IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BALDWIN GRAPHIC SYSTEMS, INC., Plaintiff, v. BBA NONWOVENS SIMPSONVILLE INC, REEMAY INC., and BBA HOLDINGS INC., Defendants.	Civil Action No. **DEMAND FOR JURY TRIAL**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff, BALDWIN GRAPHIC SYSTEMS, INC. ("BALDWIN"), for its Complaint against Defendants, BBA NONWOVENS SIMPSONVILLE INC., REEMAY INC., and BBA HOLDINGS INC., alleges as follows:

JURISDICTION AND VENUE

1. This action arises under the United States Patent Laws, 35 U.S.C. §§ 271 and 281-287. This Court has jurisdiction over the subject matter of this Complaint pursuant to 28 U.S.C. § 1338(a). Venue is proper in this Judicial District pursuant to 28 U.S.C. §§ 1391(b) and 1391(c) and § 1400(b).

PARTIES

2. BALDWIN is a corporation organized and existing under the laws of the State of Delaware, having its principal executive offices at 2 Trap Falls Road, Suite 402, Shelton, Connecticut 06484. BALDWIN, together with its affiliated companies, is a worldwide leader in the design, manufacture and sale of printing press accessories and controls for the commercial and newspaper printing industries, such as automatic cleaning systems, fountain solution cooling, pumping and mixing systems, ink systems, infrared drying systems, press protection systems,

spray dampening systems, and web accessories. BALDWIN is also renowned for its research and development of printing press cleaning techniques, including, particularly, its development of a process and product used for cleaning printing press cylinders known as "IMPACT® and PREPAC®" and commonly referred to in the industry as the "BALDWIN Wash Cloth System" and the "BALDWIN Wash Cloth Roll," respectively. BALDWIN offers its customers a broad range of market-leading technologies, products, and systems that enhance the quality of printed products and improve the economic and environmental efficiency of printing presses. BALDWIN sells its products through affiliated companies to printers to upgrade the quality and capability of existing presses, and to printing press manufacturers to add to their own new equipment.

3. Defendant BBA NONWOVENS SIMPSONVILLE INC. is a corporation incorporated in the State of Delaware, which upon information and belief is offering for sale and selling the accused product sold under the trademark ELIXIR®, from an address of 840 Southeast Main Street, Simpsonville, SC, 29581. Defendant REEMAY, INC. is a corporation incorporated in Tennessee, having a principal place of business at 70 Old Hickory Blvd, Old Hickory, TN, 37138 and is registered with the Secretary of State in Delaware to do business in the State of Delaware, and upon information and belief is manufacturing the accused product or a portion of the accused product sold under the trademark ELIXIR®, for which REEMAY, INC. is the registered owner. Defendant BBA HOLDINGS INC. is a corporation incorporated in the State of Delaware, which upon information and belief, is a holding company that owns stock in, and does business through, BBA NONWOVENS SIMPSONVILLE INC. and REEMAY INC. These defendants will hereinafter be referred to collectively as "BBA".

4. Upon information and belief, BBA has regularly transacted and continues to regularly transact business within the State of Delaware, in this Judicial District and throughout the United States.

COUNT I

(Infringement of U.S. Patent No. Re 35,976)

5. BALDWIN incorporates herein paragraphs 1 through 4 inclusive of this Complaint as if each paragraph were fully set forth herein.

6. On December 1, 1998, United States Letters Patent No. Re 35,976 ("the Re 35,976 patent"), a true and correct copy of which is annexed hereto as EXHIBIT A, was duly and legally issued in the names of Charles R. Gasparrini and Walter H. Cano for an invention entitled "Pre-Packaged, Pre-Soaked Cleaning System And Method For Making The Same."

7. BALDWIN is the lawful owner by assignment of all right, title and interest in the Re 35,976 patent, including the right to bring actions for infringements thereof and collect damages suffered as a result of such infringements.

8. Upon information and belief, BBA has directly infringed either literally or under the doctrine of equivalents and will continue to directly infringe one or more claims of the Re 35,976 patent in violation of 35 U.S.C. § 271(a) by making, using, importing into the United States, selling and/or offering for sale within this Judicial District and elsewhere in the United States, pre-packaged, pre-soaked cleaning cloths, such as, but not limited to, BBA'S "ELIXIR® Pre-Saturated Automatic Blanket Cleaning Rolls" listed under at least Item Codes GCD 9002, GCD 9003, GCD 9005, GCD 9006, GCD 9021, GCD 9025, GCD 9029, GCD 9057, GCD 9058, GCD 9076, GCD 9090, and GCD 9115, without authority or license from BALDWIN.

9. Upon information and belief, BBA has infringed either literally or under the doctrine of equivalents the Re 35,976 patent in violation of 35 U.S.C. § 271(b) by actively inducing others to infringe one or more claims of the Re 35,976 patent. Upon information and belief, BBA has sold and/or has offered for sale and is selling and/or offering for sale in the United States, without authority or license from BALDWIN, pre-packaged, pre-soaked cleaning cloths, such as, but not limited to, BBA'S "ELIXIR® Pre-Saturated Automatic Blanket Cleaning Rolls" listed under at least Item Codes GCD 9002, GCD 9003, GCD 9005, GCD 9006, GCD 9021, GCD 9025, GCD 9029, GCD 9057, GCD 9058, GCD 9076, GCD 9090, and GCD 9115, to be used in a manner that directly infringes one or more claims of the Re 35,976 patent. Upon information and belief, BBA has knowingly aided and abetted and will continue to knowingly aid and abet the direct infringement of the Re 35,976 patent by instructing its customers to use pre-packaged, pre-soaked cleaning cloths, such as, but not limited to, BBA'S "ELIXIR® Pre-Saturated Automatic Blanket Cleaning Rolls" listed under at least Item Codes GCD 9002, GCD 9003, GCD 9005, GCD 9006, GCD 9021, GCD 9025, GCD 9029, GCD 9057, GCD 9058, GCD 9076, GCD 9090, and GCD 9115, in a manner that directly infringes one or more claims of the Re 35,976 patent.

10. Upon information and belief, BBA has infringed either literally or under the doctrine of equivalents the Re 35,976 patent in violation of 35 U.S.C. § 271(c) by contributing to the infringement of one or more claims of the Re 35,976 patent. Upon information and belief, BBA has sold and/or has offered for sale and is selling and/or offering for sale in the United States, without authority or license from BALDWIN, pre-packaged, pre-soaked cleaning cloths, such as, but not limited to, BBA'S "ELIXIR® Pre-Saturated Automatic Blanket Cleaning Rolls" listed under at least Item Codes GCD 9002, GCD 9003, GCD 9005,

GCD 9006, GCD 9021, GCD 9025, GCD 9029, GCD 9057, GCD 9058, GCD 9076, GCD 9090, and GCD 9115, for use in practicing the Re 35,976 patent invention, constituting a material part of the claimed invention, knowing said pre-packaged, pre-soaked cleaning cloths to be especially made for use in an infringement of the Re 35,976 patent, and not a staple article of commerce suitable for substantial noninfringing use.

11. BALDWIN has been and continues to be damaged by the continued infringement of BBA under 35 U.S.C. § 284. BALDWIN will suffer additional and irreparable damages unless this Court enjoins BBA under 35 U.S.C. § 283 from continuing its infringement.

12. BALDWIN has no adequate remedy at law.

13. BBA has had actual knowledge of the Re 35,976 patent since at least as early as on or about July 1, 2005 and constructive knowledge prior to then. Upon information and belief, the aforesaid infringement of the Re 35,976 patent by BBA has been and is deliberate and in willful disregard of BALDWIN's patent rights, entitling BALDWIN to an assessment of treble damages against BBA pursuant to 35 U.S.C. § 284.

14. This is an exceptional case, also entitling BALDWIN to an award of its reasonable attorney fees pursuant to 35 U.S.C. § 285.

COUNT II

(Infringement of U.S. Patent No. 5,974,976)

15. BALDWIN incorporates herein paragraphs 1 through 14 inclusive of this Complaint as if each paragraph were fully set forth herein.

16. On November 2, 1999, United States Letters Patent No. 5,974,976 ("the `976 patent"), a true and correct copy of which is annexed hereto as EXHIBIT B, was duly and

legally issued in the names of C. Robert Gasparrini and Walter H. Cano for an invention entitled "Cleaning System And Process For Making Same Employing Reduced Air Cleaning Fabric."

17. BALDWIN is the lawful owner by assignment of all right, title and interest in the `976 patent, including the right to bring actions for infringements thereof and collect damages suffered as a result of such infringements.

18. Upon information and belief, BBA has directly infringed either literally or under the doctrine of equivalents and will continue to directly infringe one or more claims of the `976 patent in violation of 35 U.S.C. § 271(a) by making, using, importing into the United States, has sold and/or offered for sale and is selling and/or offering for sale in the United States, pre-packaged, pre-soaked cleaning cloths, such as, but not limited to, BBA'S "ELIXIR® Pre-Saturated Automatic Blanket Cleaning Rolls" listed under at least Item Codes GCD 9002, GCD 9003, GCD 9005, GCD 9006, GCD 9021, GCD 9025, GCD 9029, GCD 9057, GCD 9058, GCD 9076, GCD 9090, and GCD 9115, without authority or license from BALDWIN.

19. Upon information and belief, BBA has infringed the `976 patent in violation of 35 U.S.C. § 271(b) by actively inducing others to infringe either literally or under the doctrine of equivalents one or more claims of the `976 patent. Upon information and belief, BBA has sold and/or has offered for sale and is selling and/or offering for sale in the United States, without authority or license from BALDWIN, pre-packaged, pre-soaked cleaning cloths, such as, but not limited to, BBA'S "ELIXIR® Pre-Saturated Automatic Blanket Cleaning Rolls" listed under at least Item Codes GCD 9002, GCD 9003, GCD 9005, GCD 9006, GCD 9021, GCD 9025, GCD 9029, GCD 9057, GCD 9058, GCD 9076, GCD 9090, and GCD 9115, to be used in a manner that directly infringes one or more claims of the `976 patent. Upon information and belief, BBA has knowingly aided and abetted and will continue to knowingly aid and abet

the direct infringement of the `976 patent by instructing its customers to use pre-packaged, pre-soaked cleaning cloths, such as, but not limited to, BBA'S "ELIXIR® Pre-Saturated Automatic Blanket Cleaning Rolls" listed under at least Item Codes GCD 9002, GCD 9003, GCD 9005, GCD 9006, GCD 9021, GCD 9025, GCD 9029, GCD 9057, GCD 9058, GCD 9076, GCD 9090, and GCD 9115, in a manner that directly infringes one or more claims of the `976 patent.

20. Upon information and belief, BBA has infringed either literally or under the doctrine of equivalents the `976 patent in violation of 35 U.S.C. § 271(c) by contributing to the infringement of one or more claims of the `976 patent. Upon information and belief, BBA has sold and/or has offered for sale and is selling and/or offering for sale in the United States, without authority or license from BALDWIN, pre-packaged, pre-soaked cleaning cloths, such as, but not limited to, BBA'S "ELIXIR® Pre-Saturated Automatic Blanket Cleaning Rolls" listed under at least Item Codes GCD 9002, GCD 9003, GCD 9005, GCD 9006, GCD 9021, GCD 9025, GCD 9029, GCD 9057, GCD 9058, GCD 9076, GCD 9090, and GCD 9115, for use in practicing the `976 patent invention, constituting a material part of the claimed invention, knowing said pre-packaged, pre-soaked cleaning cloths to be especially made for use in an infringement of the `976 patent, and not a staple article of commerce suitable for substantial noninfringing use.

21. BALDWIN has been and continues to be damaged by the continued infringement of BBA under 35 U.S.C. § 284. BALDWIN will suffer additional and irreparable damages unless this Court enjoins BBA under 35 U.S.C. § 283 from continuing its infringement.

22. BALDWIN has no adequate remedy at law.

23. BBA has had actual knowledge of the `976 patent since at least as early as on or about July 1, 2005 and constructive knowledge prior to then. Upon information and belief,

the aforesaid infringement of the `976 patent by BBA has been and is deliberate and in willful disregard of BALDWIN's patent rights, entitling BALDWIN to an assessment of treble damages against BBA pursuant to 35 U.S.C. § 284.

24. This is an exceptional case, also entitling BALDWIN to an award of its reasonable attorney fees pursuant to 35 U.S.C. § 285.

RELIEF

WHEREFORE, BALDWIN demands judgment against BBA and respectfully prays that this Court enter orders which:

(a) Adjudge that BBA has directly infringed, has actively induced others to infringe and has contributorily infringed United States Patent Nos. Re 35,976 and 5,974,976 and that such infringement has been willful and deliberate;

(b) Preliminarily and permanently enjoin BBA and its officers, agents, employees and all others acting in concert or participation with BBA from further acts of direct infringement, active inducement of infringement or contributory infringement of each of United States Patent Nos. Re 35,976 and 5,974,976;

(c) Award to BALDWIN damages adequate to compensate it for the acts of infringement committed by BBA, together with pre- and post-judgment interest, pursuant to 35 U.S.C. § 284, first paragraph;

(d) Award to BALDWIN exemplary damages in an amount equal to three times the amount of compensatory damages assessed, based upon the willful, deliberate and intentional acts of infringement committed by BBA, pursuant to 35 U.S.C. § 284, second paragraph;

(e) Declare this case to be "exceptional" pursuant to 35 U.S.C. § 285, entitling BALDWIN to recover its reasonable attorney fees;

(f) Award to BALDWIN its costs and expenses of this action as allowed by law; and

(g) Grant to BALDWIN such other and further relief as this Court deems just and proper.

