(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 770 013 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.04.2007 Bulletin 2007/14

(51) Int Cl.:
B65B 3/30 *(2006.01)*

(21) Application number: **06020693.5**

(22) Date of filing: **02.10.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **30.09.2005 NL 1030080**

(71) Applicants:
- **Cuyten, Antonius Petrus Johannes Maria**
  5591 MN Heeze (NL)
- **Brinkman, Pieter Lijnus Willem**
  5627 TD Eindhoven (NL)

(72) Inventors:
- **Cuyten, Antonius Petrus Johannes Maria**
  5591 MN Heeze (NL)
- **Brinkman, Pieter Lijnus Willem**
  5627 TD Eindhoven (NL)

(74) Representative: **Verhees, Godefridus Josephus Maria**
De Pinckart 54
5674 CC Nuenen (NL)

(54) Device for filling containers

(57) A filling apparatus 1 has a stock tank 7, a filling orifice 9 and a pump 11. The pump is connected via a suction tube 13 to the stock tank and via a compressed air tube 15 to the filling orifice. The filling apparatus 1 also has a first closure valve 17, which is present in the suction tube, and a second closure valve 19, which is present in the compressed air tube.

With the first closure valve 17 open and the second closure valve 19 closed, the pump 11 sucks the substance 5 via the suction tube 13 from the stock tank 7. Then with the first closure valve 17 closed and the second closure valve 19 open the pump forces substance 5 via the compressed air tube 15 to the filling orifice 9.

The pump 5 is formed by two cylinders 21, 23 that move telescopically into each other, of which a first cylinder 21 is connected to the suction tube 13 and the second cylinder 23 is connected to the compressed air tube 15. The first cylinder 21 is here fixed and the second cylinder 23 can be slid over the first cylinder. The suction tube 13, compressed air tube 15 and the cylinders 21 and 23 are present in line.

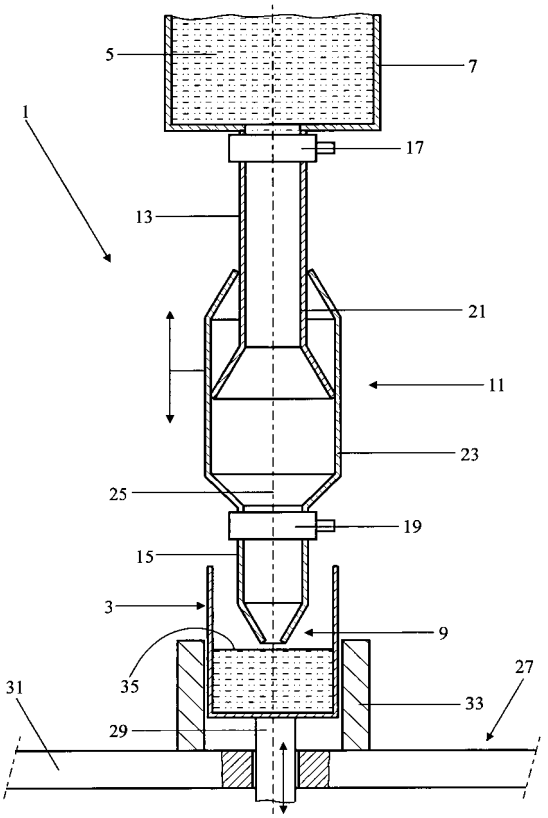

FIG. 1

EP 1 770 013 A1

Description

BACKGROUND OF THE INVENTION:

Field of the invention

[0001] The invention relates to a filling apparatus for filling receptacles with viscous substances, with or without solid particles, comprising a suction tube for connection to a stock tank, a filling orifice with a compressed air tube connected thereto, and two cylinders that slide telescopically into each other, in which the first cylinder is connected to the suction tube and the second cylinder is connected to the compressed air tube.

