



(11)

EP 3 189 968 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
12.07.2017 Bulletin 2017/28

(51) Int Cl.:
B41F 7/02 (2006.01) B41F 7/32 (2006.01)

(21) Application number: **15837884.4**

(86) International application number:
PCT/BR2015/050141

(22) Date of filing: **04.09.2015**

(87) International publication number:
WO 2016/033672 (10.03.2016 Gazette 2016/10)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

• **Morcerf, Cronge Dias**
27325-770 Rio de Janeiro (BR)

(72) Inventors:
• **Vergele, Antonio Pedro**
24230-240 Rio de Janeiro (BR)
• **Morcerf, Cronge Dias**
27325-770 Rio de Janeiro (BR)

(30) Priority: **04.09.2014 BR 202014021955 U**

(74) Representative: **Potter Clarkson LLP**
The Belgrave Centre
Talbot Street
Nottingham NG1 5GG (GB)

(71) Applicants:
• **Vergele, Antonio Pedro**
24230-240 Rio de Janeiro (BR)

(54) **SET OF DEVICES FOR IMPROVING THE OFFSET PRINTING SYSTEM**

(57) The present utility model relates to the set of devices for the offset printing system, which devices reduce the water surface tension which is thus more uniformly distributed on the offset plate allowing the surface thereof to be dampened with a smaller quantity of water. The present utility model achieves excellent offset printing quality with only 20% of the amount of dampening solution which is normally used, and 0% isopropyl acid, which is also regularly used in Alcolor printers.

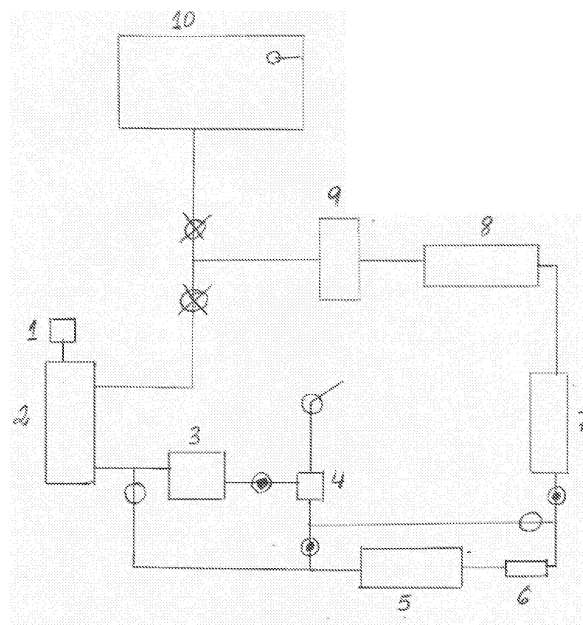


Figure 1

Description

TECHNICAL FIELD

[0001] The present utility model relates to a set of devices for improving the offset printing system. More specifically, the utility model modifies the molecular structure of water by reducing the surface tension so that a smaller amount of water can wet a larger area of the printing plate of the offset system.

BACKGROUND ART

[0002] Offset printing is a planographic process whose essence consists of repulsion between water and grease (greasy paint).

The term off-set comes from "offset lithography" (literally, out-of-place lithography), making reference to indirect printing (in lithography, printing was direct with paper having direct contact with the matrix).

[0003] Nowadays in the offset printing system, a wetting solution or simply source solution composed of several chemicals is used. Among the chemicals that make up a wetting solution there are water, glycol, acids, bases, natural gum, detergent, fungicide, bactericide and others.

[0004] The wetting solution reduces the water surface tension, helps to wash the grease off the offset plate and eliminates fungi and bacteria but has serious drawbacks, such as favoring the emulsification of the paint that causes imbalance during the process with consequent increase of dot gain, loss of brightness, loss of drying, increased ink consumption and paper breakage in the rotary printers, shortening of blanket and roll life and the disposal of water from the wetting system with high level of chemicals.

[0005] There are printers that use isopropyl alcohol in the offset printing process, which help the wetting system by reducing tarnish and possible print defects. This product causes strong smell in the printing room, is aggressive in direct contact with the skin, besides being another chemical for disposal.

