

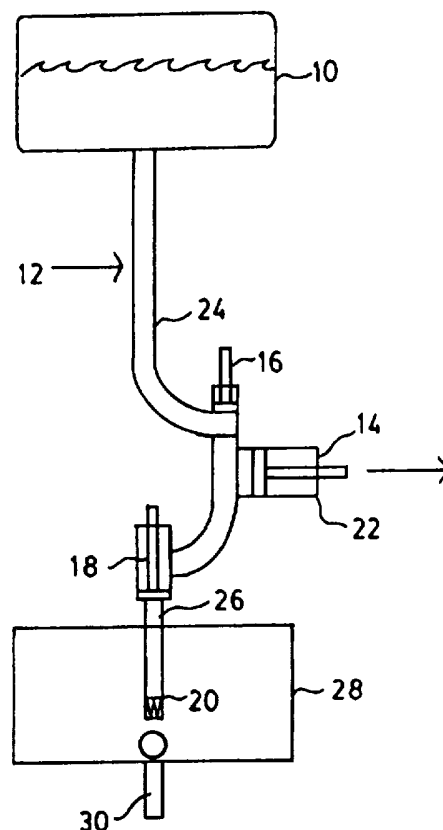


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(21) International Application Number: PCT/US95/11517 (22) International Filing Date: 12 September 1995 (12.09.95) (30) Priority Data: 08/315,957 30 September 1994 (30.09.94) US (71) Applicant (for all designated States except US): TETRA LAVAL HOLDINGS & FINANCE S.A. [CH/CH]; Avenue Général-Guisan 70, CH-1009 Pully (CH). (72) Inventors; and (75) Inventors/Applicants (for US only): FRANKE, Richard [SE/SE]; Hallestadsvagen 50, S-240 10 Dalby (SE). BRANDSTROM, Per [SE/US]; 1317 Orleans Drive, Mundelein, IL 60060 (US). KANEKO, Yutaka [JP/US]; 300 Inwood Drive, Wheeling, IL 60090 (US). ANDERS- SON, Bengt [SE/US]; 1360 Larchmont, Buffalo Grove, IL 60089 (US). (74) Agents: POLIT, Robert, B. et al.; McAndrews, Held & Malloy, Ltd., Suite 3400, 500 West Madison, Chicago, IL 60661 (US).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG). Published <i>With international search report.</i>

(54) Title: AUTOMATED PRODUCT DRAINING METHOD FOR A PACKAGING MACHINE**(57) Abstract**

A clean, automated product draining method for a packaging machine is set forth. The method includes the following steps: draining product from a product tank (10) through a filling tube (12); and controlling a rate at which the product is drained from the product tank (10) with a dispensing mechanism (14), wherein the product is drained at a slower rate than a rate at which the product is dispensed into a container during a production cycle.



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**AUTOMATED PRODUCT DRAINING METHOD
FOR A PACKAGING MACHINE**

TECHNICAL FIELD

The present invention relates to an automated product draining method for a packaging machine. More specifically, the present invention relates to a clean,
5 automated product draining method for a packaging machine.

BACKGROUND

Packaging machines are known that integrate into a single unit the various components necessary to form a
10 container, fill the container with a liquid product, and seal the container. Such packaging machines typically feed carton blanks into the machine, seal the bottoms of the cartons, fill the cartons with a product dispensed from a product storage tank through a filling tube, seal
15 the tops of the cartons, and off-load the filled cartons for shipping.

Where the liquid product dispensed into the cartons is a liquid foodstuff it may be necessary to maintain a sterile filling environment. The sterile filling

environment must be maintained in the product storage tank, the filling tube, and in a region surrounding a terminus of the filling tube from which the product is dispensed. The region surrounding the terminus of the filling tube can be partially enclosed, for example, by a casing. Further, the sterile filling environment must be maintained in an area below the terminus of the filling tube, extending as far below the terminus as is necessary to ensure that non-sterile air is effectively prevented from penetrating the area surrounding the terminus of the filling tube.

In order to prevent bacteria from forming in parts of the packaging machine that come into contact with certain liquid foodstuffs it is known to circulate a cleaning fluid through those parts. However, any liquid product remaining in the product tank at the end of the production cycle must be drained from the product tank before the cleaning cycle can begin.