Jury Demand

BALDWIN hereby requests a jury trial on all the issues in its claims.

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February 3, 2006

EXHIBIT A

US00RE35976E

United States Patent [19]

Gasparrini et al.

[11] E Patent Number: Re. 35,976

[45] Reissued Date of Patent: Dec. 1, 1998

[54] **PRE-PACKAGED, PRE-SOAKED CLEANING SYSTEM AND METHOD FOR MAKING THE SAME**

[75] Inventors: **Charles R. Gasparrini**, Port Chester, N.Y.; **Walter H. Cano**, Bridgeport, Conn.

[73] Assignee: **Baldwin Graphic Systems, Inc.**, Stamford, Conn.

[21] Appl. No.: **697,611**

[22] Filed: **Aug. 28, 1996**

Related U.S. Patent Documents

Reissue of:

[64] Patent No.: **5,368,157**
Issued: **Nov. 29, 1994**
Appl. No.: **145,881**
Filed: **Oct. 29, 1993**

U.S. Applications:

[63] Continuation of Ser. No. 419,752, Apr. 10, 1995, abandoned.

[51] **Int. Cl.**[6] **B65D 85/67**

[52] **U.S. Cl.** **206/209**; 206/410; 206/497; 53/431

[58] **Field of Search** 206/205, 207, 206/209, 210, 398, 401, 410, 497, 524.1, 524.3, 361; 15/256.5, 256.51; 101/425; 53/431, 581, 582

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,189,556	2/1940	Younghusband .
3,014,579	12/1961	Lathrop .
3,669,255	6/1972	Raymus .
3,850,294	11/1974	Phillips et al. .
3,980,176	9/1976	Boggs .
4,135,448	1/1979	Moestue .
4,295,563	10/1981	Becker et al. .
4,344,361	8/1982	MacPhee et al. .
4,467,916	8/1984	Hedden et al. .
4,678,724	7/1987	Inagabi .
4,757,763	7/1988	MacPhee et al. .
4,934,391	6/1990	Futch et al. .
4,986,182	1/1991	Sawaguchi et al. .
4,998,984	3/1991	Clendon .
5,009,716	4/1991	Gerson .
5,012,739	5/1991	Loos et al. .
5,069,128	12/1991	Hara et al. .
5,104,567	4/1992	Staehr .
5,125,342	6/1992	Hara .
5,143,639	9/1992	Krawack .
5,176,080	1/1993	Gasparrini et al. .
5,188,754	2/1993	Weltman et al. .
5,194,173	3/1993	Folkard et al. .
5,207,160	5/1993	Harada .
5,320,217	6/1994	Lenarz .

FOREIGN PATENT DOCUMENTS

2004511	8/1971	Germany .

Primary Examiner—Jacob K. Ackun
Attorney, Agent, or Firm—Morgan & Finnegan, L.L.P.

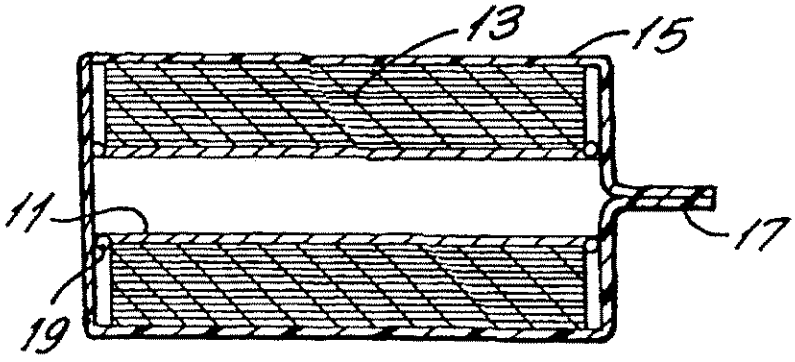
[57] **ABSTRACT**

There is disclosed a pre-packaged, pre-soaked cleaning system for use to clean the cylinders of printing machines. The system includes a pre-soaked fabric roll saturated to equilibrium with low volatility organic compound solvent which is wrapped around a cylindrical core having open ends to form a roll. The saturated, wrapped fabric roll is inserted in a heat-sealable or heat-shrinkable and heat-sealable plastic sleeve, the sleeve being to intimate contact with the fabric roll after being subjected in heat-sealing or heat-shrinking and heat-sealing, thus permitting transporting and storage of the system until use without detrimentally affecting the cleaning ability of the fabric roll.

The system may also include a slotted canister in which the saturated wrapped roll is inserted before it is placed into the plastic sleeve and heat-sealed or heat-shrunken and heat-sealed thereon or end caps inserted in the open ends of the core.

A method for making the system is also disclosed.

32 Claims, 1 Drawing Sheet



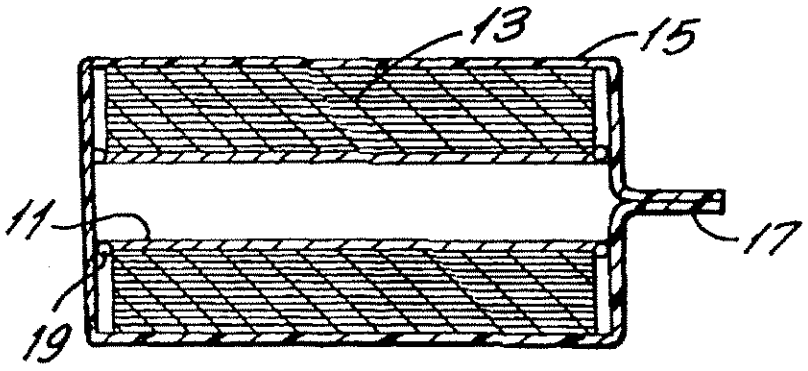


FIG.1

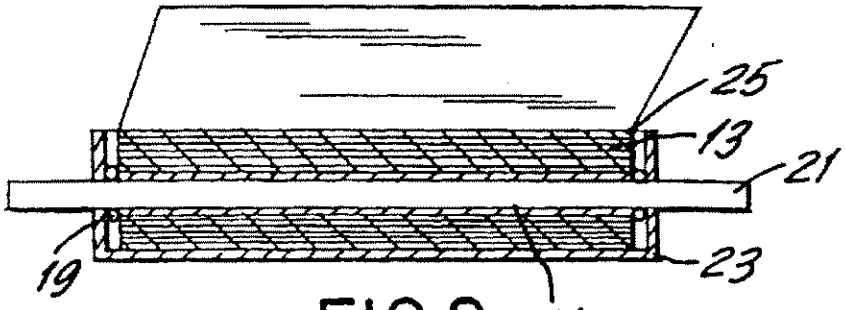


FIG.2

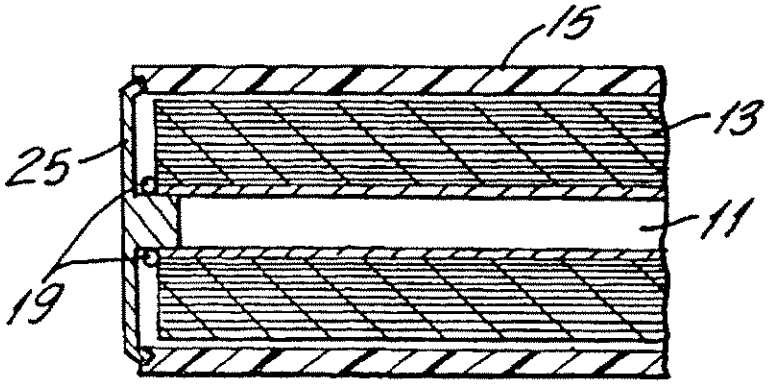


FIG.3

PRE-PACKAGED, PRE-SOAKED CLEANING SYSTEM AND METHOD FOR MAKING THE SAME

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This is a continuation of now abandoned application Ser. No. 08/419,752, filed on Apr. 10, 1995 and which is an application for reissue of U.S. Pat. No. 5,365,157 of Nov. 29, 1994.

This invention relates to a cleaning system for use to clean the cylinders of printing machines. More particularly, the invention relates to a pre-packaged, pre-soaked blanket cleaning system to clean the cylinders of printing machines. While the invention is disclosed as it applies to the cleaning of the cylinders of printing machines for the sake of simplicity, it is to be understood that it can also be utilized to clean the cylinders of other types of machinery.

BACKGROUND OF THE INVENTION

A wide variety of blanket cleaning systems and apparatus employing the same to clean the cylinders of printing machinery are known. Typical blanket cleaning systems and apparatus employing the same, including cleaning blankets and cleaning solutions, are exemplified by U.S. Pat. No. 4,135,448 to Moestue which discloses a mechanism for cleaning a cylinder that is provided with a cleaning cloth which is wetted with a cleaning fluid or solution prior to its encountering the pressure roller; U.S. Pat. No. 4,934,391 to Futch et al. which shows a composition for ink removal that exhibits a low vapor pressure and which is a low vapor pressure organic compound; U.S. Pat. No. 4,986,182 to Sawaguchi et al. which discloses a cleaning apparatus in which a cleaning cloth is dampened by a liquid; U.S. Pat. No. 5,009,716 to Gerson which shows a wash for removing ink comprising a low volatile organic compound; U.S. Pat. No. 5,012,739 to Loos which discloses a washing device comprising a cleaning cloth dampened with a washing medium; and U.S. Pat. No. 5,069,128 to Hara which shows a device for cleaning a cylinder of a printing machine comprising a cleaning cloth impregnated with a cleaning liquid.

In addition, U.S. Pat. No. 5,104,567 to Staehr discloses a liquid for cleaning ink from printing machines; U.S. Pat. No. 5,125,342 to Hara shows a method for cleaning the cylinder of a printing machine; and U.S. Pat. No. 5,143,639 to Krawack discloses a cloth moistened with a low vapor pressure cleaning agent for removing ink; whereas Weltman et al., U.S. Pat. No. 5,188,754 disclose a cloth soaked with a cleaning formula, and U.S. Pat. No. 5,194,173 to Folkard et al. discloses a method for removing ink from printing machines. Still further, U.S. Pat. Nos. 4,344,361 and 4,757,763 to MacPhee et al. disclose automatic blanket cylinder cleaners provided with cleaner fabrics adapted to contact the blanket cylinders of printing machines. On the other hand, U.S. Pat. No. 5,175,080 to Gasparrini et al. discloses a cloth supply system for the blanket cylinder for use in printing presses.

While the above-mentioned Patents accomplish their purposes to a satisfactory extent, they still exhibit a variety of drawbacks. For example, they usually require apparatus, such as pumps, spray bars, manifold lines, valves and the like as part of the automatic blanket cleaning systems for introducing the cleaning solvents or solutions to the cleaning

fabric just prior to actual use. Moreover, even in these cases, where the cleaning rolls or fabric rolls are pre-soaked or pre-wetted, the pre-soaking or pre-wetting must be accomplished just before use in order to minimize loss of cleaning solvent or solution in order to provide an effective blanket cleaning system.

There exists, therefore, a need for providing a pre-packaged, pre-soaked blanket cleaning system which does not exhibit the above-mentioned disadvantages and drawbacks. The present invention fulfills such a need.

BRIEF STATEMENT OF THE INVENTION

In accordance with the invention there is provided a pre-packaged, pre-soaked cleaning system for use with printing machines to clean the cylinders thereof comprising:

(1) a pre-soaked fabric roll saturated to equilibrium with low volatility organic compound solvent and which is disposed around an elongated, cylindrical core having open ends, and

(2) a heat-sealed or a heat-shrunken and heat-sealed plastic sleeve disposed around and in intimate contact with the fabric roll, whereby the pre-soaked, saturated fabric roll can be transported and stored vertically and/or horizontally until use without substantially disturbing the distribution of the solvent in the fabric roll and detrimentally affecting the cleaning ability of the fabric.

The invention also includes the method for making the inventive pre-packaged, pre-soaked cleaning system. Broadly, the method comprises contacting a strip of cleaning fabric with low volatility organic compound solvent which does not evaporate readily at ambient temperature and pressure and pre-soaking and saturating the fabric with the solvent, draining off excess solvent from the saturated fabric and obtaining a fabric saturated to equilibrium with solvent; wrapping the drained, saturated fabric around an elongated cylindrical core having open ends and forming a roll; disposing a heat-sealable plastic sleeve around the saturated, drained, wrapped fabric roll and subjecting the saturated, drained, wrapped fabric roll to a temperature sufficient to heat-seal the plastic sleeve around the saturated, drained, wrapped fabric roll in intimate contact with the fabric roll, whereby the pre-soaked, saturated fabric roll can be transported and stored vertically and/or horizontally until use without substantially disturbing the distribution of the solvent in the fabric roll and detrimentally affecting the cleaning ability of the fabric roll.

In a more specific aspect of the method, the strip of cleaning fabric is wrapped around the elongated cylindrical core to form a roll before contacting the strip of cleaning fabric with solvent.

In still another more specific aspect of the method, it includes subjecting the heat-sealable plastic sleeve to a vacuum and drawing the sleeve into intimate contact with the wrapped fabric roll after it has been disposed in the heat-sealable plastic sleeve.

In yet another more specific aspect of the method, the cleaning fabric is contacted with the low volatility organic compound solvent after the fabric is wrapped on the cylindrical core to form a roll by immersing the wrapped fabric roll in the solvent at ambient pressure and temperature and then drained at ambient pressure and temperature to remove excess solvent.