[0006] International Patent Application PCT/JP2007/074167 on behalf of NIPPON LITHOGRAPH, INC. and entitled "system for providing dampening water by lowering the surface tension of water to be used in offset printing, so-called lithographic printing system" describes a water treatment system for providing wetting solution for offset printing which comprises: a channel through which water can flow; a processor for magnetically treating the water passing through the channel; and a photocatalytic processor for photocatalytically treating the water passing through the channel. The abovementioned document reduces 100% of the wetting solution and isopropyl alcohol by 100%.

SUMMARY OF THE INVENTION

[0007] The present utility model will provide significant advantages over the devices used in the offset printing system, allowing an increase of its performance and presenting a more favorable cost-benefit ratio.

[0008] The present utility model refers to a set of devices for improving the offset printing system.

[0009] Specifically, the present utility model modifies the molecular structure of water by reducing the surface tension so that a smaller amount of water can wet a larger area of the printing plate of the offset system.

[0010] The world is increasingly focused on preservation and sustainability of nature and in this context the present utility model was developed for new printers to reduce 100% the use of the wetting solution, which is composed of several chemicals and isopropyl alcohol by 100% in Alcolor printers. In used printers if there are gaps in the rollers there will be a reduction of up to 80% the use of the wetting solution which is composed of several chemicals and isopropyl alcohol by 100% in Alcolor printers.

[0011] The present utility model reduces the water surface tension, which is distributed with better uniformity in the offset plate, thus allowing wetting an area with less water.

[0012] The lower the amount of water in the wetting system of an offset printer, the better the print quality will be. By reducing the system water automatically, the ink load should be reduced resulting in a lower emulsification index as a consequence.

BRIEF DESCRIPTION OF DRAWINGS

[0013] The structure and operation of the present utility model together with additional advantages thereof may be better understood by reference to the accompanying drawings and the following descriptions:

Figure 1 shows a flowchart with the devices present in one embodiment of the present utility model; Figure 2 shows a front view of the devices present in one embodiment of the present utility model; and Figure 3 shows the system devices for improving the offset printing system of one embodiment of the present utility model.

DETAILED DESCRIPTION OF THE INVENTION

[0014] While the present utility model may be susceptible to different embodiments, the preferred embodiment is set forth in the following detailed description with the understanding that it should be considered exemplary of the principles of the invention and is not intended to limit the scope of the present utility model to what has been illustrated and described herein.

[0015] The offset printing system is comprised of a mutual rejection between water and paint. The offset plate

is composed by graphics and counter-graphics areas. In the graphics area there is a pre-sensitive layer with lipophilic characteristic that rejects the water and has affinity with the ink for being oily. In the counter-graphics area is the aluminum substrate with cavities that accumulate tiny droplets of water with hydrophilic characteristics that reject the paint.

[0016] The present utility model reduces the water surface tension, which is distributed with better uniformity in the offset plate, thus allowing to wet an area with less water.

[0017] The lower the amount of water in the wetting system of an offset printer, the better the print quality will be. By reducing the system water automatically, the ink load should be reduced resulting in a lower emulsification index as a consequence.

[0018] The present utility model allows the desired water-ink balance to be gained, such as:

- balance of printing throughout the process;
- lower point gain;
- higher brightness;
- better ink drying;
- ink consumption savings;
- paper consumption savings;
- Less paper shredding on rotating printers.

[0019] The present utility model is composed of the following devices:

(1) - Cartridge filter - to minimize the amount of molecular residues and particulates present in the water from the public network, thus avoiding accumulation of impurities in the bottom of the lung tank.

(2) - Lung tank - storing public water treated by this utility model and feeding the metering tank with electric float. The return of the tubs falls into the metering tank without having contact with the lung tank.

(3) Refrigerator - coupled to the lung tank that stores the water treated by the present utility model while maintaining the temperature between 12 - 16°C. The water treated by the present utility model already promotes very low emulsification level of the paint and keep with the temperature between 12 - 16°C, reducing even more the possibility of emulsifying. When printers work at high speed, the print cylinders reach high temperatures, which are undesirable for the process, so cooled water helps the performance of the offset printing process.