Prior art

[0002] Such a filling apparatus is known from US 4,544,006. In the known filling apparatus the cylinders that slide telescopically into each other form a filling station, in which a filling cylinder can be moved in a pre-chamber cylinder to which a feed tube for a viscous substance is connected. The substance is fed under pressure via the feed tube so that the filling cylinder is pressed outwards and a connection between the pre-chamber cylinder and filling cylinder is released so that the substance can flow from the pre-chamber cylinder into the filling cylinder.

[0003] The substance can be severely restricted by bends in the tube. This will damage the structure of the substance and in particular any solid particles therein, such as fruit particles, so that the quality of the substance and any particles therein will deteriorate.

Summary of the invention

[0004] An objective of the invention is to provide a filling apparatus of the sort described in the preamble in which the quality of the substance with any solid particles present therein is retained. For this purpose the filling apparatus according to the invention is characterised in that the filling apparatus also comprises a first closure valve, which is present in the suction tube, and a second closure valve present in the compressed air tube, whereby both cylinders and both closure valves form a pump, which with the first closure valve open and the second closure valve closed sucks the substance up via the suction tube from the stock tank and then with the first closure valve closed and the second closure valve open forces the substance via the compressed air tube to the filling orifice. When the cylinders slide out of each other the volume in the cylinders increases, so that substance is sucked via the suction tube from the stock tank, and when the cylinders slide into each other the volume decreases, so that the substance is pressed away via the compressed air tube. This ensures that the substance is not bothered by a piston moving to and fro, so that the quality remains constant.

[0005] Note that from US 4,518,021 a filling apparatus is known in which both cylinders that move telescopically into each other form a valve. This means the cylinders cannot execute a pump action.

[0006] An embodiment of the filling apparatus according to the invention is characterised in that the cylinders and the suction and compressed air tube are present in line, in which the filling orifice is aimed downwards. The absence of bends in the tubes means that the substance is even less restricted so that the quality remains more constant.

[0007] A further embodiment of the filling apparatus according to the invention is characterised in that the first cylinder is stationary and the second cylinder can be slid over the first cylinder. This provides the biggest change in volume on moving the second cylinder.

[0008] A still further embodiment of the filling apparatus according to the invention is characterised in that the filling apparatus also comprises movement devices, which repeatedly raise a receptacle under the filling orifice and then slowly lower it during filling, as well as transport devices that the move the receptacles intermittently under the filling orifice, in which during the rest periods a receptacle is displaced vertically by the movement devices, which transport devices comprise a transport belt that is provided with vertical guides to guide the receptacles during the vertical displacement, which guides can be moved under the filling orifice in the lowest position, in which the displacement of the second cylinder and the movement devices are arranged so that when filling a receptacle the level of the substance in the receptacle remains a short distance under the filling orifice and the receptacle remains in the guide. The filling orifice must be just above the level of the substance as otherwise the substance would drop too quickly so that the quality would decrease too much. As the filling orifice moves with the second cylinder the receptacles needs to be displaced over a smaller distance than if the filling orifice were fixed, as is the case with the known filling apparatus. This means that the receptacles do not have to be lifted above the guides.

Brief description of the drawings

[0009] The invention will be elucidated further below on the basis of drawings in which an embodiment of the filling apparatus according to the invention is shown. Figure 1 shows an embodiment of the filling apparatus in lengthwise cross-section.

Detailed description of the drawings

[0010] Figure 1 shows an embodiment of the filling apparatus 1 according to the invention for filling receptacles 3 with a viscous substance 5. The filling apparatus 1 has a stock tank 7, a filling orifice 9 and a pump 11. The pump is connected via a suction tube 13 to the stock tank and via a compressed air tube 15 to the filling orifice. The

filling apparatus 1 also has a first closure valve 17, which is present in the suction tube, and a second closure valve 19, which is present in the compressed air tube.

[0011] With the first closure valve 17 open and the second closure valve 19 closed the pump 11 sucks the substance 5 via the suction tube 13 from the stock tank 7. Then with the first closure valve 17 closed and the second closure valve 19 open, the pump forces the substance 5 via the compressed air tube 15 to the filling orifice 9.