In yet another more specific aspect of the method, when the cleaning fabric is pre-soaked, either as a flat sheet or as a roll after it has been wrapped onto a cylindrical core, it is

preferable that the fabric be subjected to a vacuum in a vacuum chamber or the like in order to remove air therefrom before pre-soaking thereof takes place. In this connection, any suitable vacuum chamber or device can be employed.

Still further in another more specific aspect of the method, the plastic sleeve employed is not only heat-sealable but also heat-shrinkable and the sleeve is subjected to a temperature sufficient to heat-seal and heat-shrink the sleeve around the fabric roll.

In addition, the method, in another more specific aspect, includes the insertion of end caps in the open ends of the elongated cylindrical core and which extend over the peripheral edges of the fabric roll before the roll is inserted in the plastic sleeve.

Thus, in another embodiment of the pre-packaged, pre-soaked cleaning system according to the invention described above, the system includes a plastic sleeve disposed around and in intimate contact with the fabric roll which is not only heat-sealed, but also heat-shrunken.

Moreover, in a still further modified embodiment, the system includes end caps inserted in the open ends of the elongated cylindrical core which extend over the peripheral edges of the fabric roll.

In still a further modified embodiment of the pre-packaged and pre-soaked blanket cleaning system of the invention, it may also include a slotted canister in which the wrapped, drained, saturated roll is disposed. In such modified embodiment, the method of making the system is also modified to include an additional step of inserting the wrapped drained, saturated fabric roll into the slotted canister before introducing the same into the plastic sleeve.

THE DRAWINGS

In order to understand the invention more fully, reference is directed to the accompanying Drawing, which is to be taken in conjunction with following detailed description of the invention and in which Drawing:

FIG. **1** is a lateral, sectional, elevational view of a pre-packaged, pre-soaked cleaning system according to the invention;

FIG. **2** is a lateral, sectional, elevational view of the system shown in FIG. **1**, including the disposition of the pre-soaked, wrapped roll in a slotted canister before it is inserted in the heat-sealable sleeve and/or heat-sealable and heat-shrinkable sleeve shown in FIG. **1**; and

FIG. **3** is a partial, sectional, elevational, diagrammatic view of the system shown in FIG. **1** employing end caps disposed in the open ends of the elongated cylindrical core and extending over the peripheral edges of the fabric roll.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. **1**, a pre-packaged, pre-soaked cleaning system according to the invention comprises an elongated cylindrical core **11** made from, for example, relatively heavy cardboard of sufficient strength so that it can support thereon a pre-soaked fabric roll **13** of paper or cloth. On the other hand, if desired, the core may also be made of metal, such as steel, aluminum and the like. The fabric is pre-soaked and saturated to equilibrium with low volatility organic compound solvent, as described in more detail hereinbelow, before or after it is wrapped around the core **11** to form roll **13** in any convenient manner and the roll is then inserted in a sleeve **15** made of heat-sealable or heat-sealable and heat-shrinkable plastic material which is heat-sealed along its edge **17** or heat-shrunken and heat-sealed along its edge **17**, so that sleeve **15** is in intimate contact with the fabric roll **13**. The core **11** is also preferably provided with engagement means **19**, such as ball bearings or the like, or with other suitable means, for reception of a shaft **21** (FIG. **2**) located on an appropriate machine, such as a printing machine or the like (not shown) provided with a take-up roll to take-up cleaning fabric after it has achieved its cleaning function.

It has been surprisingly found that the pre-packaged, pre-soaked cleaning system described is a very stable system which can be transported and stored in a horizontal and/or vertical disposition until use without substantially disturbing the distribution of the solvent in the fabric roll and detrimentally affecting the cleaning ability of the fabric.

In the modified embodiment of the invention illustrated in FIG. **2**, the pre-soaked roll is inserted in a canister **23**, provided with a slit **25** through which a portion of the fabric roll **13** can be withdrawn before the assembly is sealed in the sleeve **15**.

In the modified embodiment as shown in FIG. **3**, the system of this invention is also preferably provided with end caps, such as end cap **25**, made of plastic or metal or the like disposed in the open ends of the core **11**. The end caps extend over the peripheral edges of the fabric roll **13** and the sleeve **15** may extend, as shown, over the edges of the end caps, or it may extend completely around the ends of the roll **13** as shown in FIG. **1**. Obviously, when a slotted canister **23** is employed, end caps will not be used. Moreover, it is to be understood that it is within the purview of this invention that the sleeve is sized conveniently to accommodate the roll to be covered thereby and to be drawn or shrunken into intimate contact with the roll and heat-sealed, as needed, whether it be open at both ends or at one end only.

The fabric from which the fabric roll is made may vary widely. For example, it may be made of paper or cloth. In those cases where a cloth fabric is employed, it may be a woven or a non-woven cloth fabric made of synthetic or natural fibers or mixtures of the same. Exemplative, but not limitative, of suitable synthetic fibers which may be used in the cloth fabrics are polyester fibers, rayon fibers, nylon fibers, and acrylic fibers and the like. Exemplative, but not limitative, of the natural fibers which may be employed are cotton fibers, wood pulp fibers and hemp fibers and the like.

In those cases where paper is employed as the fabric material, paper fabrics made from wood pulp modified chemically in accordance with paper manufacturing technology are suitable, for example.

On the other hand, no matter whether paper or cloth fabric is employed in carrying out the practice of this invention, it is preferred that the materials used therein exhibit high acceptability to being soaked or wetted by the low volatility organic compound solvent used to saturate the same. In this regard, it is preferred that the fabric employed be one which has a caliper thickness in a range of from about 0.003 [mils] *inch* to about [0.030 mils] *0.30 inch*, and preferably in a range of from about 0.008 [mils] *inch* to about 0.020 [mils] *inch*, and the ability when saturated with low volatility organic compound solvent to retain from about 0.05 to about 0.5 cc of solvent per in^2 of fabric determined by routine testing methods.

In general, woven and non-woven fabrics suitable for use in carrying out the practice of the invention have a basis weight in a range of from about 1.5 ounces per square yard to about 6.0 ounces per square yard, a caliper thickness in the range mentioned above, a tensile strength in the longitudinal (machine) direction in a range of from about 20 lbs.

per inch to about 200 lbs. per inch and in a width (cross) direction in a range of from about 15 lbs per inch to about 125 lbs. per inch.

Where paper is employed as a cleaning fabric in the system of this invention, it has a basis weight in a range of from about 40 lbs. to about 90 lbs., a caliper thickness in a range of from abut 0.003 [mils] *inch* to about 0.10 [mils] *inch*, a tensile strength in the longitudinal (machine) direction in a range of from about 20 lbs. per inch to about 80 lbs. per inch and in the width (cross) direction in a range of from abut 15 lbs. per inch to about 50 lbs. per inch, a porosity in a range of from about 1.0 second to about 10 seconds when subjected to 100 cc of low volatility organic compound solvent or water, and a stretchability in a range of from about 1.0 percent to about 6.0 percent, all determined by routine testing methods.

The low volatility organic compound solvent employed in carrying out the practice of this invention may vary widely and generally it includes at least one low volatility organic compound solvent which does not readily evaporate, as well as mixtures of the same with similar low volatile organic compound solvents or with normally volatile organic compound solvents. Exemplative, but not limitative, of suitable solvent materials of this type are organic compound solvents selected from vegetable oils and citrus oil and the like. Generally, such solvent materials have a volatility in a range of from about zero up to about 30.0 percent, and preferably a volatility in a range of from about zero percent to about 20.0 percent, determined by routine testing methods. It is to be understood that within the purview of this invention, such suitable solvents also include normally volatile organic compound solvents, that is, those which readily evaporate and which are selected from mineral spirits and aliphatic hydrocarbon solvents and the like. Such solvent materials generally have a volatility of from zero up to about 100 percent determined by routine testing methods.

A wide variety of heat-sealable and/or heat-shrinkable and heat-sealable plastic materials may be used for the plastic sleeves employed in the practice of this invention. For example, the sleeve may be made from polyethylenes, polyolefins, polyvinyl chlorides, and polyamides and the like. Generally, such materials are heat-sealable and/or heat-shrinkable and heat-sealable at a temperature in a range of from about 300° F. to about 400° F., and preferably in a range of from about 350° F. to about 375° F. Moreover, it is to be understood that within the purview of this invention, the heat-sealable and/or heat-shrinkable and heat-sealable sleeve may be made from heat-sealable and/or heat-shrinkable and heat-sealable paper.

The method for making a pre-packaged, pre-soaked cleaning system according to the invention comprises contacting a strip of cleaning fabric with low volatility organic compound solvent which does not evaporate readily at ambient pressure and temperature and pre-soaking and saturating the fabric with the solvent, draining of excess solvent from the saturated fabric and obtaining a fabric saturated to equilibrium with the solvent; wrapping the drained, saturated fabric around an elongated cylindrical core having open ends and forming a roll; disposing a heat-sealable plastic sleeve around the drained, saturated, wrapped fabric roll and subjecting the sleeve to a temperature sufficient to heat seal the plastic sleeve around the drained, saturated, wrapped fabric roll in intimate contact with the fabric roll, whereby the pre-soaked, saturated fabric roll can be transported and stored vertically and/or horizontally until use without disturbing the distribution of the solvent in the fabric roll and detrimentally affecting the cleaning ability of the fabric roll.

In a variation of the method, the fabric is preferably wrapped around the core before contacting the same with the solvent. Wrapping of the fabric on the cylindrical core can be done in any convenient manner and requires no special apparatus, a wide variety of roll making equipment being readily available for accomplishing the same.

Whether the fabric is contacted with solvent either before or after the roll has been formed, the roll is then inserted in a heat-sealable and/or heat-scalable and heat-shrinkable plastic sleeve and the sleeve is heat-sealed and/or heat-sealed and heat-shrunken at any appropriate temperature around the roll in intimate contact therewith. Generally, temperatures in a range of from about 300° F. to about 400° F. and preferably in a range of from about 350° F. to about 375° F. to accomplish the heat sealing and/or heat sealing and heat-shrinking of the saturated fabric roll in the plastic sleeve and bring the sleeve into intimate contact with the fabric roll, as mentioned above, may be employed.

In a variation of the method, it is preferred, especially where a heat-sealable plastic sleeve is employed, that once the fabric roll is inserted in the sleeve, the so assembled sleeve and roll be subjected to a vacuum which draws the heat-sealable plastic sleeve into intimate contact with the wrapped fabric roll, while at the same time exhausting any air from the interior of the sleeve, and then simply heat-sealing the sleeve around the roll by application of heat to the open peripheral edges of the sleeve. Known appropriate vacuum apparatus and heat-sealing apparatus may be used by simple adaptation of the same physically to accomplish apparatus for applying the vacuum and heat-sealing of the sleeve.

On the other hand, where a sleeve employed in carrying out the method in both heat-sealable and heat-shrinkable, then one or more small openings or vent holes (not shown) in the sleeve, preferably located near the open edges of the sleeve, are provided to permit exhaustion of air from the sleeve as heat-sealing and heat-shrinking is accomplished, the location of such opening or openings assuring that any such opening or openings will be closed during the heat-sealing and heat-shrinking of the sleeve.

In accordance with the method of this invention, contact between the fabric strip and the solvent can be achieved in a variety of ways. For example, if desirable, the appropriate solvent may be poured over the fabric in amounts sufficient to saturate the same while simply permitting excess solvent to drain off into a tray, or the solvent can be sprayed on the fabric. The saturation step can be carried out at ambient temperature and pressure and the excess, as mentioned, simply permitted to drain off for a period of time sufficient to obtain a fabric saturated to equilibrium with the solvent.

However, it is within the purview of the invention that the fabric strip be immersed or transported through a tank of appropriate solvent in a substantially horizontal direction either before or after, and preferably after, it has been wrapped on the core to form a roll. After saturation has taken place, the saturated fabric is preferably simply suspended in a position to permit excess solvent to drain off and be collected in a trap for reuse.

Wrapping of the fabric on the elongated cylindrical core to form a roll, as well as draining thereof, may also take place at ambient temperature and pressure. When saturation and wrapping to form a roll are completed, the roll is inserted in the heat-sealable or heat-shrinkable and heat-sealable plastic sleeve and the sleeve is heat-sealed and/or heat-shrunk and heat-sealed at a temperature sufficient to heat-seal or heat-shrink and heat-seal the sleeve around the

drained, saturated, wrapped fabric roll in intimate contact with the fabric roll. In this regard, the particular heat-shrinking and heat-sealing temperature will be dependent upon the type of heat-shrinkable and heat-sealable material utilized and may extend in a range of from about the softening temperature of such material up to about the decomposition temperature of such material. Care must be taken, however, to be sure that the particular temperature employed is not so high that it will have a deleterious effect on the saturated fabric roll disposed in the plastic sleeve.

In general, heat-shrinking and heat-sealing can be achieved at temperatures in a range of from about 300° F. up to about 400° F., and preferably are achieved at temperatures in a range of from about 350° F. up to about 375° F. and may be carried out in an oven, or under heat-radiating lamps.

The plastic sleeve will be sized so that the wrapped roll can be inserted therein with facility and the open edges of the sleeve then brought together in contact with each other in order to seal the same, while at the same time, being sized also so that when shrinking takes place, it will be brought into intimate contact with the fabric roll around which it is disposed.