Typically, the remaining product is drained from the product tank by opening the pump valves in the system such that the remaining product flows out of the product tank and into the casing, or where a casing is not provided, onto a draining floor, at atmospheric

pressure under the force of gravity. As the remaining liquid product is drained from the product tank in this manner it tends to splash in the casing and becomes unsuitable for reuse. Specifically, the remaining
5 product tends to foam and may become contaminated as it is drained from the product tank. Therefore, the remaining product is disposed of once it is drained from the system. Since packaging machines must be frequently cleaned, regularly disposing of the remaining product is
10 costly.

SUMMARY OF THE INVENTION

A clean, automated product draining method for a packaging machine is set forth. The method includes the following steps: draining product from a product tank
5 through a filling tube; and controlling a rate at which the product is drained from the product tank with a dispensing mechanism, wherein the product is drained at a slower rate than the rate at which the product is dispensed into a container during a production cycle.

10 Other objects and advantages of the present invention will become apparent upon reference to the accompanying detailed description when taken in conjunction with the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates the draining of product into an upper end of a filling tube in accordance with the disclosed method.

5 FIG. 2 illustrates the draining of product into a lower end of a filling tube in accordance with the disclosed method.

FIG. 3 illustrates graphically the controlling sequence for draining the product.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As illustrated in FIG. 1, product from a product tank 10 of a packaging machine can be drained from a filling tube 12. The rate, or flow at which the product is drained is controlled with a suitable dispensing mechanism, such as a pump 14, that, for example, may be a servomotor driven pump under control of a control system, such as is disclosed in U.S.S.N. 08/475,396 (Corporate Docket No. TRX-0126; Attorney Docket No. 10623US01), entitled "Control System for a Packaging Machine", filed on September 28, 1994 and incorporated by reference. Where the pump 14 is used as the dispensing mechanism, inlet and outlet valves 16, 18 can be sequentially activated to assist in controlling the rate of flow at which the product is drained. In this case, the outlet valve 18 is disposed between the product tank 10 and a dispensing end 20 of the filling tube 12. The inlet valve 16 is disposed between the outlet valve 18 and the product tank 10. The pump 14 is disposed between the inlet valve 16 and the outlet valve 18. The method is then carried out as follows.

First, the outlet valve 18 is closed. Next, the inlet valve 16 is opened. A return stroke of a piston

22, as indicated by the arrow in FIG. 1, of the pump 14 is activated when or as the inlet valve 16 is opened. The product then drains into a region 24 of the filling tube 12 between the product tank 10 and the outlet valve 18. The inlet valve 16 is then closed, and then the outlet valve 18 is opened. As the outlet valve 18 is opened, a forward stroke of the piston 22, as indicated by the arrow in FIG. 2, is activated. The product then drains through a second region 26 of the filling tube 12 between the outlet valve 18 and the dispensing end 20 of the filling tube 12.

As the product drains out of the dispensing end 20 of the filling tube 12, the product must enter a clean draining environment, or it may become contaminated and unusable. As illustrated in FIGS. 1 and 2, the draining environment can include a clean chamber 28 formed by a cleaning box and a clean, automated cover as is discussed more fully in U.S.S.N. 08/316,109 (Corporate Docket No. TRX-0101; Attorney Docket No. 10586US01), filed on even date herewith and incorporated by reference. A drain pipe 30 can be connected to, for example, a lower end of the clean chamber 28. The product can then drain into the clean chamber 28 and

through the drain pipe 30. The illustrated system is a closed system that includes a vent pipe, such a system being disclosed in U.S.S.N. 08/315,958 (Corporate Docket No. TRX-0099; Attorney Docket No. 10580US01), filed on
5 even date herewith and hereby incorporated by reference.

In order to prevent the product from splashing as it enters the clean chamber 28, the pump 14 is operated at a slower rate than a rate at which the product is dispensed into a container during a production cycle.
10 The slower rate can, for example, be 50% or less of the rate at which the product is dispensed. More specifically, the slower rate may be 10-25% of the rate at which the product is dispensed.