[0012] The pump 5 is formed by two cylinders 21, 23 that move telescopically into each other, in which a first cylinder 21 is connected to the suction tube 13 and the second cylinder 23 is connected to the compressed air tube 15. The first cylinder 21 is here fixed and the second cylinder 23 is can be slid over the first cylinder. The suction tube 13, compressed air tube 15 and the cylinders 21 and 23 are present in line (indicated by centre line 25).

[0013] The filling apparatus 1 also has movement devices 27, which raise the receptacle 3 under the filling orifice 9 and then lower it slowly during filling. The filling apparatus 1 also has transport devices 29, which move the receptacles intermittently under the filling orifice 9. During the rest periods of the intermittent movement the receptacle 3 is displaced vertically by the movement devices 27.

[0014] The transport devices 27 comprise a transport belt 31, which is provided with vertical guides 33 to guide the receptacles during the vertical displacement. The guides can be moved under the filling orifice 9 in the lowest position. The displacement of the second cylinder 23 and the movement devices 27 are arranged so that when a receptacle is being filled the level 35 of the substance in the receptacle remains at a short distance under the filling orifice 9 and the receptacle 3 remains in the guide 33.

[0015] Although in the above the invention is explained on the basis of the drawings, it should be noted that the invention is in no way limited to the embodiment shown in the drawings. The invention also extends to all embodiments deviating from the embodiment shown in the drawings within the context defined by the claims.

Claims

1. Filling apparatus for filling receptacles with viscous substances, with or without solid particles, comprising a suction tube for connection to a stock tank, a filling orifice with a compressed air tube connected thereto, and two cylinders that move telescopically into each other, in which a first cylinder is connected to the suction tube and the second cylinder is connected to the compressed air tube, **characterised in that** the filling apparatus also comprises a first closure valve, which is present in the suction tube, and a second closure valve, which is present in the compressed air tube, in which both cylinders and both closure valves form a pump, which when the first closure valve is open and the second closure valve is closed sucks the substance via the suction tube from the stock tank and then when the first closure valve is closed and the second closure valve is opened forces the substance via the compressed air tube to the filling orifice.

2. Filling apparatus according to claim 1, **characterised in that** the cylinders and the suction and compressed air tube are in line, in which the filling orifice is aimed downwards.

3. Filling apparatus according to claim 1 or 2, **characterised in that** the first cylinder is stationary and the second cylinder can be slid over the first cylinder.

4. Filling apparatus according to claim 1, 2 or 3, **characterised in that** the filling apparatus also comprises movement devices, which continually raise a receptacle under the filling orifice and then lower it slowly during filling, as well as transport devices that move the receptacles intermittently under the filling orifice, in which a receptacle can be displaced vertically by the movement devices during the rest periods, which transport devices comprise a transport belt, which is provided with vertical guides to guide the receptacles during the vertical displacement, which guides can be moved under the filling orifice in the lowest position, in which the displacement of the second cylinder and the movement devices are arranged so that when a receptacle is being filled the level of the substance in the receptacle remains at a short distance under the filling orifice and the receptacle remains in the guide.