In those cases where the saturated wrapped fabric roll is to be employed with a slotted canister, the roll is simply inserted in the canister with a portion thereof protruding through the slot and the canister is provided with knock-out end portions which may be inserted therein after insertion of the roll, such end portions simply being removed when the roll is to be disposed on an appropriate shaft of a printing apparatus or the like in order to permit insertion of the shaft through the core of the roll, as well as removal of the shaft from the core. Moreover, the canister may be made from metals, such as light gauge steel, aluminum and the like or from cardboard or from plastic materials, such as polyethylenes, polyolefins, polyvinyl chlorides, polyamides, and the like.

In those instances where end caps, such as end cap **25**, are employed in making the pre-packaged, pre-soaked cleaning system of this invention, the end caps, which may be made of the same materials mentioned above for the canister **23**, are simply inserted in the open ends of the cylindrical core after the wrapping, saturation and draining steps of the method have been accomplished.

It is to be understood that within the context of this invention, the terminology "saturated to equilibrium" as it is used in connection with the saturation of the fabric and/or fabric roll with solvent means that after draining the fabric and/or fabric roll retains therein sufficient solvent in an amount to wet the fabric to the extent that it imparts efficient cleaning ability to the fabric to clean cylinders of apparatus, such as printing machinery, and the fabric has retained therein after draining from about 0.05 to about 0.5 cc of solvent per in^2 of fabric.

The so-made pre-packaged, pre-soaked blanket cleaning system of this invention can be employed on any printing apparatus, simply by modifying the apparatus to provide it with a shaft which can be inserted through the core and also a take-up roll which is employed to take up the used portion of the cleaning fabric after it has carried out its cleaning function. This is a distinct advantage of the cleaning system of this invention since it eliminates the need for complex apparatus, such as pumps, spray bars, manifold lines, valves and the like, especially as part of the automatic blanket cleaning systems used on printing machinery to introduce cleansing solvents or solutions to the cleaning fabrics just prior to use.

In addition, the cleaning system of this invention provides numerous other advantages. For example, it is relatively simple in construction, employs readily available materials and can be made in a relatively simple and forward manner without resort to highly complex and expensive procedures which necessitate the use of elaborate machinery. Numerous other advantages of this invention will be readily apparent to those skilled in the art.

Accordingly, this invention is not to be limited to the embodiments disclosed and illustrated herein, except as defined in the appended claims.

What is claimed is:

1. A pre-packaged, pre-soaked cleaning system for use to clean the cylinders of printing machines comprising:

(1) a pre-soaked fabric roll saturated to equilibrium with low volatility organic compound solvent disposed around an elongated cylindrical core having open ends, and

(2) a heat-sealed plastic sleeve disposed around and in intimate contact with said fabric roll, whereby the pre-soaked, saturated fabric roll can be transported and stored vertically and horizontally until use without substantially disturbing the distribution of said solvent in said fabric roll and detrimentally affecting the cleaning ability of the fabric.

2. A pre-packaged, pre-soaked cleaning system as defined in claim **1** wherein the fabric is a cloth fabric.

3. A pre-packaged, pre-soaked cleaning system as defined in claim **2** wherein the cloth comprises non-woven synthetic fiber material.

4. A pre-packaged, pre-soaked cleaning system as defined in claim **2** wherein the cloth comprises woven synthetic fiber material.

5. A pre-packaged, pre-soaked cleaning system as defined in claim **2** wherein the cloth comprises non-woven natural fiber material.

6. A pre-packaged, pre-soaked cleaning system as defined in claim **2** wherein the cloth comprises woven, natural fiber material.

7. A pre-packaged, pre-soaked cleaning system as defined in claim **2** wherein the cloth comprises a mixture of synthetic and natural fiber materials.

8. A pre-packaged, pre-soaked cleaning system as defined in claim **2** wherein the fabric has a basis weight in a range of from about 1.5 ounces per square yard to about 6.0 ounces per square yard, a caliper thickness in a range of from about 0.003 [mils] *inch* to about 0.30 [mils] *inch*, a tensile strength in the longitudinal direction in a range of from about 20 lbs. per inch to about 200 lbs. per inch and in a width direction in a range of from about 15 lbs. per inch to about 125 lbs. per inch.

9. A pre-packaged, pre-soaked cleaning system as defined in claim **1** wherein the fabric is paper fabric.

10. A pre-packaged, pre-soaked cleaning system as defined in claim **9** wherein the paper fabric has a basis weight in a range of from about 40 lbs. to about 90 lbs., a caliper thickness in a range of from about 0.003 [mils] *inch* to about [**0.010** mils] *0.10 inch*, a tensile strength in the longitudinal direction in a range of from about 20 lbs. per inch to about 80 lbs. per inch and in a width direction in a range of from about 15 lbs. per inch to about 50 lbs. per inch, a porosity in a range of from about 1.0 second to about 10 seconds, and a stretchability in a range of from about 1.0 percent to about 6.0 percent.

11. A pre-packaged, pre-soaked cleaning system as defined in claim **1** wherein the low volatility organic compound solvent comprises at least one organic solvent com-

pound which does not readily evaporate and is selected from the group consisting of vegetable oils and citrus oils having a volatility in a range of from about zero up to about 30 percent.

12. A pre-packaged, pre-soaked cleaning system as defined in claim 1 wherein the low volatility organic compound solvent comprises at least one organic solvent compound which readily evaporates and which is selected from mineral spirits and aliphatic hydrocarbon solvents and a volatility in a range of from about zero up to about 100 percent.

13. A pre-packaged, pre-soaked cleaning system as defined in claim 1 wherein the heat-sealed plastic sleeve is comprised of a heat-sealable plastic material selected from the group consisting of heat sealable polyethylenes, heat-sealable polyolefins, polyvinyl chlorides, and heat-sealable polyamides.

14. A pre-packaged, pre-soaked cleaning system as defined in claim 1 wherein the heat-sealed plastic sleeve is also heat-shrinkable and is comprised of a heat-sealable and heat-shrinkable plastic material selected from the group consisting of heat-sealable and heat-shrinkable polyethylenes, heat-sealable and heat-shrinkable polyolefins, heat-sealable and heat-shrinkable polyvinyl chlorides, and heat-sealable and heat-shrinkable polyamides.

15. A pre-packaged, pre-soaked cleaning system according to claim 1 including a canister disposed between the pre-soaked fabric roll and the heat-sealed plastic sleeve.

16. A pre-packaged, pre-soaked cleaning system according to claim 1 including end caps located in the open ends of the elongated cylindrical core and extending over the peripheral edges of the fabric roll.

17. A method for making a pre-packaged, pre-soaked cleaning system comprising contacting a strip of cleaning fabric with low volatility, organic compound solvent which does not evaporate readily at ambient temperature and pressure and pre-soaking and saturating said fabric with said solvent, draining off excess solvent from said saturated fabric and obtaining a fabric saturated to equilibrium with said solvent; wrapping the drained, saturated fabric around an elongated cylindrical core having open ends and forming a roll; disposing a heat-sealable plastic sleeve around the drained, saturated, wrapped fabric roll and subjecting said plastic sleeve to a temperature sufficient to heat-seal said plastic sleeve around said drained, saturated, wrapped fabric roll in intimate contact with the fabric roll, whereby the pre-soaked, saturated fabric roll can be transported and stored vertically and horizontally until use without substantially disturbing the distribution of said solvent in said fabric roll and detrimentally affecting the cleaning ability of the fabric roll.

18. A method for making a pre-packaged, pre-soaked cleaning system as defined in claim 17 wherein the strip of cleaning fabric is wrapped around the elongated cylindrical core to form a roll before contacting said strip of cleaning fabric with the solvent.

19. A method for making a pre-packaged, pre-soaked cleaning system according to claim 17 including subjecting the heat-sealable plastic sleeve to a vacuum and drawing the heat-sealable plastic sleeve into intimate contact with the wrapped fabric roll after disposing the wrapped fabric roll in said heat-sealable plastic sleeve and before heat-sealing said plastic sleeve.

20. A method for making a pre-packaged, pre-soaked cleaning system according to claim 17 including inserting the wrapped fabric roll into a slotted canister before it is introduced into the plastic sleeve.

21. A method for making a pre-packaged, pre-sealed cleaning system according to claim 17 including inserting end caps in the open ends of the elongated cylindrical core which extend over the peripheral edges of the fabric roll before said fabric roll is inserted into the plastic sleeve.

22. A method for making a pre-packaged, pre-soaked cleaning system as defined in claim 17 wherein the cleaning fabric is immersed at ambient temperature and pressure in the low volatility organic compound solvent to saturate said fabric and then drained at ambient temperature and pressure to remove excess solvent before said fabric is wrapped on the cylindrical core to form a roll.

23. A method for making a pre-packaged, pre-soaked cleaning system as defined in claim 17 wherein the cleaning fabric is immersed at ambient temperature and pressure in the low volatility organic compound solvent to saturate said fabric and then drained at ambient temperature and pressure to remove excess solvent after said fabric is wrapped on the cylindrical core to form a roll.

24. A method according to claim 17 wherein the cleaning fabric is paper.

25. A method for making a pre-packaged, pre-soaked cleaning system comprising contacting a strip of cleaning fabric with low volatility, organic compound solvent which does not evaporate readily at ambient temperature and pressure and pre-soaking and saturating said fabric with said solvent, draining off excess solvent from said saturated fabric and obtaining a fabric saturated to equilibrium with said solvent; wrapping the drained, saturated fabric around an elongated cylindrical core and forming a roll; disposing a heat-shrinkable and heat-sealable plastic sleeve around the drained, saturated, wrapped fabric roll and subjecting said plastic sleeve to a temperature sufficient to heat-shrink and heat-seal said plastic sleeve around said drained, saturated, wrapped fabric roll in intimate contact with the fabric roll, whereby the pre-soaked, saturated fabric roll can be transported and stored vertically and horizontally until use without substantially disturbing the distribution of said solvent in said fabric roll and detrimentally affecting the cleaning ability of the fabric roll.

26. A method for making a pre-packaged, pre-soaked cleaning system as defined in claim 25 wherein the plastic sleeve is heat-shrunken and heat-sealed at a temperature in a range of from about 300° F. to about 400° F.

27. A method for making a pre-packaged, pre-soaked cleaning system as defined in claim 25 wherein the plastic sleeve is heat-shrunken and heat-sealed at a temperature in a range of from about 350° F. to about 375° F.

28. A pre-packaged, pre-soaked cleaning system for use to clean the cylinders of printing machines comprising:

(1) a pre-soaked fabric roll saturated to equilibrium with low volatility organic compound solvent disposed around a core, and

(2) a sealed sleeve disposed around and in contact with said fabric roll, whereby the pre-soaked, saturated fabric roll can be transported and stored vertically and horizontally until use without substantially disturbing the distribution of said solvent in said fabric roll and detrimentally affecting the cleaning ability of the fabric.

29. A pre-packaged, pre-soaked cleaning system as defined in claim 28 wherein the sealed sleeve can be opened or removed from the fabric roll for use of said fabric roll and including in combination therewith means for positioning said pre-packaged, pre-soaked cleaning system adjacent a cylinder to be cleaned.

30. A pre-packaged, pre-soaked cleaning system as defined in claim 1 wherein the sealed sleeve can be opened

or removed from the fabric roll for use of said fabric roll and including means locating said fabric roll adjacent to and operatively associated with a cylinder to be cleaned.

31. A pre-packaged, pre-soaked cleaning system as defined in claim 28, in combination with mounting means for mounting the pre-soaked fabric roll in a position to clean a cylinder while the fabric is in contact with and being fed past said cylinder.

32. A pre-packaged, pre-soaked cleaning system for use to clean the cylinder of printing machines comprising in combination:

(1) a pre-soaked fabric roll saturated to equilibrium with cleaning solvent disposed around a core, said fabric roll having a sealed sleeve which can be opened or removed from said fabric roll for use of said fabric roll, disposed therearound, and said system including

(2) means for locating said fabric roll adjacent to and operatively associated with a cylinder to be cleaned.

* * * * *

EXHIBIT B

US005974976A

United States Patent [19]

Gasparrini et al.

[11] Patent Number: 5,974,976

[45] Date of Patent: Nov. 2, 1999

[54] **CLEANING SYSTEM AND PROCESS FOR MAKING SAME EMPLOYING REDUCED AIR CLEANING FABRIC**

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[73] Assignee: **Baldwin Graphic Systems, Inc.**, Stamford, Conn.

[21] Appl. No.: **08/924,495**

[22] Filed: **Aug. 27, 1997**

Related U.S. Application Data

[63] Continuation of application No. 08/431,799, May 1, 1995, abandoned.