(4) - Special cartridge filter of a micro for backwashing - to minimize the amount of molecular residues and particles that may be present in the water from the public network, thus avoiding clogging in the paths that the water will go through in the present utility model. This optimizes the process without interrupting the offset printing process for filter washing.

(5) - Return pump.

(6) - Rotor for measuring liters/minute treated by the present utility model;

(7) Magnetic device - to obtain a good offset printing, it is known that reduction of surface tension and increase of water conductivity are important factors. The development of this utility model has always been based on practical PRELLO offset printing tests with wetting system. PRELLO is equipment that faithfully reproduces the printing proofs that will serve as the standard to guide the printer in the execution of the work.

[0020] Several studies have shown that water flowing with turbulent flow through certain magnetic field arrays has reduced surface tension and increased conductivity. We prepared several magnetic field arrays that were submitted to PRELLO's practical test and finally we arrived at a model that allowed to make an excellent offset printing with only 20% wetting solution that is used regularly and 0% isopropyl alcohol also regularly used in Alcolor printers.

[0021] Several studies have shown that water flowing with turbulent flow through certain magnetic field arrays has reduced surface tension and increased conductivity.

[0022] Therefore, several magnetic field arrays were prepared that were submitted to PRELLO's practical test and finally a model was obtained that allowed an excellent offset printing with only 20% wetting solution that is used regularly and 0% isopropyl alcohol also regularly used in Alcolor printers.

(8) - Filter with UV lamp - consists of a UV-C lamp and a special impregnated fabric with titanium dioxide. UV light irradiated on the surface of the impregnated fabric with titanium dioxide with energy equal to or greater than band gap energy, moves one of its electrons from one field of the molecule to another field and, thus, the valence bands are formed. When the UV irradiation is interrupted, the photocatalyst returns to the initial state. In the water absorbed in the impregnated fabric with titanium dioxide these gaps of valence bands generate highly oxidizing hydroxyl radicals that decompose organic compounds. Its oxidizing power is greater than that of ozone and fluorine.

(9) - (O₂) eliminator

(10) - during the water treatment process and especially in the passage through the filter with UV lamp, occurs the formation of O₂ which is eliminated at this stage.

[0023] Therefore, as can be seen in the operation of the present utility model, the water from the public network passes through the cartridge filter (1) for the return pump (5), through the magnetic device (7), through the special filter with UV lamp (8), through the O₂ eliminator (9), through the refrigerator (3) and finally to the lung tank (2).

[0024] Figure 1 shows a flowchart with the devices present in one embodiment of the present utility model, wherein (1) represents the cartridge filter, (2) lung tank, (3) refrigerator, (4) special cartridge filter for backwashing (5) pump, (6) rotameter, (7) magnetic device, (8) UV filter with photocell, (9) O₂ eliminator and (10) represents the return tank of the printer. This tank only receives water from the lung tank, but no water from it goes to the lung tank thus avoiding contamination of the whole system.

[0025] The components of the electrical part are: circuit breaker; water solenoid, photocell, buzzer, timer, hour meter, electric float, buttonhole and reactor.

[0026] Figure 2 shows a front view of the printing system devices, wherein (1) and (2) represent a metal tube, (3) represents a metal ring, (4) represents a sealing ring, (5) represents a quick coupling, (6) represents a flange, (7) represents an adjusting ring, (8) represents a metal tube, (9) represents a magnet and (10) represents a metal threaded bush

[0027] Figure 3 shows the system devices for improving the offset printing system of one embodiment of the present utility model, wherein (1) represents a special fabric impregnated with titanium dioxide, (2) represents a synthetic tube, (3) represents a glass tube, (4) represents a UV lamp, (5) represents a synthetic flange, (6) represents a photocell, (7) represents a quick coupler, (8) represents a fixing bar and (9) represents a metal nut.

[0028] In view of the foregoing, it is apparent to one skilled in the art that the present utility model has the following advantages over the prior art:

It is ecologically correct, reducing 80% of the chemical wetting solution and isopropyl alcohol by 100%; Reduced ink consumption by working with less water on the printing plate due to the reduced water surface tension. When we reduce the wetting water compulsorily we have to lower the ink load.

