



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



Publication number:

**0 351 899 B1**

12

## EUROPEAN PATENT SPECIFICATION

- 49 Date of publication of patent specification: **28.09.94** 51 Int. Cl.<sup>5</sup>: **B41F 31/02**
- 21 Application number: **89201477.0**
- 22 Date of filing: **08.06.89**

54 **Device for the total emptying of large-size ink containers having a low degree of flowability.**

30 Priority: **22.07.88 IT 2144988**

43 Date of publication of application:  
**24.01.90 Bulletin 90/04**

45 Publication of the grant of the patent:  
**28.09.94 Bulletin 94/39**

84 Designated Contracting States:  
**AT BE CH DE ES FR GB GR IT LI LU NL SE**

56 References cited:  
**EP-A- 0 227 232**  
**FR-A- 2 203 772**  
**US-A- 4 534 493**  
**US-A- 4 632 281**  
**US-A- 4 635 820**

73 Proprietor: **TOTAL INCHIOSTRI S.p.A.**  
**Via Vittor Pisani, 16**  
**I-20124 Milano (IT)**

72 Inventor: **Orlandi, Paolo**  
**Piazzale Dateo, 2**  
**I-20129 Milano (IT)**

74 Representative: **Mittler, Enrico et al**  
**c/o Marchi & Mittler s.r.l.**  
**Viale Lombardia, 20**  
**I-20131 Milano (IT)**

**EP 0 351 899 B1**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

## Description

The present invention relates to a device for the total emptying of large-size containers for ink having a low degree of flowability.

Modern ink used in super-fast heat-set reel printing machines is notoriously characterized by a high degree of thixotropy and thus by extremely low qualities of flowability.

There has been in use for some time a valid system for feeding the ink fountains of printing machines when the ink is packaged in 200 kg containers having total opening.

The system includes a piston pump operated by compressed air inserted directly from above into the container and integrally connected to a pressing plate forming a perfect airtight seal. The plate has the function of scraping the walls of the container perfectly and promoting with its descent the feeding of the ink to the pump's intake mouth.

The problem started when 1000 kg containers began to be used instead of the 200 kg size. In fact, with these containers, different requirements had to be met such as:

- a) a high adherence to the container's inner walls;
- b) a highly flexible gasket to adapt to the inevitable ovalization of the container's wall;
- c) the lowest possible friction between gasket and container so as not to hamper the plate's descent;
- d) a gasket of a material able to resist chemically;
- e) a non-sinkable plate;
- f) the descent of the plate to be executed in a constantly horizontal manner.

US-A-4632281 discloses a fluid dispensing system according to the preamble of claim 1.

Emptying devices are also known from US-A-4534493, US-A-4632281 and US-A-4635820, in which complicated mechanisms are provided to cause descent of the pressing plate and ink delivering.

EP-A-0227232 discloses a system for feeding ink from ink containers, which includes suction pumps and follower plates which move down the tanks as ink is consumed.

According to the invention and emptying device has been accomplished for large-size containers, having the construction defined in claim 1.

Preferably, the concavity of the pressing plate's lateral wall is of a circular shape, and the annular gasket is stressed against the container's inner wall and in spaced relationship with the lateral wall of the container at both its end lips.

Still preferably, the gasket is accomplished in flexible PVC.

In the claimed device the gasket adapts easily to any ovalization of the container, it has a high adherence to the container's inner wall and, at the same time, it creates limited friction, which does not hamper the descent of the plate. An appropriate size also ensures the pressing plate's unsinkability.

A further feature of the present invention is represented by the fact that the pressing plate is provided with a guide tube which extends axially upwards from the centre of the plate and slidably engages the top of the container.

In this way the pressing plate can maintain itself constantly horizontal during its downward stroke.

The suction pump associated with the bottom of the container, below the pressing plate, provides for ink delivering and further assists in the descent of the pressing plate even in the case of some slight oozing of ink through the gasket's engagement area.

An example of an embodiment of the present invention is illustrated for greater clarity, out with no limiting intention, in the enclosed drawings, wherein:

Fig. 1 shows schematically, partly as a view and partly in cross-section, a large-size container provided with an emptying device according to the invention;

Fig. 2 shows the enlarged detail of the pressing plate and its corresponding gasket, of which said emptying device is constituted.

Fig. 1 shows a container 1, having a cylindrical lateral wall 2, a top wall 3 provided with a feed opening 4 having an openable cover 5, and a bottom wall 6 having a supply hole 7.

From the supply hole 7 there extends laterally a conduit 8, which a flexible union 9 connects to the inlet of a piston pump 10 operated by a motor 11 and provided with an outlet conduit 12.

Inside the container 1 there is slidably housed a pressing plate 13, with a lateral wall having circular concavity 14 (Fig. 2), wherein a flexible gasket in PVC 15 is inserted in the form of a cylindrical ribbon. The gasket 15 is held by a clamp 16, which in combination with the above concavity confers on the gasket a corresponding concave shape which determines the friction contact between the gasket and the container's lateral wall only at two extreme lips 17 and 18.

At the centre of the pressing plate 13 there is welded and strengthened with gussets 19 a receiving opening 20 for a vertical tube 21, which extends upwards and passes slidably through the feed opening 4 and a lower guide hole 22 in the plate 23 (Fig. 1).

Lastly the pressing plate is provided with a hole 24 with a vent valve 25 (Fig. 2).

During operations, the pressing plate 13 pushes the underlying ink contained in the container 1 towards the supply hole 7. The ink is sucked up by the piston pump 10 and sent to the outlet conduit 12.