[51] **Int. Cl.**[6] **B41C 33/00**

[52] **U.S. Cl.** **101/483**; 101/424

[58] **Field of Search** 101/483, 424, 101/423, 425; 100/37, 47

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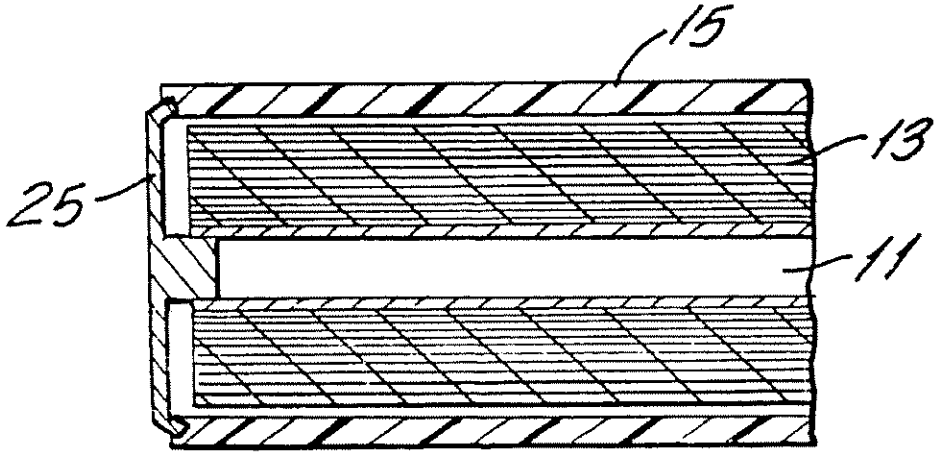
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Primary Examiner—Edgar Burr
Assistant Examiner—Anthony H. Nguyen
Attorney, Agent, or Firm—Morgan & Finnegan, L.L.P.

[57] **ABSTRACT**

A cleaning system for a printing press using pre-soaked, reduced volume of air in cleaning fabric and a method for making the system are disclosed. The system includes a cleaning fabric treated to reduce the amount of air volume the cleaning fabric contains. The cleaning fabric is saturated to functional equilibrium with a low volatility organic compound solvent. The cleaning fabric is wrapped around an elongated core to form a fabric roll. The saturated, wrapped fabric roll may be used to clean a cylinder of a printing press. The saturated, wrapped fabric roll may be inserted in a sealable sleeve, the sealable sleeve being in contact with the fabric roll and then sealed, thus permitting transporting and storage of the system until use without detrimentally affecting the cleaning ability of the fabric.

26 Claims, 2 Drawing Sheets



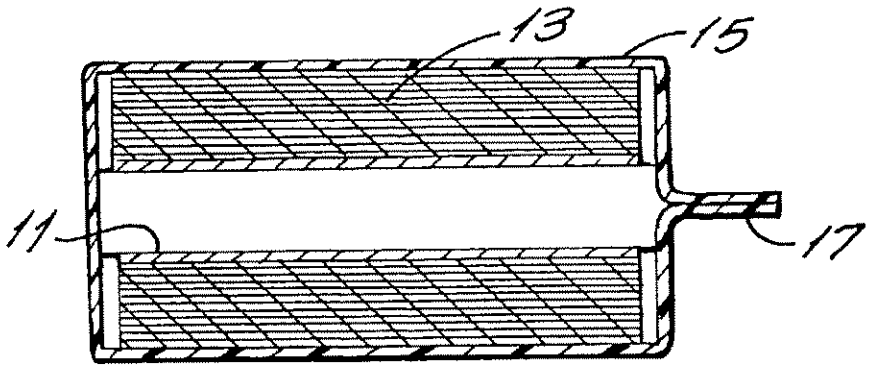


FIG.1

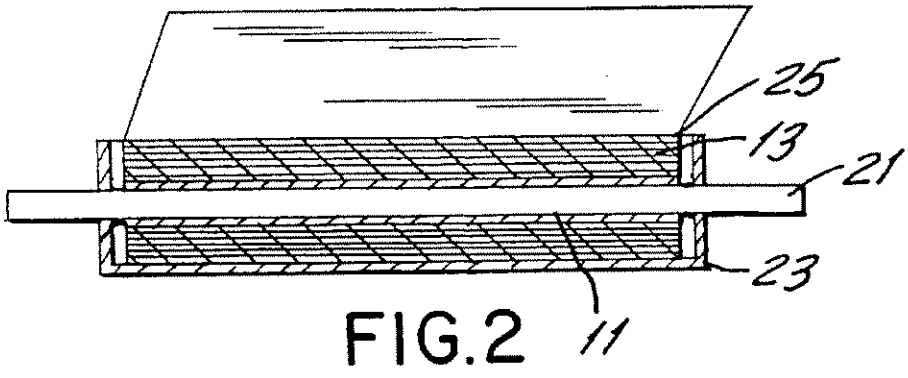


FIG.2

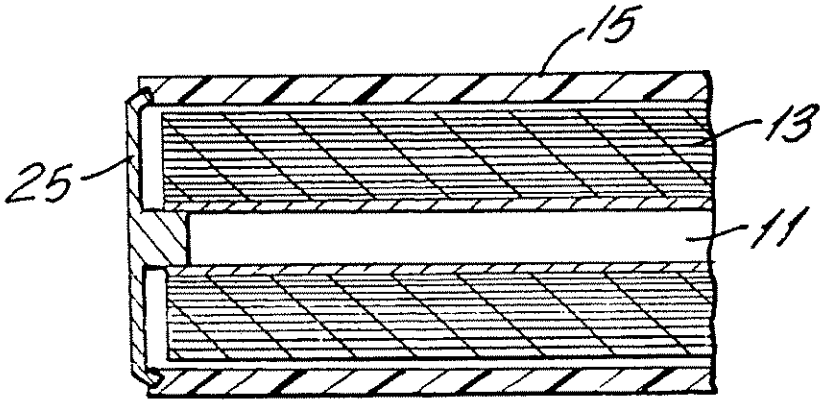


FIG.3

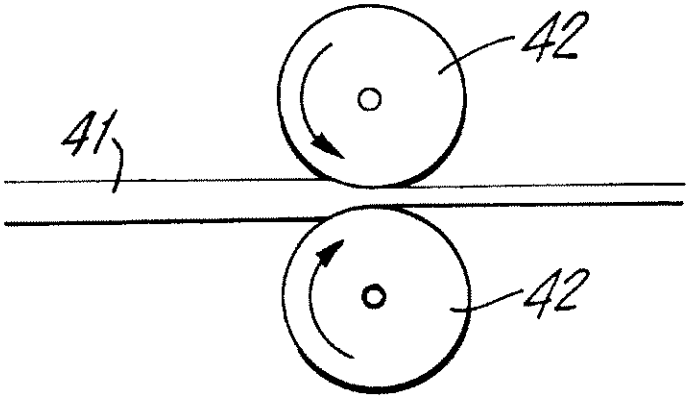


FIG.4

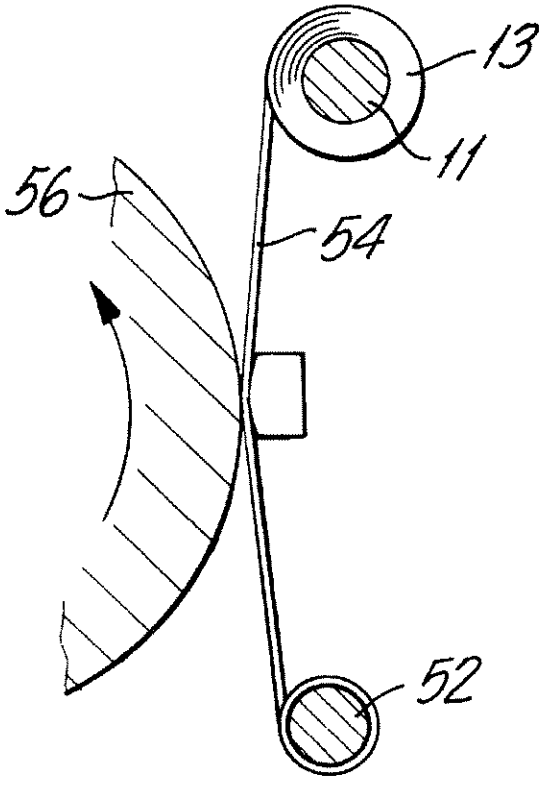


FIG.5

CLEANING SYSTEM AND PROCESS FOR MAKING SAME EMPLOYING REDUCED AIR CLEANING FABRIC

This is a continuation of application Ser. No. 08/431,799, filed on May 1, 1995, now abandoned.

FIELD OF THE INVENTION

This invention relates to a cleaning system employing a fabric with a reduced volume of air for use to clean the cylinders of a printing machine. More particularly, the invention relates to an improved pre-soaked cleaning system employing a fabric with a reduced volume of air to clean the cylinders of a printing press. While the invention is described as it applies to the cleaning of the cylinders of printing machines for the sake of simplicity, it is to be understood that it can be utilized to clean the cylinders of other types of machinery.

BACKGROUND OF THE INVENTION

A wide variety of blanket cleaning systems and apparatus employing the same to clean the cylinders of printing presses are known. Typical blanket cleaning systems and apparatus employing the same, including cleaning blankets and cleaning solutions, are exemplified by U.S. Pat. No. 4,135,448 to Moestue which is directed to a mechanism for cleaning a cylinder that is provided with a cleaning cloth which is wetted with a cleaning fluid or solution prior to its encountering the pressure roller; U.S. Pat. No. 4,934,391 to Futch et al. is directed to a composition for ink removal that exhibits a low vapor pressure and which is a low vapor pressure organic compound; U.S. Pat. No. 4,986,182 to Sawaguchi et al. is directed to a cleaning apparatus in which a cleaning cloth is dampened by a liquid; U.S. Pat. No. 5,009,716 to Gerson is directed to a wash for removing ink comprising a low volatile organic compound; U.S. Pat. No. 5,012,739 to Loos is directed to a washing device comprising a cleaning cloth dampened with a washing medium and U.S. Pat. No. 5,069,128 to Hara is directed to a device for cleaning a cylinder of a printing machine comprising a cleaning cloth impregnated with a cleaning liquid.

In addition, U.S. Pat. No. 5,104,567 to Staehr is directed to a liquid for cleaning ink from printing machines; U.S. Pat. No. 5,125,342 to Hara is directed to a method for cleaning the cylinder of a printing machine; and U.S. Pat. No. 5,143,639 to Krawack is directed to a cloth moistened with a low vapor pressure cleaning agent for removing ink; whereas U.S. Pat. No. 5,188,754 to Weltman et al. is directed to a cloth soaked with a cleaning formula and U.S. Pat. No. 5,194,173 to Folkard et al. is directed to a method for removing ink from printing machines. Still further, U.S. Pat. Nos. 4,344,361 and 4,757,763 to MacPhee et al. is directed to automatic blanket cylinder cleaners provided with cleaning fabrics adapted to contact the blanket cylinders of printing presses. On the other hand, U.S. Pat. No. 5,175,080 to Gasparrini et al. is directed to a cloth supply system for the blanket cylinder for use in printing presses.

Still further, U.S. Pat. No. 5,320,217 to Lenarz is directed to a sealed envelope which contains a moistened pad that functions as a swab. The pad is secured to the envelope by an intermediate line seal. Consequently, when the top of the envelope is removed, the pad is exposed. Since the pad is still captively held to the remainder of the envelope, the liquid on the pad may be dispensed by holding the clean, dry, bottom of the envelope. Thus, the pad functions as a swab and the remainder of the envelope functions as the applicator

and the reservoir. Alternatively, U.S. Pat. No. 4,998,984 to McClendon is directed to a pre-packaged single use disposable wiper pad or towelette that is saturated with a disinfecting liquid and the pad is effective to disinfect inanimate surfaces. The pad is of a size which fits into a pocket or purse and makes it convenient to carry, while posing no problem in disposing of the same, such as by flushing in a toilet.

U.S. Pat. No. 4,679,724 to Inagaki is directed to a water-proof container having a cylindrical base member made of paper which is surrounded by a double-wall heat-shrinkable plastic film covering the paper base member and having at least one portion heat-sealed to close the paper base member entirely within the plastic film and lid connected to the base member for closing at least one open end of a container shape formed by the paper base member.

U.S. Pat. No. 4,467,916 to Hedden et al. is directed to a package of wound glass fiber strand from which the glass fiber strands can be removed more efficiently for feeding into processing operations. The wound package of glass fiber strands is a package of superimposed annular layers of glass fiber strands having a central longitudinal, cylindrical cavity about which the strands are wound and having an outer cylindrical surface and a substantially flat circular top and bottom section. The package is covered with a stretchable polymeric film and at least one free end of the glass fiber strand extends into the central cavity for removal from the interior to the exterior of the package. U.S. Pat. No. 4,295,563 to Becker et al. is directed to an article of manufacture comprising a hollow rod of longitudinally gathered tubes of cellulose hydrate-based materials the hollow rod having a latent water content of between about 25% and 100% by weight based on the total weight of the hollow rod and being free of chemical anti-bacteriocidal agent; a closed, substantially gas impermeable packaging sheath having a hollow interior chamber therein and in which the hollow rod is positioned so that this rod is completely enveloped by the packaging sheath which is made of a flexible film of material that is substantially impermeable to gases; and a protective gas essentially fills the remaining portion of the hollow interior chamber of the sheath so that the gas protects the hollow rod against the formulation of aerobic microorganisms on the water-containing cellulose hydrate material.

Still further, U.S. Pat. No. 3,980,176 to Boggs is directed to a high speed yarn take-up system which consists of a pneumatic injector nozzle rotably mounted off-center of a single fluted rotating screw. Yarn is injected into the area exposed at the trailing edge of the screw and compressed and moved forward in a compression chamber by the feeding of the screw. A plastic tube is continuously formed around the compression chamber to receive the yarn mass as it discharges, thus forming a tube of indefinite unlimited length and from ¼ to 4 inches or larger in diameter. The tube may contain a single end or multiple ends of yarn which may be removed from the tube at high speed by simply slitting the plastic as the yarn is pulled from the package. Alternatively, U.S. Pat. No. 3,850,294 to Phillips et al. is directed to a package of roving unsized continuous filaments of glass, the package being saturated with water which maintains the filaments in group orientation.