[0029] Reduced paper consumption by faster cleaning of printer machine startup.

[0030] Excellent ink transfer, balance throughout the printing process, better drying and brightness, lower point gain among other benefits due to the low emulsification of the ink.

[0031] Increases the life of blanket and printer rolls that are harmed by the wetting solution and isopropyl alcohol; and

[0032] Lower aggressiveness to health of employees working at the printer.

[0033] Thus, although only some embodiments and exemplifications of the present utility model have been presented, it is known that various omissions, substitutions and changes in the set of devices for improving the offset printing system can be accomplished by a skilled person without departing from spirit and scope of this utility model.

[0034] It is expressly provided that all combinations of elements performing the same function in substantially

the same way, to achieve the same results, are within the scope of the present utility model. Substitutions of elements from one embodiment described to another are also contemplated in this utility model.

Claims

1. A set of devices for the offset printing system **characterized in that** it comprises:

- (1) cartridge filter;
- (2) lung tank;
- (3) refrigerator;
- (4) cartridge filter of a micro with backwash;
- (5) return pump;
- (6) rotameter;
- (7) magnetic device;
- (8) filter with UV lamp;
- (9) O₂ eliminator; and

Components of the electrical part.

2. A set of devices for the offset printing system according to claim 1, **characterized in that** the refrigerator is coupled to the lung tank which stores the treated water at a temperature between 12-16°C.

3. A set of devices for the offset printing system according to claim 1, **characterized in that** it uses only 20% of wetting solution and is free of isopropyl alcohol.

4. A set of devices for the offset printing system according to claim 1, **characterized in that** the filter with UV lamp (8) consists of a UV-C lamp and a special fabric impregnated with titanium dioxide and photocell.

5. A set of devices for the offset printing system according to claim 1, **characterized in that** the components of the electrical part comprise a circuit breaker; a water solenoid, a photocell, a buzzer, a timer, an hour meter, an electric float, buttonhole and a reactor.

6. A set of devices for the offset printing system according to claim 1, **characterized in that** the lung tank stores the treated water and feeds the dosing tank with an electric float.

7. A set of devices for the offset printing system according to claim 1, **characterized in that** the water from the public network passes through the cartridge filter (1) for a return pump (5), passes through the magnetic device (7), then by the special filter with UV lamp (8), then by the O₂ eliminator (9), the refrigerator (3) and finally to the lung tank (2).