FIG. 3 is an exemplary timing diagram illustrating
15 operation of the inlet valve 16, shown at line 32, the outlet valve 18, shown at line 34, and the pump 14, shown at line 36.

Although the present invention has been described with reference to specific embodiments, those of skill
20 in the art will recognize that changes may be made thereto without departing from the scope and spirit of the invention as set forth in the appended claims.

WE CLAIM AS OUR INVENTION:

1. A clean, automated product draining method for a packaging machine comprising the following steps:

(a) draining product from a product tank
5 through a filling tube; and

(b) controlling a rate of step (a) with a dispensing mechanism, wherein the product is drained at a slower rate than a rate at which the product is dispensed into a container during a production cycle.

10 2. A clean, automated product draining method according to claim 1 wherein the dispensing mechanism further comprises a pump, and wherein step (b) further comprises the following steps:

(1) sequentially closing an outlet
15 valve, disposed between a product tank and a dispensing end of a filling tube in a packaging machine, and opening an inlet valve, disposed between the outlet valve and the product tank; and

20 (2) activating a return stroke of a piston of the pump, disposed between the

inlet valve and the outlet valve during
step (1).

3. A clean, automated product draining method
according to claim 2, further comprising the
5 following step:

(3) draining, into a region of a
filling tube between the product tank and
the outlet valve, product remaining in the
product tank.

10 4. A clean, automated product draining method
according to claim 3, further comprising the
following step:

(4) closing the inlet valve.

5. A clean, automated product draining method
15 according to claim 4, further comprising the
following step:

(5) opening the outlet valve.

6. A clean, automated product draining method
according to claim 5, further comprising the

following step:

(6) activating a forward stroke of the piston during step (5).

7. A clean, automated product draining method according to claim 5, further comprising the following step:

(7) draining the product through the dispensing end of the filling tube.

8. A clean, automated product draining method according to claim 1, further comprising the steps of:

forming a clean, closed chamber ; and
draining the product from the product tank into the chamber.

9. A clean, automated product draining method according to claim 8, further comprising the step of:

draining the product from the chamber into a drain pipe.

10. A clean, automated product draining method

according to claim 1 wherein the rate of step (a) is less than 50% of the rate at which the product is dispensed into a container during a production cycle.

11. A clean, automated product draining method
5 according to claim 1 wherein the rate of step (a) is 10-25% of the rate at which the product is dispensed into a container during a production cycle.

12. A clean, automated product draining method
for a packaging machine comprising the following
10 steps:

(a) closing an outlet valve disposed between a product tank and a dispensing end of a filling tube in a packaging machine;

(b) opening an inlet valve disposed between the
15 outlet valve and the product tank;

(c) activating a return stroke of a piston disposed between the inlet valve and the outlet valve during step (b);

(d) draining into a region of a filling tube
20 between the product tank and the outlet valve product remaining in the product tank;

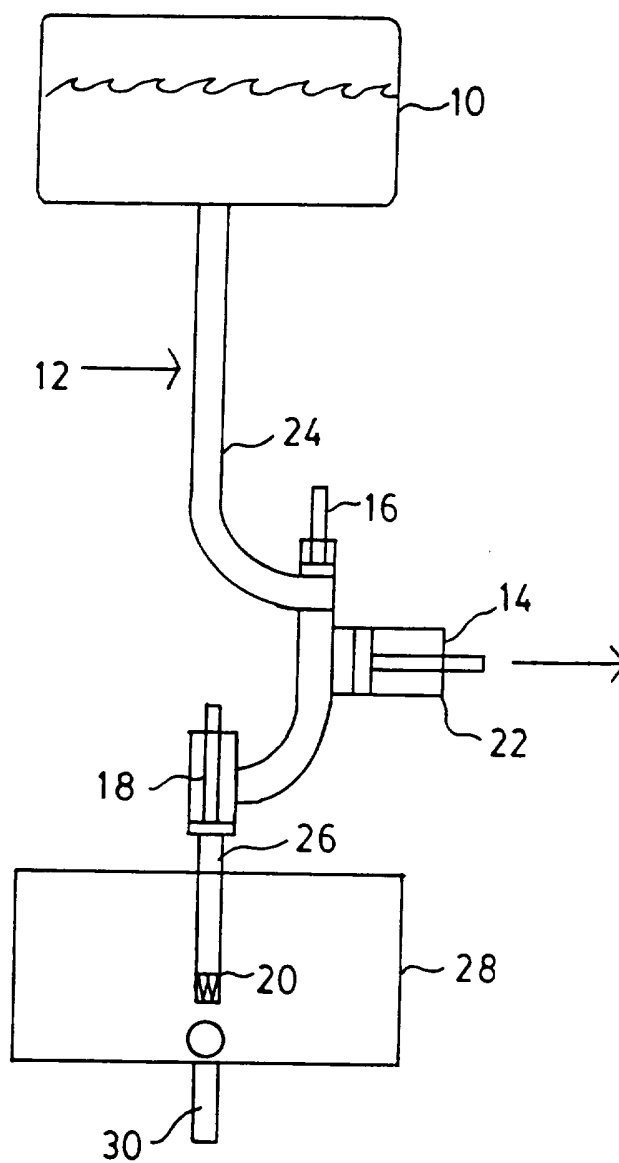
- (e) closing the inlet valve;
 - (f) opening the outlet valve;
 - (g) activating a forward stroke of the piston during step (f); and
- 5 (h) draining the product through the dispensing end of the filling tube.