U.S. Pat. No. 3,014,579 to Lathorp is directed to a disposable cleaning device which consists of a capsule containing a plurality of applicators and which may be employed in many and various uses. The applicators enclosed within the capsule comprise a central core of sponge or sponge rubber having a wad or pad of absorbent material, such as cotton or the like, wrapped around the core.

The core is saturated with suitable material and the cotton wrap, for example, provides a vehicle through which the material in the sponge rubber core is absorbed from the core and applied to a given usage.

Still further, U.S. Pat. No. 2,189,556 to Younghusband is directed to a pipe cleaner formed with a pliable metal member, such as a spindle or length of wire or the like. Attached to that member and extending through at its length are tufts of fabric or other material capable of absorbing liquid. These tufts are impregnated or saturated with a liquid solvent solution and the impregnating pipe cleaners are then packed in a container and sealed to prevent evaporation.

While the above-mentioned patents accomplish their purposes to a satisfactory extent, they still exhibit a variety of drawbacks. For example, they usually require apparatus, such as pumps, spray bars, manifold lines, valves, and the like as part of the automatic blanket cleaning systems for introducing the cleaning solvents or solutions to the cleaning fabric just prior to actual use. Moreover, even in these cases, where the cleaning rolls or fabric rolls are pre-soaked or pre-wetted, the pre-soaking or pre-wetting, must be accomplished just before use in order to minimize loss of cleaning solvent or solution in order to provide an effective cylinder cleaning system.

U.S. Pat. No. 5,368,157 to Gasparrini et al., the present applicants, attempted to overcome these problems. That patent is directed to a pre-packaged, pre-soaked cleaning system for use with printing machines or the like to clean the cylinders of such machines and which comprises a pre-soaked fabric roll saturated to functional equilibrium with low volatility organic compound solvent and which is disposed around an elongated, cylindrical core and enclosed in a sealed sleeve which if desired may be a heat-sealed or a heat-shrunken and heat-sealed plastic sleeve disposed around and intimate contact with the fabric roll, whereby the pre-soaked saturated fabric roll can be transported and stored vertically and/or horizontally until use without substantially disturbing the distribution of the solvent in the fabric roll and detrimentally effecting the cleaning ability of the fabric.

While the invention disclosed in U.S. Pat. No. 5,368,157 works for its intended purpose, improvements have been discovered. When the patented product is placed in the vertical position, the solvent would shift downward in the evacuated package. When the package is restored to the horizontal position, the solvent migrates back towards equilibrium in the roll. This migration is caused by air pockets in the fabric of the roll that have not been completely evacuated.

There exists, therefore, a need for providing a prepackaged, pre-soaked blanket cleaning system which minimizes the above-mentioned disadvantages and drawbacks. The present invention fulfills such a need.

SUMMARY OF THE INVENTION

Briefly described, the present invention is directed to a new and improved system for cleaning a cylinder of a printing press using a pre-soaked fabric having a reduced volume of air which prevents and/or reduces the migration of the solvent in the fabric roll and increases the length of the cleaning fabric without increasing the diameter of the fabric roll. In accordance with a preferred embodiment, the cleaning system includes a core. Preferably, but not necessarily, the core is hollow and cylindrically shaped. A cleaning fabric with a reduced air content is wrapped around the core to form a fabric roll. A wetting agent comprising a low volatility cleaning compound is present in the cleaning fabric in an amount sufficient to saturate the cleaning fabric to functional equilibrium.

Advantageously, the fabric roll is sealed by a sleeve disposed around the cleaning fabric. The sleeve may also be in intimate contact with the fabric roll. This allows the cleaning fabric to be transported and stored both vertically and horizontally until use without substantially disturbing the distribution of the solution in the fabric and detrimentally affecting the cleaning ability of the fabric.

In a preferred embodiment, the air content of the cleaning fabric is reduced by between about 1% to about 50%. This acts to reduce the thickness of the fabric. It also acts to increase the length of fabric while not increasing the diameter of the fabric roll.

Another preferred embodiment further includes a means for positioning the fabric adjacent to a cylinder to be cleaned. This means may also place the cleaning fabric operatively associated with the cylinder or in a position to clean the cylinder while the fabric is in contact with and fed past the cylinder.

The invention also includes a method for making the inventive cleaning system. Broadly, the method comprises reducing the air in a strip of cleaning fabric. The strip of cleaning fabric is placed in contact with a low volatility organic compound solvent which does not evaporate readily at ambient temperature and pressure and saturating the cleaning fabric with the solvent. Solvent is applied by measured absorption to the fabric to obtain a fabric saturated to functional equilibrium with the solvent. The saturated cleaning fabric is wrapped around a core to form a pre-soaked fabric roll.

In a more specific aspect of the method, the fabric roll is sealed to allow transportation and storage, both vertically and horizontally, until use without substantially disturbing the distribution of the solvent in the fabric roll and detrimentally affecting the cleaning ability of the fabric roll.

In still another aspect of the method, the content of air in the cleaning fabric is reduced by calendaring.

In yet another more specific aspect of the method, the content of air in the cleaning fabric is reduced by reducing the thickness of the cleaning fabric by between about 10% to about 50%.

In yet another more specific aspect of the method, the amount of air in the cleaning fabric is reduced by between about 1% and about 50%.

It will be appreciated by those skilled in the art that the foregoing summary of the invention and the following detailed description are merely exemplary and explanatory of the present invention, but are not intended to be restrictive thereof or limiting of the advantages which can be achieved by the invention or various combinations thereof. The accompanying drawings referred to herein and constituting in part hereof, illustrate preferred embodiments of the invention and, together with the detailed description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention more fully, reference is directed to the accompanying drawings, which is to be taken in conjunction with the following description of the invention and in which Drawings:

FIG. 1 is a lateral, sectional, elevational view of a cleaning system employing a reduced volume of air in cleaning fabric according to the invention;

FIG. **2** is a lateral, sectional, elevational view of the system shown in FIG. **1**, including the disposition of the presoaked, wrapped roll in a slotted canister before it is inserted in the sealable sleeve and/or sealable and shrinkable sleeve shown in FIG. **1**;

FIG. **3** is a partial, sectional, elevational, diagrammatic view of the system shown in FIG. **1** employing end caps disposed in the open ends of the elongated core and extending over the peripheral edges of the fabric roll;

FIG. **4** is a sectional view of a fabric undergoing calendaring; and

FIG. **5** is a partial cross-sectional view of a cylinder to be cleaned and a pre-soaked cleaning system employing a reduced volume of air in fabric according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. **1**, a cleaning system employing a reduced volume of air in cleaning fabric with a longer length but not an increased diameter according to the present invention comprises an elongated core **11** made from, for example, relatively heavy cardboard of sufficient strength so that it can support thereon a pre-soaked fabric roll **13**. Additionally, if desired, the core **11** can be made from any other suitable material including, but not limited to, plastic or metal, such as steel, aluminum, and the like. Core **11** may have open ends to allow engagement on an appropriate machine. Core **11** may also be a shaft. Preferably, as shown in FIG. **2**, core **11** is completely hollow to allow a shaft, rod, or the like **21** to be inserted within core **11** to provide engagement. The core **11** is also preferably provided with engagement means (not shown), for reception of a shaft **21** located on an appropriate machine (not shown), such as a printing machine or the like, provided with a take-up shaft **52** to take-up the cleaning fabric after it has achieved its cleaning function. Alternatively, shaft **21** may be equipped with engagement means (not shown) for engagement of a core **11**. Preferably, the core **11** is cylindrical in shape. However, the core **11** may be any other appropriate shape.

The machine further includes a means for properly positioning the cleaning fabric to allow cleaning of the cylinder. Several ways exist for this result to be achieved. For example, the cleaning fabric **54** may be positioned so that it is adjacent the cylinder **56** to be cleaned. In another example, the cleaning fabric **54** may be adjacent to and operatively associated with the cylinder **56** to be cleaned. In yet another possible embodiment, the cleaning fabric **54** is operatively associated with the cylinder **56** to clean the cylinder **56** as the fabric **54** is in contact with and fed past the cylinder **56**. One possible arrangement is shown in FIG. **5**. The person of ordinary skill in the art will be aware of many other configurations that will work for the invention's intended purpose without undue experimentation. These examples are merely exemplary and are not meant to limit how the invention may be used.

The fabric is presoaked and saturated with a low volatility organic compound solvent, as described in more detail hereinbelow, before or after it is wrapped around the core **11** to form roll **13** in any convenient matter. Solvent is applied in measured amounts so that the fabric is presoaked to functional equilibrium. The preferred method of applying solvent is measured absorption of solvent. If desired, an excess amount of solvent can be applied and the excess solvent drained or spun off to obtain functional equilibrium rather than the use of measured absorption. In a preferred embodiment, the roll **13** is then inserted into a sealable sleeve **15** which is to be sealed in any convenient and appropriate matter. Preferably, sleeve **15** is made of heat-sealable or heat-sealable and shrinkable plastic material which is heat sealed along its edge **17** or shrunken and heat-sealed along its edge **17**. The sealing of sealable sleeve **15** preferably places sleeve **15** in intimate contact with fabric roll **13**.

In the modified embodiment of the invention illustrated in FIG. **2**, the pre-soaked fabric roll is inserted in a sleeve or canister **23**, provided with a slit **24** through which a portion of the fabric roll **13** can be withdrawn before the assembly is sealed in the sleeve.

In yet another modified embodiment, as shown in FIG. **3**, the system of this invention is also preferably provided with end caps, such as end cap **25**, made of plastic or metal or like material disposed in the open ends of the core **11**. The end caps extend over the peripheral edges of the fabric roll **13** and the sleeve **15** may extend, as shown, over the edges of the end caps or it may extend completely around the ends of the roll **13** as shown in FIG. **1**. Obviously, when a slotted canister **23** is employed end caps will not be used. Moreover, it is to be understood that it is within the purview of this invention that the sleeve is sized conveniently to accommodate the roll to be covered thereby and to be drawn or shrunken into intimate contact with the roll and sealed, as needed, whether it be open at both ends or at one end only.

The fabric from which the fabric roll is made may vary widely. For example, it may be made of paper, cloth, film, a mixture of wood pulp and polyester, such as DuPont SONTARA, or any other suitable material. In those cases where a cloth fabric is employed, it may be a woven or non-woven cloth fabric made of synthetic or natural fibers or mixtures of the same. Exemplative, but not limitative, of suitable synthetic fibers which may be used in the cloth fabrics are polyester fibers, rayon fibers, nylon fibers, and acrylic fibers and the like. Exemplative, but not limitative, of the natural fibers which may be employed are cotton fibers, wood pulp fiber, hemp fibers and the like.

In those cases where paper is employed as the fabric material, paper fabrics made from wood pulp modified chemically in accordance with paper manufacturing technology are suitable.

On the other hand, no matter what fabric is employed in carrying out the practice of this invention, it is preferred that the materials used therein exhibit high acceptability to being soaked or wetted by a solvent. Preferably, this solvent is a low volatility organic compound solvent used to saturate the fabric. In this regard, it is preferred that the fabric employed be one which has a caliper thickness in a range from about 0.003 inches to about 0.030 inches, and preferably in a range from about 0.007 inches to about 0.020 inches, and the ability, when saturated with low volatility organic compound solvent, to retain from about 0.02 cc to about 0.5 cc of solvent per in^2 of fabric determined by routine testing methods.

In general, woven and non-woven fabrics suitable for use in carrying out the practice of the invention have a basic weight in a range of from about 1.5 ounces per square yard to about 6.0 ounces per square yard, a caliper thickness in the range mentioned above, a tensile strength in the longitudinal (machine) direction in a range of from about 20 lbs. per inch to about 200 lbs. per inch and in a width (cross) direction in a range from about 15 lbs. per inch to about 125 lbs. per inch.

When paper is employed as a cleaning fabric in the system of this invention, it preferably has a basis weight in a range

of from about 40 lbs. to about 90 lbs., a caliper thickness in a range of from about 0.003 inches to about 0.010 inches, a tensile strength in the longitudinal (machine) direction in a range of from about 20 lbs. per inch to about 80 lbs. per inch and in the width (cross) direction in a range of from about 15 lbs. per inch to about 50 lbs. per inch, a porosity in a range of from about 1.0 second to about 10 seconds when subjected to 100 cc of low volatility organic compound solvent or water, and a stretch ability in a range of from about 1.0 percent to about 6.0 percent all determined by routine testing methods.

Regardless of the type of material used as the cleaning fabric, the fabric must have a reduced air content. In one embodiment, all of the air is removed from the fabric. In another embodiment, between about 1% and about 50% of the air is removed. One method of accomplishing this reduced air content is to start with a fabric with substantially no or little air content. Alternatively, if the fabric initially has a substantial air content, this air content can be removed from the fabric to produce a reduced air content fabric. The reduced air content provides for an absorptive solvent amount and a reduced displacement of solvent during storage and thus less of a shift or no shift in the fabric roll's center of gravity and allows for better and more even distribution of the solvent within the fabric roll **13**.