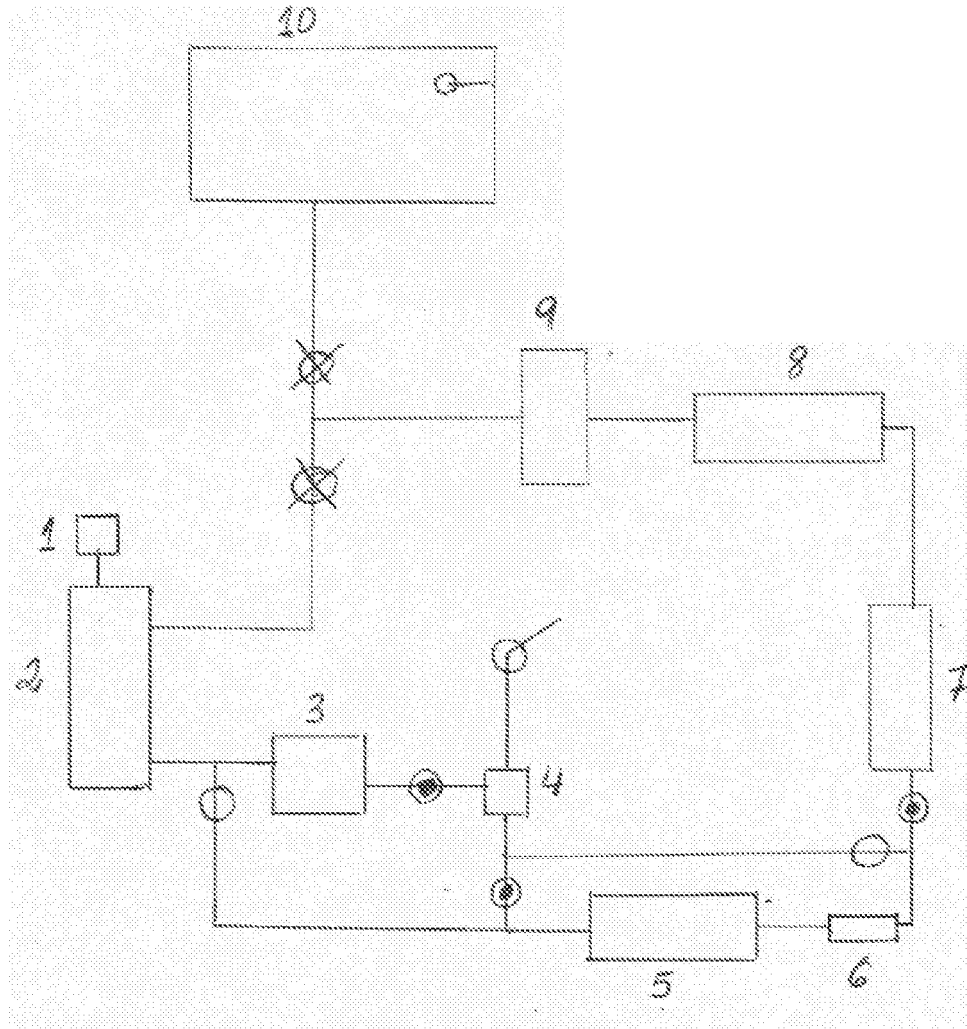


Figure 1

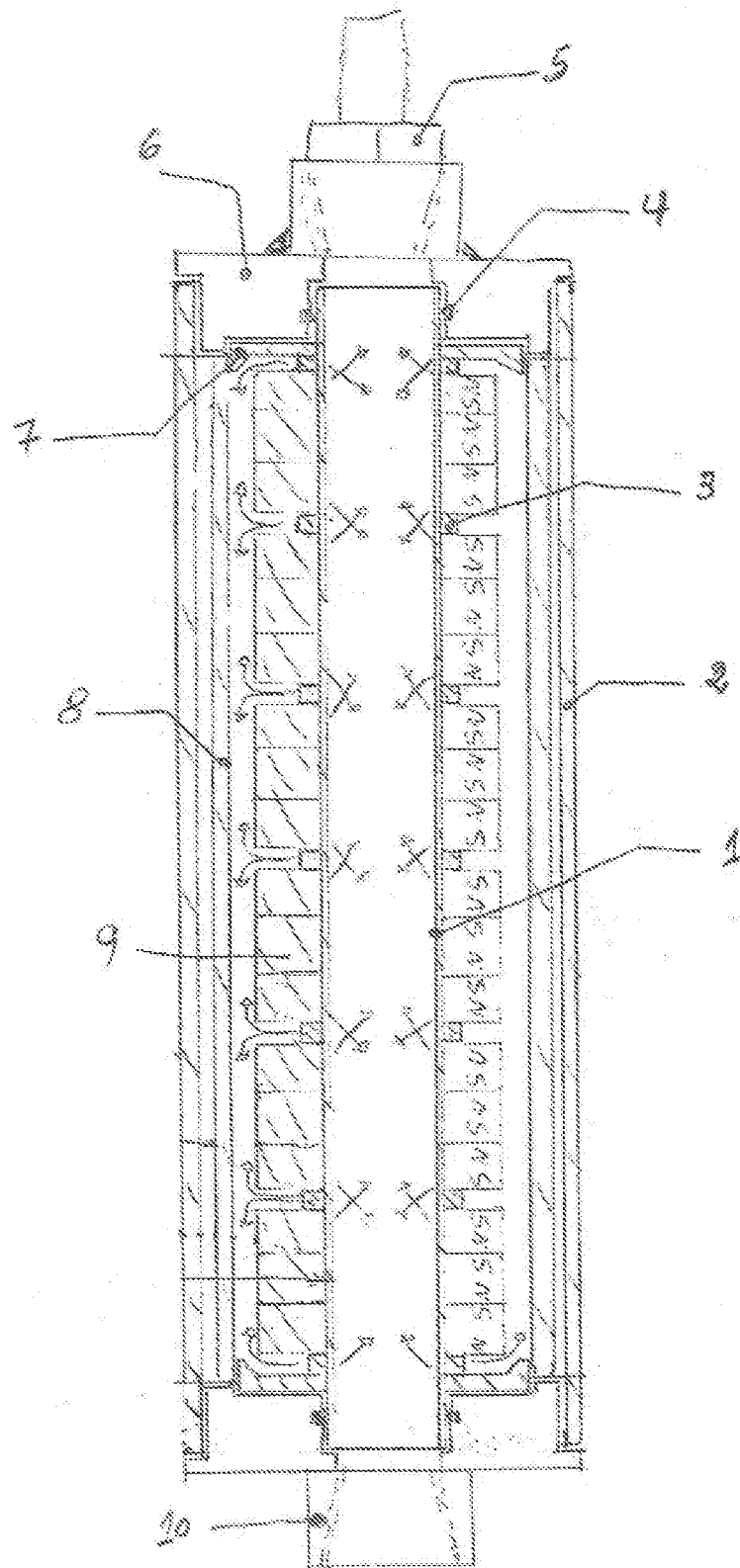


Figure 2

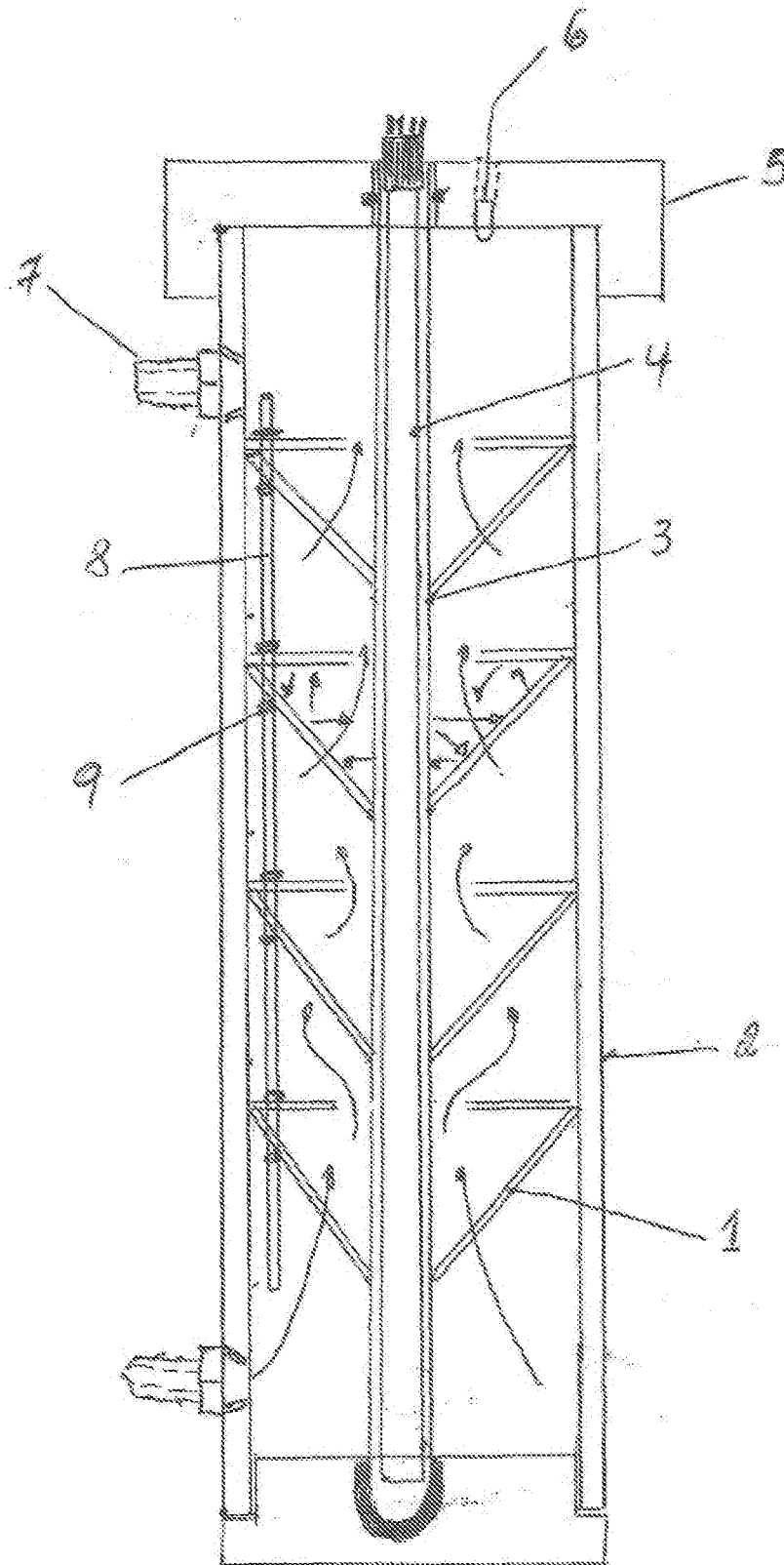


Figure 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/BR2015/050141

A. CLASSIFICATION OF SUBJECT MATTER
B41F7/02 (2006.01), B41F7/32 (2006.01)

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)

IPC 2006.01 - B41F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

INPI/BR

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2010179529 A (SAKATO KK) 19 August 2010 (19-08-2010) Paragraph 29, in the descriptive report	2
Y	JP 2008265021 A (MIHARA RYOJU ENGINEERING CO LT) 06 November 2008 (06-11-2008) Paragraphs 2 and 3, in the descriptive report	2
A	CN 203528039 U (SUN YUE) 09 April 2014 (09-04-2014)	
A	JP 2000351193 A (ST ENGINEERING KK) 19 December 2000 (09-04-2014)	

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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

"&" document member of the same patent family