13. A clean, automated product draining method for a packaging machine comprising the following
10 steps:

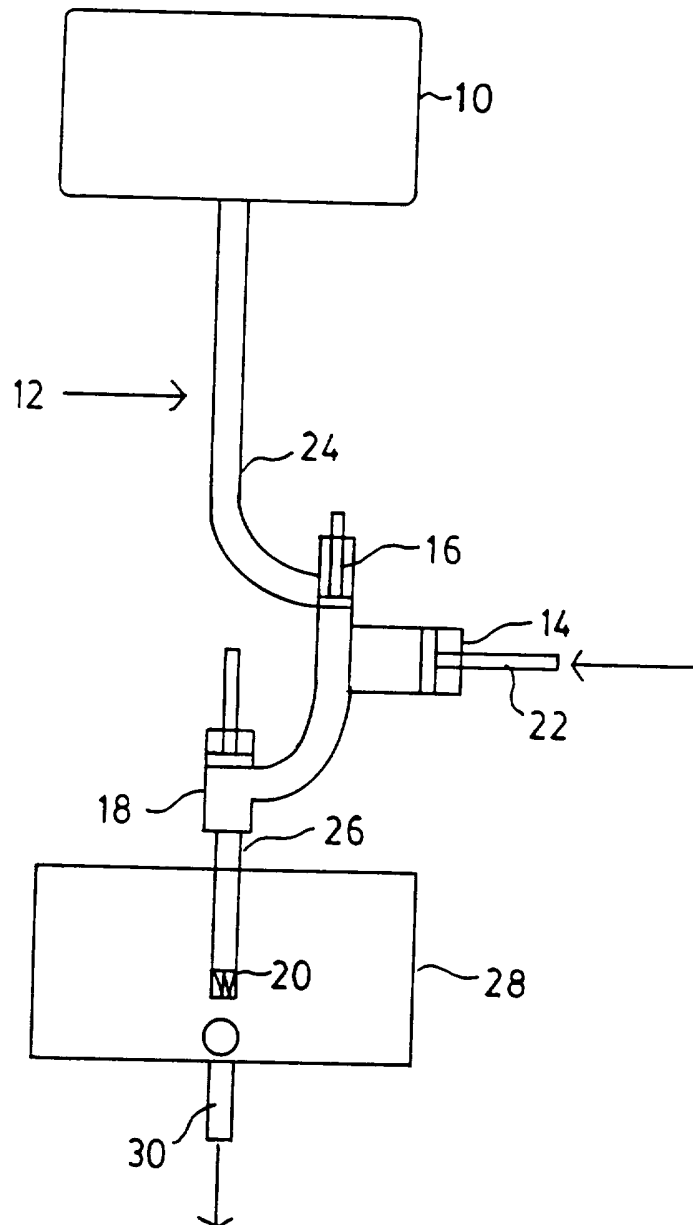
- draining product from a product tank into an upper region of a filling tube at a controlled rate following the completion of a production cycle of the packaging machine; and
- 15 draining the product into a lower region of the filling tube at a controlled rate.