The preferred, but not exclusive, method of reducing the air content in the fabric is calendaring. Calendaring is demonstrated in FIG. **4**. A fabric **41** is calenderized by running it through at least a pair of rollers **42**. The at least a pair of rollers **42** compress the fabric. Preferably, but not necessarily, the temperature of the at least a pair of rollers **42** is hotter than room temperature. Alternatively, the temperature of the at least a pair of rollers **42** is at about ambient temperature or less than ambient temperature. It has been found that the wettability and the distribution of the solvent is very good in the calenderized fabric.

The amount of calendaring necessary to remove the air from the fabric is dependent on the fabric. For example, if standard cloth of 0.012 inches is used, such as DuPont's SONTARA, it is preferred that the fabric is calendared to reduce its thickness to about 0.0085 inches. This reduces the air content in the cloth by about 30%.

A surprising and unexpected result of the calendaring process is that the length of fabric is increased while not increasing the diameter of the fabric roll **13**. This provides an important advantage because cleaners are designed to accept fabric rolls of up to a certain diameter. For example, one of the assignor's automatic blanket cleaners will only accept a cleaning fabric roll having a diameter of about 2.75 inches. Because of this extra length, a fabric roll of calenderized cloth will be usable for more washes than a regular fabric roll of the same fabric having the same diameter. This has two advantages. First, the cost per wash will be reduced. Second, the pressmen need not change a roll of cleaning fabric as often since there are more washes per roll of cloth. This will allow for the press to be run more often. These advantages can be realized regardless of whether the fabric is pre-soaked and/or prepackaged.

The amount of increase in the length of cloth due to calendaring is dependent on the fabric used and the amount of calendaring. For example when DuPont SONTARA cloth having a thickness of about 0.012 inches and a length of about 12 yards is placed about a core, having a diameter of about 1.5 inches, the fabric roll has a diameter of 2.75 inches. After being calendared the cloth has a thickness of about 0.0085 inches and a length of about 16 yards and still has a diameter of about 2.75 inches when placed on the same core. Thus, in this situation, calendaring results in an about 25% to about 30% increase in the length of the fabric without increasing the diameter of fabric roll **13**. Depending on the type of fabric and amount of calendaring, results may range from about a 10% increase to about a 50% increase.

The low volatility organic compound solvent employed in carrying out the practice of this invention may vary widely and generally it includes at least one low volatility, organic compound solvent which does not readily evaporate at ambient temperature and pressure, as well as mixtures of the same with similar low volatile organic compound solvents or with normally volatile organic compound solvents. Exemplative, but not limitative, of suitable solvent materials of this type are organic compound solvents selected from vegetable oils and citrus oils and the like. Generally, such solvent materials have a volatile organic content in a range of from about zero up to about 30.0 percent, and preferably a volatile organic content in a range of from about zero percent to about 20.0 percent, determined by routine testing methods. It is to be understood that within the purview of this invention, such suitable solvents also include normally volatile organic compound solvents, that is, those which readily evaporate and which are selected from mineral spirits and aliphatic hydrocarbon solvents and the like. Such solvent materials generally have a volatile organic content of from zero up to about 100 percent determined by routine testing methods. Preferably, a low volatility solvent will be used because the lower the volatility of the solvent, the longer the fabric stays wet since less solvent evaporates. The closer the volatility is to zero percent, the longer the life of the presoaked fabric on the printing press.

For the embodiments involving heat-sealing and/or heat-sealing and shrinking, a wide variety of heat-sealable and/or shrinkable and heat-sealable plastic materials may be used for sealable sleeve **15**. For example, the sleeve may be made from polyethylenes, polyolefins, polyvinyl chlorides, and polyamides and the like. Generally, such materials are heat-sealable and/or shrinkable and heat-sealable at a temperature in a range of from about 300° F. to about 400° F., and preferably in a range of from about 350° F. to about 375° F. Moreover, it is to be understood that within the purview of this invention, the heat-sealable and/or shrinkable and heat-sealable sleeve may be made from heat-sealable and/or shrinkable and heat-sealable paper.

The method of making a cleaning system employing a reduced air content cleaning fabric according to the invention comprises obtaining a strip of reduced air content cleaning fabric. For purposes of this invention, the term reduced air content cleaning fabric additionally encompasses a fabric having no or substantially no air content. One method of obtaining a reduced air content cleaning fabric is to make or purchase a cleaning fabric with substantially little or no air content. Alternatively, a strip of fabric with a substantial air content can have its air content reduced. Preferably, the method of reducing the air content of the fabric is calendaring. The strip of reduced air content cleaning fabric is brought in contact with a low volatility, organic compound solvent which does not evaporate readily at ambient pressure and temperature and presoaking and saturating the cleaning fabric to functional equilibrium. This is preferably done by measured absorption. Excess solvent, if any, may be removed from the cleaning fabric, preferably by draining or spinning the excess solvent, to obtain a fabric saturated to functional equilibrium with the solvent. The cleaning fabric is wrapped around an elongated core forming a fabric roll.

In one variation of the method, the fabric is preferably wrapped around the core prior to contacting the same with the solvent. In yet another embodiment, the fabric is wrapped around the core after being saturated with the cleaning solvent. It is also within the invention to saturate the fabric with solvent both prior to and after forming the fabric roll **13**. The wrapping of the fabric can be done in any convenient manner and requires no special apparatus, a wide variety of roll making equipment being readily available for accomplishing the same.

In a preferred embodiment, the method further comprises the step of sealing the fabric roll so that it can be transported and stored vertically and horizontally until use without substantially disturbing the distribution of said solvent in said fabric roll and detrimentally affecting the cleaning ability of the fabric. The preferred, but not exclusive, method of sealing the fabric roll is the use of a sealable sleeve disposed around the fabric roll. The preferred type of sealable sleeve is a heat-sealable plastic sleeve around the wrapped fabric roll and placed in intimate contact with the fabric roll and subjecting the sleeve to a temperature sufficient to seal the plastic sleeve around the wrapped fabric roll. In order to use this type of sealant, the fabric roll is inserted in a heat-sealable and/or shrinkable and heat-sealable plastic sleeve and the sleeve is heat-sealed and/or heat-sealed and shrunken at any appropriate temperature around the roll in intimate contact therewith. Generally, temperatures in a range of from about 300° F. to about 400° F., and preferably in a range from about 350° F. to about 375° F., are used to accomplish the heat-sealing and/or heat-sealing and heat-shrinking of the saturated fabric roll in the plastic sleeve and bringing the sleeve into intimate contact with the fabric roll.

In a variation of the method, it is preferred, especially where a heat-sealable plastic sleeve is employed, that once the fabric roll is inserted in the sleeve, the so assembled sleeve and fabric roll be subjected to a vacuum which draws the heat-sealable plastic sleeve into intimate contact with the fabric roll, while at the same time exhausting any air from the interior of the sleeve, and then simply heat-sealing the sleeve around the roll by application of heat to the open peripheral edges of the sleeve. Known appropriate vacuum apparatus and heat-sealing apparatus may be used by simple adaption of the same physically to accomplish apparatus for applying the vacuum and heat-sealing of the sleeve.

On the other hand, when a sleeve employed in carrying out the method is both heat-sealable and shrinkable, then one or more small openings or vent holes (not shown) in the sleeve, preferably located near the open edges of the sleeve, are provided to permit exhaustion of air from the sleeve as heat-sealing and shrinking is accomplished, the location of such opening or openings assuring that any such opening or openings will be closed during the heat-sealing and heat-shrinking of the sleeve.

In accordance with the method of this invention, contact between the fabric strip and the solvent can be achieved in a variety of ways by a variety of means for introducing the solvent including spray nozzles, pouring containers, and immersing tanks. For example, if desirable, the appropriate solvent may be poured over the fabric in amounts sufficient to saturate the same while simply permitting excess solvent to drain off into a tray, or the solvent can be sprayed on the fabric. The saturation step can be carried out at ambient temperature and pressure and the excess, as mentioned above, simply permitted to drain off for a period of time sufficient to obtain a fabric saturated to functional equilibrium. Any other appropriate method of removing the excess solvent to obtain a fabric saturated to functional equilibrium can be used.

It is within the purview of an embodiment of the invention that the fabric strip be immersed or transported through a tank of appropriate solvent in a substantially horizontal direction either before or after, and preferably before, it has been wrapped on the core to form a roll. After saturation has taken place, the saturated fabric is preferably simply suspended in a position to permit excess solvent to drain off or run through two rollers and be collected in a tray for reuse.

Additionally, in accordance with a preferred embodiment of the method, the air content of the fabric must be reduced or eliminated. Any appropriate reduction of air content step may be employed. The preferred method of reducing the air content of the fabric is calendaring. A fabric is calenderized by running it through at least a pair of rollers. The at least a pair of rollers compresses the fabric. Preferably, but not necessarily, the temperature of the pair of rollers is either hotter than room temperature or at or cooler than room temperature. A surprising and unexpected result of the removal of the air content is that the length of fabric is increased while not increasing the diameter of the fabric roll.

The wrapping of the fabric on the elongated core to form a roll, as well as measured absorption and/or draining or other removal thereof, may also take place at ambient temperature and pressure. When the saturation of the fabric and wrapping of the fabric to form a fabric roll are completed, the fabric roll may be inserted in a sleeve. Preferably, the fabric roll is inserted in a heat-sealable and shrinkable plastic sleeve and the sleeve is heat-sealed and/or shrunk and heat-sealed at a temperature sufficient to heat-seal the sleeve around and in contact with the saturated, wrapped fabric roll. In this regard, the particular shrinking and heating-sealing temperature will be dependent upon the type of shrinkable and heat-sealable material utilized. Care must be taken, however, to be sure that the particular temperature employed is not so high that it will have a deleterious affect on the saturated fabric roll disposed in the plastic sleeve.

In general, heat-sealing can be achieved at temperatures in a range of from about 300° F. up to about 400° F., and preferably are achieved at temperatures in a range of from about 350° F. up to about 375° F. and may be carried out in an oven, or under heat-radiating lamps.

The sleeve will be sized so that the wrapped fabric roll can be inserted therein with facility and the open edges of the sleeve then brought together in contact with each other in order to seal the same, while at the same time, being sized also so that if and when shrinking takes place, it will be brought into contact with the fabric roll around which it is disposed.

In those cases where the saturated, wrapped fabric roll is to be employed with a slotted canister **23**, the roll is simply inserted in the canister **23** with a portion thereof protruding through the slot and the canister **23** is provided with a knock-out end portions which may be inserted therein after insertion of the roll, such end portions simply being removed when the roll is to be disposed on an appropriate shaft of a printing apparatus or the like in order to permit insertion of the shaft from the core. Moreover, the canister **23** may be made from metals, such as light gauge steel, aluminum and the like, or from cardboard or from plastic materials, such as polyethylenes, polyolefins, polyvinyl chlorides, polyamides, and the like.

In those instances where end caps, such as end caps **25**, are employed in making the cleaning system employing a reduced air cleaning fabric, the end caps, which may be made of the same materials mentioned above for the canister

23, are simply inserted in the open ends of the core 11 after wrapping, saturation and removal of excess solvent of the method has been accomplished.

It is to be understood that within the context of this invention, the terminology "saturated to functional equilibrium" as it is used in connection with the saturation of the fabric and/or fabric roll with solvent means that after applying a measured amount of solvent or removing the excess solvent from the fabric and/or fabric roll, the fabric and/or fabric roll retains therein sufficient solvent or wetting agent in an amount to wet the fabric to the extent that it imparts efficient cleaning ability to the fabric to clean cylinders of apparatus, such as printing machinery, and the fabric has preferably retained therein after measured absorption or removal of the excess, if any removal is required, from about 0.02 cc to about 0.5 cc of solvent per in^2 of fabric.

In one embodiment, the so made cleaning system employing a reduced air content fabric of this invention can be employed on any printing apparatus simply by modifying the apparatus to provide it with at least one shaft which can be inserted through the open ends of the core. In a preferred embodiment, a single shaft is inserted through a hollow core. Additionally, the printing apparatus may be provided with a take-up roll which is employed to take up the used portion of the cleaning fabric after it has carried out its cleaning function. This is a distinct advantage of the cleaning system of this invention since it eliminates the need for complex apparatus, such as pumps, spray bars, manifold lines, valves and the like, especially as part of the automatic blanket cleaning systems used on printing machinery to introduce cleansing solvents or solutions to the cleaning fabric just prior to use.

In addition, the cleaning system of this invention provides numerous other advantages. For example, it is relatively simple in construction, employs readily available materials, and can be made in a relatively simple and forward manner without resort to highly complex and expensive procedures which necessitate the use of elaborate machinery. Additionally, the invention is an alternative to the invention discussed in U.S. Pat. No. 5,368,157 to Gasparrini et al. in that it provides for less solvent displacement during storage and thus less of a change in the fabric roll's center of gravity. Additionally, the use of a cleaning fabric with a reduced volume of air on the present and conventional systems not involving presoak techniques will have the advantage of having more fabric on a cleaning fabric supply roll of a given diameter. Numerous other advantages of this invention will be readily apparent to those skilled in the art.

It will remain understood by those skilled in the art that the present invention in its broader aspects is not limited to the particular embodiments shown and described herein, and that variations may be made which are within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

We claim:

1. A device for cleaning a cylinder of a printing press comprising:

a reduced air content cleaning fabric having an air content by volume of 1 to 50 percent; and

a solvent comprising a low volatility cleaning compound which does not readily evaporate at ambient temperature, and means for introducing said solvent being into said reduced air content cleaning fabric in an amount sufficient for cleaning said cylinder of a printing press.