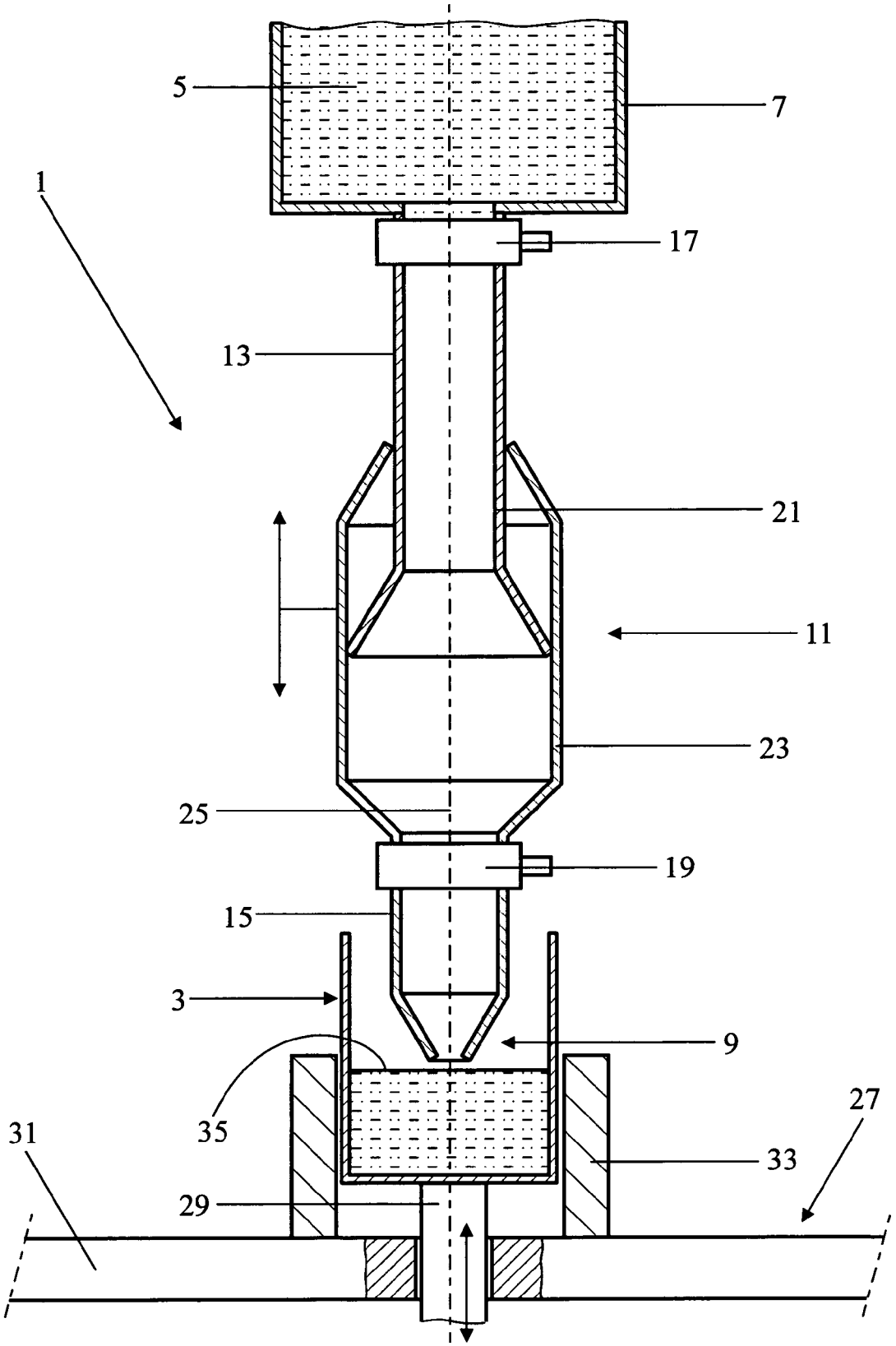

FIG. 1

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 02 0693

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,A	US 4 518 021 A (COPAS ET AL) 21 May 1985 (1985-05-21) * column 2, line 46 - column 7, line 48; figures *	1,3,4	INV. B65B3/30
D,A	US 4 544 006 A (TRENNER ET AL) 1 October 1985 (1985-10-01) * column 2, line 12 - column 3, line 22; figures *	1,2	
A	DE 24 38 796 A1 (FINNAH, JOSEF, 4422 AHAUS; FINNAH, JOSEF, 4422 AHAUS, DE) 26 February 1976 (1976-02-26)		
A	FR 1 521 915 A (UNILEVER N.V) 19 April 1968 (1968-04-19)		

TECHNICAL FIELDS SEARCHED (IPC)

B65B
F04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17 January 2007	Jagusiak, Antony

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

4

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 02 0693

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-01-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4518021 A	21-05-1985	NONE	
US 4544006 A	01-10-1985	NONE	
DE 2438796 A1	26-02-1976	NONE	
FR 1521915 A	19-04-1968	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 4544006 A **[0002]**
- US 4518021 A **[0005]**