14. A clean, automated product draining method according to claim 13 wherein the controlled rate is
20 10-25% of the rate at which the product is dispensed into a container during a production cycle.

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FIG. 1

2/3

FIG. 2

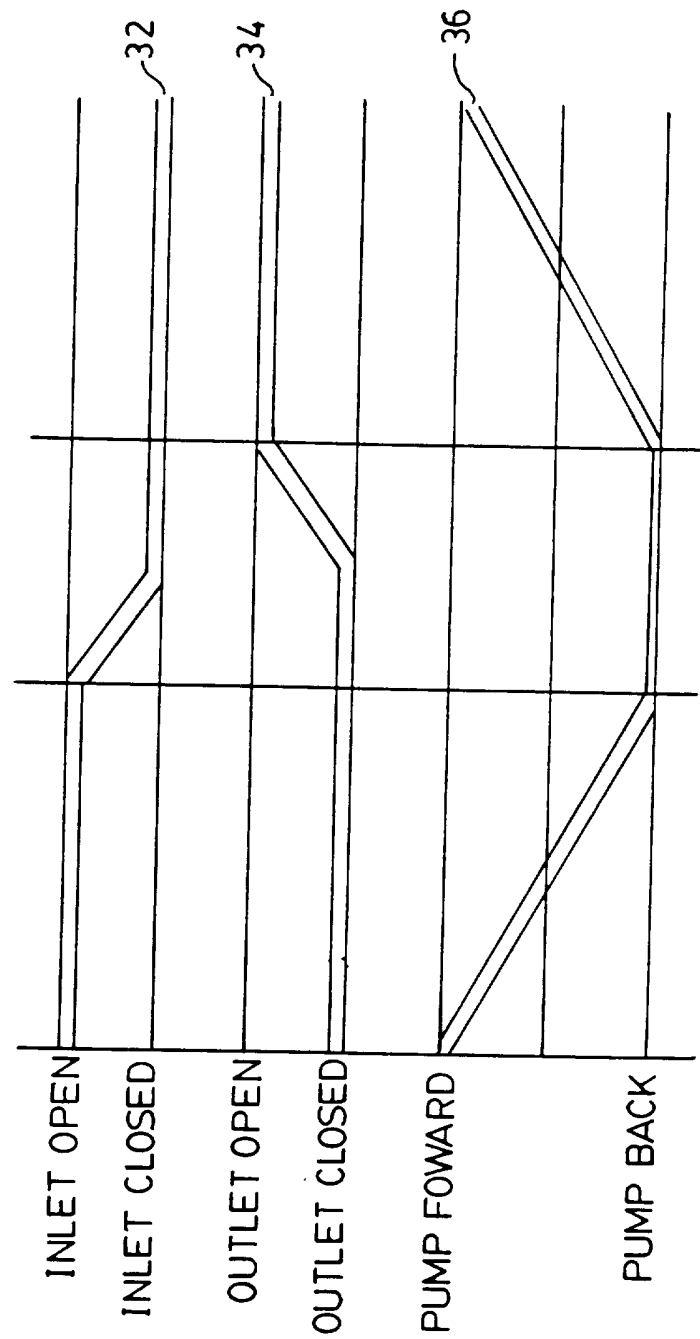


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US95/11517

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : B65B 3/00

US CL : 141/1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 141/1, 86, 87, 89-92, 115-117, 121-123

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS, search terms: drain (p) tank (p) empty? (p) fill tube and 141/1, 85-93.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	US, A, 2,141,618 (ROGE) 27 DECEMBER 1938, SEE PAGE 2, RIGHT COLUMN, LINES 11-19.	1-7, 10-14
X	US, A, 5,348,058 (RUHL) 20 SEPTEMBER 1994, SEE COLUMN 4, LINES 47-49.	12, 13
----- Y		----- 1-11, 14
Y	US, A, 3,195,585 (FECHHEIMER) 20 JULY 1965, SEE COLUMN 2, LINES 1-29.	1-11, 14

☐ Further documents are listed in the continuation of Box C.
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07 NOVEMBER 1995

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