The gasket 15 is airtight with the container's lateral wall 2 at the lips 17 and 18, thus limiting friction with the above wall 2. The tube 21 together with the guide hole 22 ensures the constant horizontal disposition of the plate 13 during its descent. The venting hole 24 with the valve 25 allows the air to be vented from under the plate 13 when required.

### Claims

1. An emptying device for the total emptying of large-size containers for ink having a low degree of flowability, including a pressing plate (13) sliding vertically inside the container (1) and provided with a concave lateral wall (14) and an annular gasket (15) surrounding said pressing plate (13) and having a corresponding concave cross-section shape with a central portion held against such concave lateral wall (14) of the pressing plate (13) and two end lips (17, 18), at least a lower one of which is in friction and sealing contact with a lateral wall (2) of the container, characterized in that it also includes a suction pump (10) interposed between the container's bottom (6) and an outlet conduit (12), and said lower end lip (17) of the annular gasket (15) is resiliently stressed against said lateral wall (2) of the container (1) and in spaced relationship with respect to said concave lateral wall (14) of the pressing plate (13).
2. Device according to claim 1, characterized in that said gasket (15) is of PVC.
3. Device according to claim 1, characterized in that said concave lateral wall (14) of the pressing plate (13) has circular concavity and that said gasket (15) is held inside it so as to be stressed against the container's lateral wall (2) and in spaced relationship with the lateral wall (14) of the pressing plate (13) at its end lower (17) and upper (18) lips.
4. Device according to claim 1, characterized in that said pressing plate (13) is provided with a guide tube (21), which extends vertically upwards from the centre of the plate and slidably engages with a guide hole (22) on the top of the container.

### Patentansprüche

1. Entleerungsvorrichtung zum vollständigen Entleeren von großbemessenen Behältern für Farbe, welche ein geringes Fließvermögen hat, welche eine Preßplatte (13) umfaßt, die gleitbeweglich vertikal im Inneren des Behälters (1) angeordnet ist und mit einer konkaven Seitenwand (14) und einer ringförmigen Dichtung (15) versehen ist, welche die Preßplatte (13) umgibt und eine entsprechende konkave Querschnittsgestalt mit einem Mittelteil hat, welcher gegen die konkave Seitenwand (14) der Preßplatte (13) anliegt und zwei endseitige Lippen (17, 18) hat, von denen wenigstens die untere in Reibschluß- und Dichtungskontakt mit der Seitenwand (2) des Behälters ist, **dadurch gekennzeichnet**, daß sie auch eine Saugpumpe (10) umfaßt, welche zwischen dem Boden (6) des Behälters und einer Ausableitung (12) angeordnet ist, und daß die untere endseitige Lippe (17) der ringförmigen Dichtung (15) federnd nachgiebig gegen die Seitenwand (2) des Behälters (1) und in einem Abstand bezüglich der konkaven Seitenwand (14) der Preßplatte (13) gespannt ist.
2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß die Dichtung (15) aus PVC besteht.
3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß die konkave Seitenwand (14) der Preßplatte (13) kreisförmig konkav ausgestaltet ist, und daß die Dichtung (15) im Inneren derselben derart gehalten ist, daß sie gegen die Seitenwand (2) des Behälters unter einem Abstand zu der Seitenwand (14) der Preßplatte (13) an ihren unteren endseitigen Lippen (17) und ihren oberen endseitigen Lippen (18) gespannt ist.
4. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß die Preßplatte (13) mit einem Führungsrohr (21) versehen ist, welches vertikal von dem Mittelteil der Platte nach oben verläuft und gleitbeweglich mit einer Führungsöffnung (22) an der Oberseite des Behälters zusammenarbeitet.

### Revendications

1. Dispositif de vidange servant à vider entièrement des récipients de grande dimension destinés à contenir une encre ayant un faible degré de fluidité, qui comprend un plateau de pression (13) qui coulisse verticalement à l'intérieur du récipient (1) et est muni d'une paroi

- latérale concave (14) et d'une garniture d'étanchéité annulaire (15), laquelle entoure ledit plateau de pression (13) et possède une forme de section concave correspondante qui comprend une partie centrale tenue contre ladite paroi latérale concave (14) du plateau de pression (13) et deux lèvres terminales (17, 18) dont au moins une, la lèvre inférieure, est en contact frottant et de joint étanche avec une paroi latérale (2) du récipient, caractérisé en ce qu'il comprend aussi une pompe d'aspiration (10) interposée entre le fond (6) du récipient et un conduit de sortie (12), et ladite lèvre d'extrémité inférieure (17) de la garniture d'étanchéité annulaire (15) est pressée élastiquement contre ladite paroi latérale (2) du récipient (1) et espacée de ladite paroi latérale concave (14) du plateau de pression (13).
- 5
- 10
- 15
2. Dispositif selon la revendication 1, caractérisé en ce que ladite garniture d'étanchéité (15) est faite de PVC. 20
3. Dispositif selon la revendication 1, caractérisé en ce que ladite paroi latérale concave (14) du plateau de pression (13) possède une concavité circulaire et que ladite garniture d'étanchéité (15) est tenue dans cette paroi de manière à être pressée contre la paroi latérale (2) du récipient et à être espacée de la paroi latérale (14) du plateau de pression (13) au niveau de ses lèvres terminales inférieure (17) et supérieure (18). 25
- 30
4. Dispositif selon la revendication 1, caractérisé en ce que ledit plateau de pression (13) est muni d'un tube de guidage (21) qui s'étend verticalement vers le haut en partant du centre du plateau et qui coulisse dans un trou de guidage (22) de la paroi supérieure du récipient. 35
- 40

45

50

55



Fig. 2