Date of the actual completion of the international search

04 January 2016

Date of mailing of the international search report

06/01/2016

Name and mailing address of the ISA/**BR**
INSTITUTO NACIONAL DA
PROPRIEDADE INDUSTRIAL
+55 21 3037-3663 Rua Sao Bento nº 1, 17º andar
Facsimile No. cep: 20090-010, Centro - Rio de Janeiro/RJ

Authorized officer

Raul Flores da Fonseca

Telephone No.

+55 21 3037-3493/3742

INTERNATIONAL SEARCH REPORT

International application No.

PCT/BR2015/050141

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP H06171061 A (TOPPAN PRINTING CO LTD) 21 June 1994 (21-06-1994)	
A	JP H05330009 A (SAKATA INKS) 14 December 1993 (14-12-1993)	
A	JP S61163858 A (TOPPAN PRINTING CO LTD) 24 July 1986 (24-07-1986)	
A	JP S5591671 A (NITSUKEI SHOJI KK) 11 July 1980 (11-07-1980)	
A	GB 1393856 A (HEIDELBERGER DRUCKMASCH AG) 14 May 1975 (14-05-1975)	

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/BR2015/050141

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

The subject matter of claim 3 is claimed in terms of the result obtained, which is the same as stating the problem addressed without indicating the technical features necessary for achieving this result, leading to a lack of clarity and contravening PCT Article 6.
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/BR2015/050141

5	CN 203528039 U	2014-04-09	NONE	
	JP 2010179529 A	2010-08-19	NONE	
10	JP 2008265021 A	2008-11-06	NONE	
	JP 2000351193 A	2000-12-19	TW 496752 B	2002-08-01
	JP H06171061 A	1994-06-21	NONE	
15	JP H05330009 A	1993-12-14	NONE	
	JP S61163858 A	1986-07-24	NONE	
	JP S5591671 A	1980-07-11	NONE	
20	GB 1393856 A	1975-05-14	BR 7302026 D0	1974-07-25
			CH 550668 A	1974-06-28
			DE 2214721 B1	1973-06-14
			FR 2177895 A1	1973-11-09
25			IT 980588 B	1974-10-10
			JP S4914211 A	1974-02-07
			JP S5237402 B2	1977-09-22
			NL 7304007 A	1973-09-27
			NL 150376 B	1976-08-16

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

- JP 2007074167 W [0006]