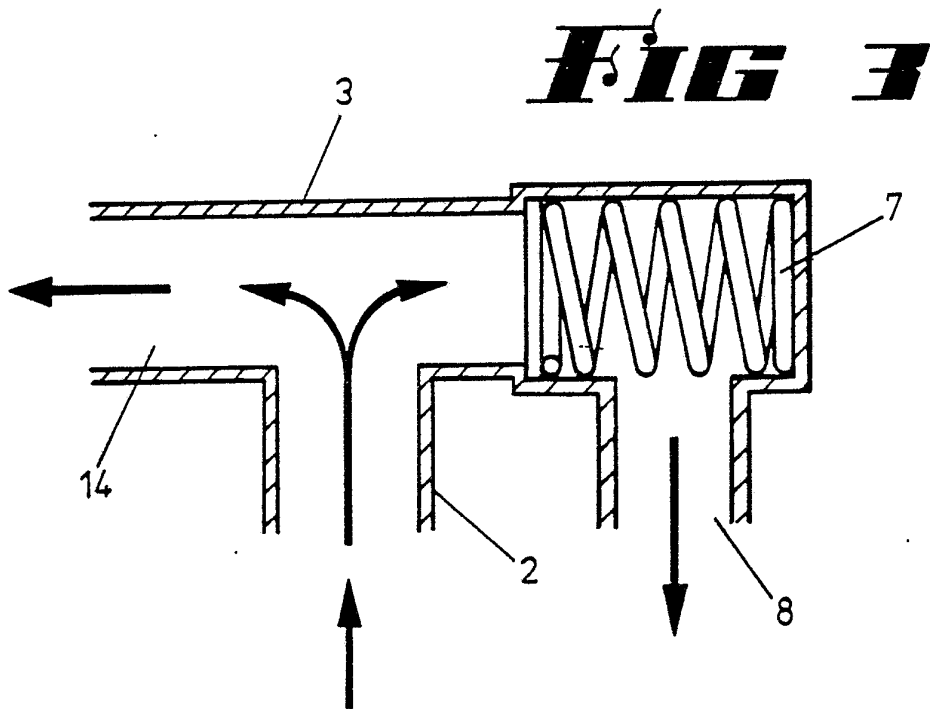
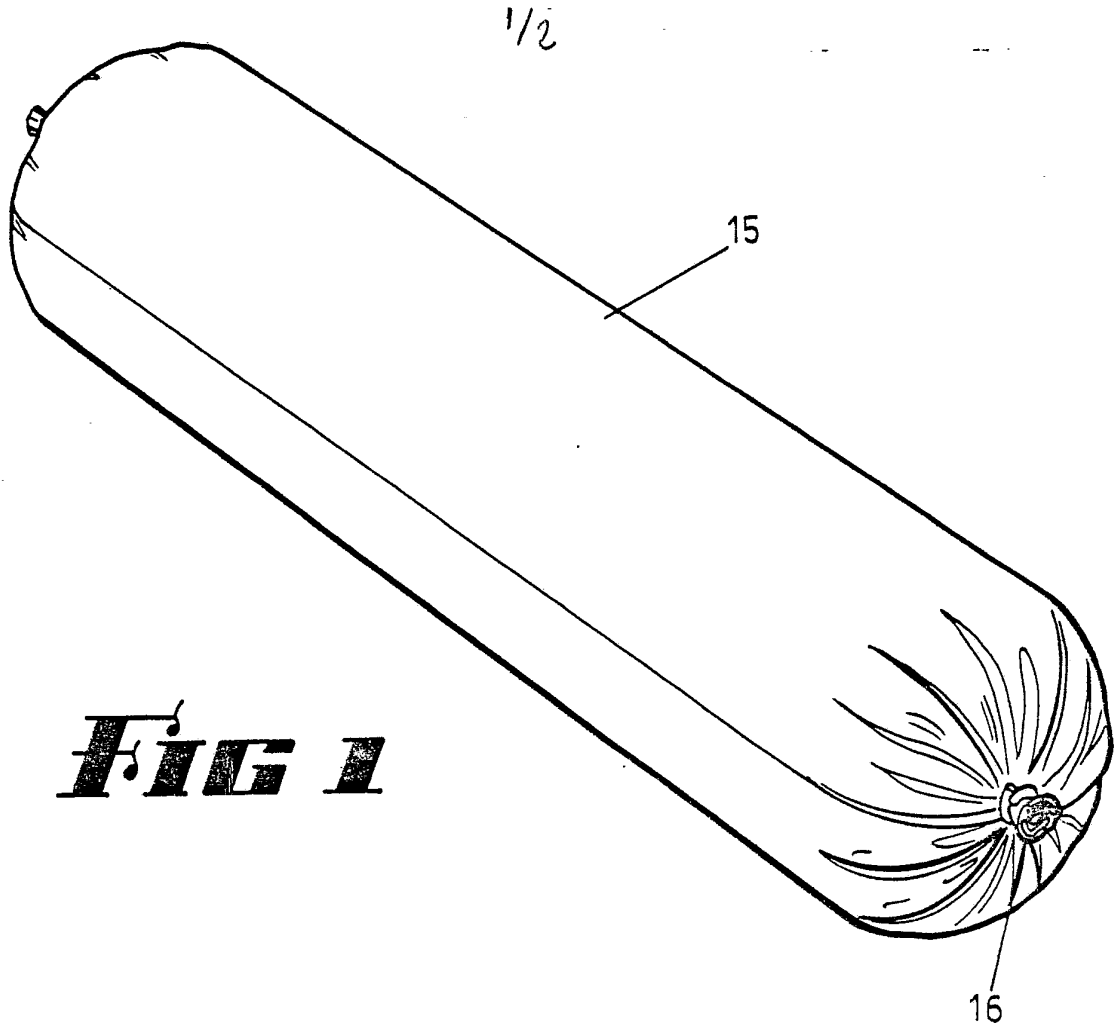