2. The device for cleaning the cylinders of a printing press as defined in claim 1 further comprising a sealed sleeve disposed around and in contact with said fabric, said sealed sleeve containing substantially no air.

3. The device for cleaning the cylinders of a printing press as defined in claim 2 wherein said sealed sleeve is comprised of a heat-sealable plastic material selected from the group consisting of heat sealable polyethylene, heat-sealable polyolefins, polyvinyl chlorides, and heat-sealable polyamides.

4. The device for cleaning the cylinders of a printing press as defined in claim 2 wherein said sealed sleeve is shrinkable and is comprised of a heat-sealable and shrinkable plastic material selected from the group consisting of heat-sealable and shrinkable polyethylenes, heat-sealable and shrinkable polyolefins, heat-sealable and shrinkable polyvinyl chlorides, and heat-sealable and shrinkable polyamides.

5. The device for cleaning the cylinders of a printing press as defined in claim 2 further comprising a canister disposed between said fabric and said sleeve.

6. The device for cleaning the cylinders of a printing press as defined in claim 2 including a core which comprises an elongated cylinder having open end, said device further comprising end caps located in the open end of said core.

7. The device for cleaning the cylinders of a printing press as defined in claim 1 wherein the thickness of said fabric has been reduced by between about 10% to about 50%.

8. The device for cleaning the cylinders of a printing press as defined in claim 1 wherein said fabric is a cloth fabric.

9. The device for cleaning a cylinder of a printing press as defined in claim 1 wherein said fabric retains from about 0.02 to about 0.5 cc of said solvent per square inch of said fabric.

10. The device for cleaning the cylinders of a printing press as defined in claim 1 wherein said fabric comprises a mixture of wood pulp and polyester.

11. The device of claim 1 wherein said fabric has a length that is about 10 to 50 percent greater than the length of non-reduced air content fabric having an equal diameter about said core.

12. The device for cleaning a cylinder of a printing press as defined in claim 1 further comprising a means for positioning said fabric adjacent to said cylinder to be cleaned.

13. The device for cleaning a cylinder of a printing press as defined in claim 1 further comprising a mounting means for mounting said core and said fabric in a position to clean said cylinder while said fabric is in contact with and is fed past said cylinder.

14. A method for making a cleaning system comprising:

reducing air content of a strip of cleaning fabric by 1 to 50 percent to form a strip of reduced air cleaning fabric; and

contacting said strip of reduced air content cleaning fabric with a low volatility, organic compound solvent which does not evaporate readily at ambient temperature and pressure and pre-soaking and saturating said reduced air content cleaning fabric with said solvent.

15. The method as defined in claim 14 further comprising the step of sealing said wrapped, saturated cleaning fabric roll in a substantially liquid impervious material so that said wrapped, saturated cleaning fabric roll can be transported and stored vertically and horizontally until use without substantially disturbing the distribution of said solvent in said fabric roll and detrimentally affecting the cleaning ability of said fabric.

16. The method as defined in claim 15 wherein said step of sealing comprises disposing a sealable sleeve around the

wrapped, saturated fabric roll and sealing said sealable sleeve around said wrapped, saturated fabric roll.

17. The method as defined in claim **16** wherein said step of sealing comprises subjecting said sealable sleeve to a vacuum to remove substantially all of the air from said sealable sleeve before sealing said sleeve.

18. The method as defined in claim **14** including providing an elongated core wherein said strip of cleaning fabric is wrapped about said elongated core prior to contacting said strip of cleaning fabric with said solvent.

19. The method as defined in claim **14** wherein the step of contacting said strip comprises saturating said fabric beyond equilibrium with excess solvent and removing said solvent so that said fabric is in functional equilibrium.

20. The method as defined in claim **19** wherein said solvent is removed until said fabric retains from about 0.02 to about 0.5 cc of solvent per square inch of said fabric.

21. The method as defined by claim **14** wherein said step of contacting said strip comprises bringing a measured amount of said solvent in contact with said strip of cloth and allowing said measured amount of solvent to be absorbed.

22. The method as defined in claim **21** wherein said fabric absorbs from about 0.02 to about 0.5 cc of said solvent per square inch of said fabric.

23. The method as defined in claim **14** further comprising the steps of:

(a) unwinding at least a portion of said cleaning fabric from said fabric roll;

(b) placing said at least a portion of said cleaning fabric in contact with a cylinder to be cleaned; and

(c) taking-up said at least a portion of said cleaning fabric on a take-up shaft.

24. The method as defined in claim **14** wherein the step of reducing air content of said strip of cleaning fabric comprises calendaring said cleaning fabric.

25. The method as defined in claim **14** wherein the step of reducing air content of said strip of cleaning fabric is accomplished by reducing the thickness of said cleaning fabric by between about 10% to about 50%.

26. The method as defined in claim **14** wherein said step of reducing air content of said strip of cleaning fabric further comprises the step of increasing the length of said cleaning fabric by at least about 25% without substantially effecting the diameter of said fabric roll after the cleaning fabric has been wound about a core.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 5,974,976
DATED : August 27, 1997
INVENTOR(S) : C. Robert Gasparrini et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 11,
Line 61, "of" has been replaced with -- reduced by --.

Signed and Sealed this

Twenty-second Day of October, 2002

Attest:

Attesting Officer

JAMES E. ROGAN
Director of the United States Patent and Trademark Office

JS 44
(Rev. 12/96)

CIVIL COVER SHEET

The JS-44 civil cover sheet and the information contained herin neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civl docket sheet. (SEE INSTRUCTIONS ON THE REVERSE OF THE FORM.)

I. (a) PLAINTIFFS

BALDWIN GRAPHIC SYSTEMS, INC.

(b) COUNTY OF RESIDENCE OF FIRST LISTED PLAINTIFF _____
(EXCEPT IN U.S. PLAINTIFF CASES)

DEFENDANTS

BBA NONWOVENS SIMPSONVILLE INC., REEMAY INC. and BBA HOLDINGS INC.

COUNTY OF RESIDENCE OF FIRST LISTED DEFENDANT _____
(IN U.S. PLAINTIFF CASES ONLY)
NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED.

(c) ATTORNEYS (FIRM ADDRESS AND TELEPHONE NUMBER)
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Wilmington, DE 19801
302-658-9200

ATTORNEYS (IF KNOWN)

II. BASIS OF JURISDICTION (PLACE AN "X" IN ONE BOX ONLY)

- ☐ 1 U.S. Government Plaintiff
- ☒ 3 Federal Question (U.S. Government Not a Party)
- ☐ 2 U.S. Government Defendant
- ☐ 4 Diversity (Indicate Citizenship of Parties in Item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES
(For Diversity Cases Only)
(PLACE AN "X" IN ONE BOX FOR PLAINTIFF AND ONE BOX FOR DEFENDANT)

	PTF	DEF		PTF	DEF
Citizen of This State	☐ 1	☐ 1	Incorporated or Principal Place of Business in This State	☐ 4	☐ 4
Citizen of Another State	☐ 2	☐ 2	Incorporated and Principal Place of Business in Another State	☐ 5	☐ 5
Citizen or Subject of a Foreign Country	☐ 3	☐ 3	Foreign Nation	☐ 6	☐ 6

IV. ORIGIN *(PLACE AN "X" IN ONE BOX ONLY)*

☒ 1 Original Proceeding | ☐ 2 Removed From State Court | ☐ 3 Remanded From Appellate Court | ☐ 4 Reinstated or Reopened | ☐ 5 Transferred From another district (specify) _____ | ☐ 6 Multidistrict Litigation | ☐ 7 Appeal to District Judge from Magistrate Judgement

V. NATURE OF SUIT *(PLACE AN "X" IN ONE BOX ONLY)*

CONTRACT
- ☐ 110 Insurance
- ☐ 120 Marine
- ☐ 130 Miller Act
- ☐ 140 Negotiable Instrument
- ☐ 150 Recovery of Overpayment & Enforcement of Judgement
- ☐ 151 Medicare Act
- ☐ 152 Recovery of Defaulted Student Loans (Excl Veterans)
- ☐ 153 Recovery of Overpayment of Veteran's Benefits
- ☐ 160 Stockholder Suits
- ☐ 190 Other Contract
- ☐ 195 Contract Product Liability

TORTS

PERSONAL INJURY
- ☐ 310 Airplane
- ☐ 315 Airplane Product Liability
- ☐ 320 Assault Libel & Slander
- ☐ 330 Federal Employers Liability
- ☐ 340 Marine
- ☐ 345 Marine Product Liability
- ☐ 350 Motor Vehicle
- ☐ 355 Motor Vehicle Product Liability
- ☐ 360 Other Personal Injury

PERSONAL INJURY
- ☐ 362 Personal Injury - Med Malpractice
- ☐ 365 Personal Injury - Product Liability
- ☐ 368 Asbestos Personal Injury Product Liability

PERSONAL PROPERTY
- ☐ 370 Other Fraud
- ☐ 371 Truth in Lending
- ☐ 380 Other Personal Property Damage
- ☐ 385 Property Damage Product Liability

REAL PROPERTY
- ☐ 210 Land Condemnation
- ☐ 220 Foreclosure
- ☐ 230 Rent Lease & Ejectment
- ☐ 240 Torts to Land
- ☐ 245 Tort Product Liability
- ☐ 290 All Other Real Property

CIVIL RIGHTS
- ☐ 441 Voting
- ☐ 442 Employment
- ☐ 443 Housing/ Accommodations
- ☐ 444 Welfare
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PRISONER PETITIONS
- ☐ 510 Motions to Vacate Sentence

HABEAS CORPUS:
- ☐ 530 General
- ☐ 535 Death Penalty
- ☐ 540 Mandamus & Other
- ☐ 550 Civil Rights
- ☐ 555 Prison Condition

FORFEITURE/PENALTY
- ☐ 610 Agriculture
- ☐ 620 Other Food & Drug
- ☐ 625 Drug Related Seizure of Property 21 USC 881
- ☐ 630 Liquor Laws
- ☐ 640 R R & Truck
- ☐ 650 Airline Regs
- ☐ 660 Occupational Safety/Health
- ☐ 690 Other

LABOR
- ☐ 710 Fair Labor Standards Act
- ☐ 720 Labor/Mgmt. Relations
- ☐ 730 Labor Mgmt. Reporting & Disclosure Act
- ☐ 740 Railway Labor Act
- ☐ 790 Other Lablor Litigation
- ☐ 791 Empl Ret Inc Security Act

BANKRUPTCY
- ☐ 422 Appeal 28 USC 158
- ☐ 423 Withdrawal 28 USC 157

PROPERTY RIGHTS
- ☐ 820 Copyrights
- ☒ 830 Patent
- ☐ 840 Trademark

SOCIAL SECURITY
- ☐ 861 HIA (1395ff)
- ☐ 862 Black Lung (923)
- ☐ 863 DIWC/DIWW (405(g))
- ☐ 864 SSID Title XVI
- ☐ 865 RSI (405(g))

FEDERAL TAX SUITS
- ☐ 870 Taxes (U.S. Plaintiff or Defendant
- ☐ 871 IRS - Third Party 26 USC 7609

OTHER STATUTES
- ☐ 400 State Reapportionment
- ☐ 410 Antitrust
- ☐ 430 Banks or Banking
- ☐ 450 Commerce/ICC Rates/etc
- ☐ 460 Deportation
- ☐ 470 Racketeer Influenced and Corrupt Organizations
- ☐ 810 Selective Service
- ☐ 850 Securities/Commodities/ Exchange
- ☐ 875 Customer Challenge 12 USC 3410
- ☐ 891 Agricultural Acts
- ☐ 892 Economic Stabilization Act
- ☐ 893 Environmental Matters
- ☐ 894 Energy Allocation Act
- ☐ 895 Freedom of Information Act
- ☐ 900 Appeal of Fee Determination Under Equal Access to Justice
- ☐ 950 Constitutionality of State Statutes
- ☐ 890 Other Statutory Actions

VI. CAUSE OF ACTION (CITE THE U.S. CIVIL STATUTE UNDER WHICH YOU ARE FILING AND WRITE BRIEF STATEMENT OF CAUSE DO NOT CITE JURISDICTIONAL STATUTES UNLESS DIVERSITY)

Patent infringement under 35 U.S.C. §271

VII. REQUESTED IN COMPLAINT

☐ CHECK IF THIS IS A **CLASS ACTION** UNDER F.R.C.P. 23

DEMAND $

CHECK YES only if demanded in complaint:
JURY DEMAND: ☒ YES ☐ NO

VIII. RELATED CASE(S) IF ANY (See Instructions)

JUDGE _____ DOCKET NUMBER _____

DATE
February 3, 2006

SIGNATURE OF ATTORNEY OF RECORD

FOR OFFICE USE ONLY

RECEIPT # _____ AMOUNT _____ APPLYING IFP _____ JUDGE _____ MAG. JUDGE _____

AO FORM 85 RECEIPT (REV. 9/04)

United States District Court for the District of Delaware

Civil Action No. 06-77

ACKNOWLEDGMENT OF RECEIPT FOR AO FORM 85

NOTICE OF AVAILABILITY OF A UNITED STATES MAGISTRATE JUDGE TO EXERCISE JURISDICTION

I HEREBY ACKNOWLEDGE RECEIPT OF 3 COPIES OF AO FORM 85.

2/3/06
(Date forms issued)

Luke Nuzzi
(Signature of Party or their Representative)

Luke Nuzzi
(Printed name of Party or their Representative)

Note: Completed receipt will be filed in the Civil Action