AMENDED CLAIMS

[received by the International Bureau on 28 1983 (28.12.83);
original claims 1 to 6 replaced by new claims 1 to 4]

1. Apparatus for the continuous packaging of ice cream in tubular containers, the apparatus comprising a packaging machine having a positive pressure pump for feeding the ice cream into the tubular packages formed by passing a packaging film over a tubular former, a churn for mixing the ice cream and feeding it under pressure from a positive pressure pump in the churn to the inlet of the positive pressure pump in the packaging machine, characterised in that the ice cream is conveyed by an inlet pipe terminating at a T-junction, the inlet pipe joining to the stem of the T-junction, one arm of the T-junction being connected to the inlet of the positive pressure pump of the packaging machine, the other arm being closed by a spring loaded pressure relief valve whereby excess pressure and rates of flow are relieved from the T-junction.
2. Apparatus as defined in Claim 1 wherein a pressure gauge is connected to the T-junction.
3. Apparatus as defined in Claim 1 characterised by a bypass valve connected to the inlet pipe, the bypass valve bypassing ice cream during start up and close down of the packaging machine.
4. Apparatus for the continuous packaging of ice cream substantially as hereinbefore described and as illustrated in the accompanying drawings.





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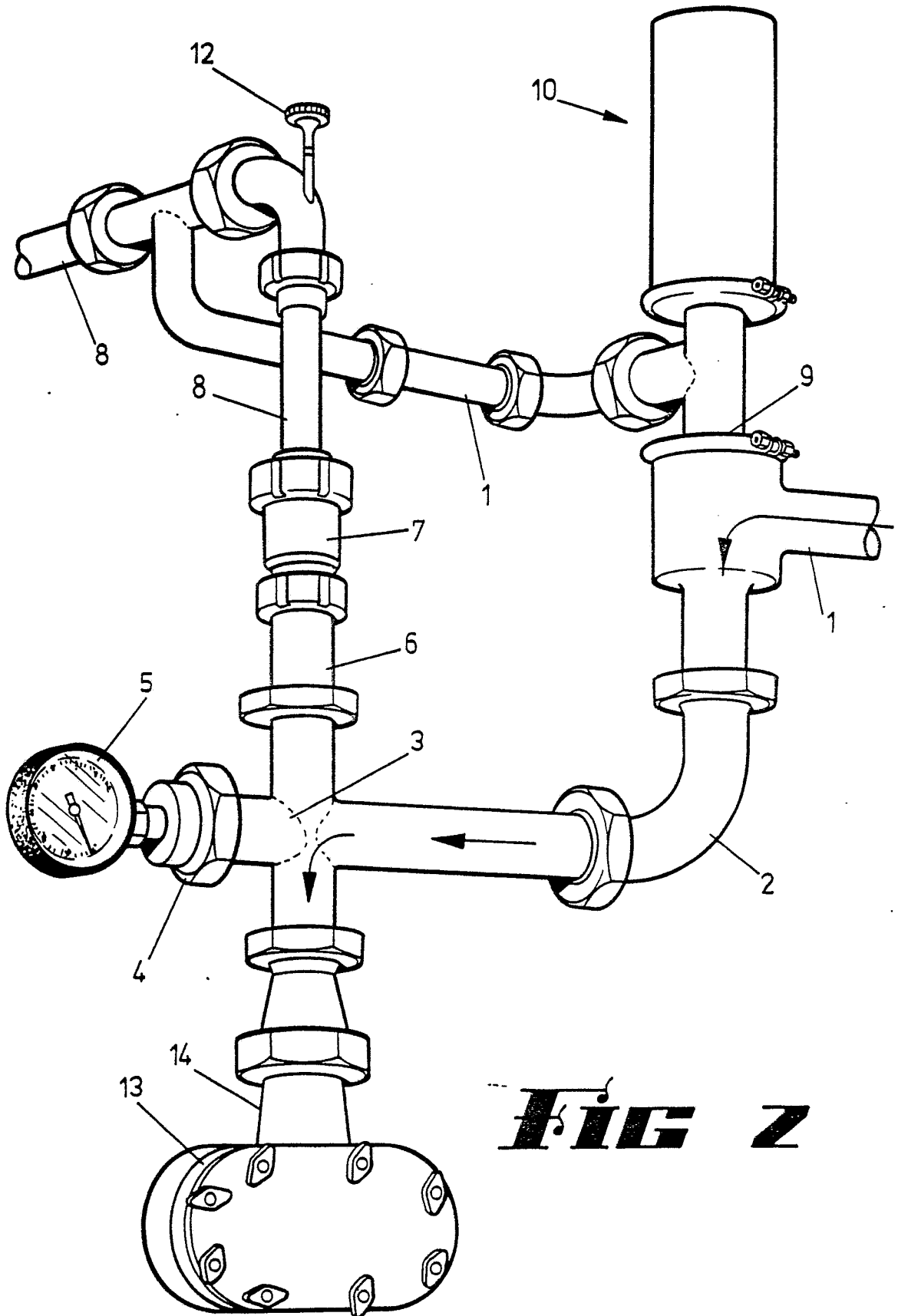


FIG 2



INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU83/00106

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ³ B65B 3/04, 3/12, 37/06		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
IPC	B65B 3/04, 3/12, 37/06, 9/12, 9/20, A23G 9/22	
US Cl.	426/410, 426/393	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵		
AU: IPC as above; Australian Classification 57.4		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category *	Citation of Document, ¹⁵ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X	AU, A, 54735/73 (SCHERICO LTD.) 24 October 1974 (24.10.74)	(1-6)
Y	FR, A, 840375 (BERGERIOUX) 25 April 1939 (25.04.39)	(1-6)
Y	US, A, 2563278 (RUMMEL, et al) 7 August 1951 (07.08.51)	(1-6)
<p>* Special categories of cited documents: ¹⁵</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ²	Date of Mailing of this International Search Report ²	
25 October 1983 (25.10.83)	28 October 1983 (28.10.83)	
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Australian Patent Office	A.S. Moore <i>A.S. Moore</i>	