IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BALDWIN GRAPHIC SYSTEMS, INC.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil Action No. 06-077-JJF
	)	
FIBERWEB SIMPSONVILLE, INC., and FIBERWEB, INC.,	)	
	)	
	)	
Defendants.	)	

DECLARATION OF FRANCIS DIGIOVANNI IN SUPPORT OF DEFENDANTS' MOTION TO TRANSFER OR STAY THIS ACTION

I, Francis DiGiovanni declare as follows:

1. I make this declaration in support of Defendants' Memorandum in Support of their Motion to Transfer or Stay this Action.

2. I have been retained by the Defendants as counsel in connection with the litigation between Baldwin Graphic Systems, Inc. and Defendants (Fiberweb Simpsonville, Inc., and Fiberweb, Inc.). I have personal knowledge of the facts set forth below.

3. I am an attorney at the law firm of Connolly Bove Lodge & Hutz LLP.

4. Exhibit A is a true and correct copy of Judge Moran's July 28, 2005 Opinion and Order.

5. Exhibit B is a true and correct copy of Judge Moran's March 21, 2006 Opinion and Order.

6. Exhibit C is a true and correct copy of United States Patent No. Re 35,976 issued by the United States Patent and Trademark Office to Charles Robert Gasparrini and Walter H. Cano on December 1, 1998.

7. Exhibit D is a true and correct copy of United States Patent No. 5,974,976 issued by the United States Patent and Trademark Office to Charles Robert Gasparrini and Walter H. Cano on November 2, 1999.

I declare under the penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Dated: June 14, 2007



Francis DiGiovanni

544922

EXHIBIT A

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

BALDWIN GRAPHIC SYSTEMS, INC.,	)	
	)	
Plaintiff,	)	
	)	
vs.	)	No. 03 C 7713
	)	
SIEBERT, INC.,	)	
	)	
Defendant.	)	

MEMORANDUM OPINION AND ORDER

Plaintiff Baldwin Graphic Systems, Inc. (Baldwin) brought this suit against Siebert, Inc. (Siebert) alleging infringement of three patents for technology devoted to cleaning printing press components. Siebert has moved for summary judgment. Though Baldwin's complaint contains three counts, each based on a different patent, only two patents are relevant to Siebert's motion. Baldwin has not pursued count III for infringement of U.S. Patent No. 6,035,483 and in a proposed amended complaint drops all allegations concerning this patent. Siebert seeks summary judgment on Baldwin's other two counts involving Reissue U.S. Patent No. 35,976 for a "Pre-Packaged, Pre-Soaked Cleaning System And Method For Making The Same" and U.S. Patent No. 5,974,976 for a "Cleaning System And Process For Making Same Employing Reduced Air Cleaning Fabric." We consider Siebert's motion as well as Baldwin's motion to amend the complaint by dropping count III and adding Siebert's chief executive and president, James Mulcahy, as a defendant.

BACKGROUND

Baldwin, a Delaware corporation headquartered in Connecticut, manufactures and

sells printing press accessories, some of which are used to clean press components. Inventors, Charles Gasparrini and Walter Cano, developed innovations in the cleaning of printing presses for which they attained several patents that they then assigned to Baldwin. On November 29, 1994, Baldwin received U.S. Patent No. 5,368,157 ('157 patent) for an invention entitled "Pre-Packaged, Pre-Soaked Cleaning System And Method For Making The Same." The patent abstract described the invention as a roll of fabric soaked in a low volatility organic compound solvent that is placed in a heat-sealed plastic sleeve for shipping and storage. The roll can be attached to a printing press so that the solvent-soaked fabric contacts and cleans soiled press cylinders.

On April 10, 1995, less than five months after the patent issued, Gasparrini filed a Reissue Patent Application with the Patent and Trademark Office (PTO). He stated that errors in the original patent rendered it defective and that through an inadvertent mistake he and Cano had claimed less in the specification than that to which they had a right. The reissue application sought to amend language in the abstract and add a number of new claims. Though the patent examiner initially rejected Gasparrini's claims in the reissue application, after considerable correspondence recorded in the prosecution history, the patent was reissued with amendments as Reissue U.S. Patent No. 35,976 (reissue patent).

In November 1999, Baldwin acquired another patent that improved on the pre-packaged, pre-soaked cleaning system. Due to air pockets in the fabric of the pre-soaked roll, the solvent would shift, depending on how the roll was stored, creating an uneven distribution of solvent. Gasparrini and Cano solved this problem by reducing the amount of air in the fabric and thus curtailing the movement of solvent. On November 2, 1999, the PTO issued U.S. Patent No. 5,974,976 ('976 patent) for Gasparrini and Cano's invention, entitled

"Cleaning System And Process For Making Same Employing Reduced Air Cleaning Fabric." The description of the preferred embodiment of the invention explained that "[t]he preferred, but not exclusive, method of reducing the air content in the fabric is calendaring [sic]," a process in which the fabric is compressed by a pair of rollers.

Siebert, an Illinois corporation, owns a patent on a solvent that is also used in the cleaning of printing press components. In 2001, Siebert asked its attorney to assess whether the sale of fabric rolls soaked in its solvent would infringe certain patents assigned to Baldwin. In his written opinion, counsel concluded that Siebert's sale of pre-soaked rolls in drums or unsealed containers in quantities of three or more would not infringe Baldwin's reissue or '976 patents. In July 2002, Siebert began manufacturing and selling pre-soaked fabric rolls. None of Siebert's rolls was individually wrapped. Siebert sold the rolls in sets of three packaged in a zip-locked bag or in quantities of six to nine in a plastic bag that was not shut, but folded over. Sometime thereafter, Siebert stopped selling its set of three rolls in zip-locked bags, opting to package them in the same style as its larger quantity sales – in a folded-over plastic bag. Baldwin alleges that Siebert's sale of the pre-soaked rolls infringes independent claims 1 and 14 of the '976 patent, as well as dependent claims 7, 9 and 25. It further alleges defendant induced infringement of claim 23 and contributorily infringed claim 12. As to the reissue patent, Baldwin alleges contributory infringement of claim 32 for those rolls sold in zip-locked bags.

DISCUSSION

Our function in ruling on a motion for summary judgment is to determine if there is a genuine issue of material fact for trial. Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 249 (1986). If the evidence on file shows that no such issue exists, and the moving party is entitled

to judgment as a matter of law, we will grant the motion. Celotex Corp. v. Catrett, 477 U.S. 317, 322-23 (1986); Bennett v. Roberts, 295 F.3d 687, 694 (7th Cir. 2002). A "metaphysical doubt as to the material facts" is not enough to create a genuine issue of fact for trial, Matsushita Elec. Indus. Co., Ltd. v. Zenith Radio Corp., 475 U.S. 574, 585 (1986); the evidence must allow for a reasonable trier of fact to find for the non-movant. Buscaglia v. United States, 25 F.3d 530, 534 (7th Cir. 1994). When reviewing a motion for summary judgment we draw all inferences in the light most favorable to the non-movant. DeValk Lincoln Mercury, Inc. v. Ford Motor Co., 811 F.2d 326, 329 (7th Cir. 1987). In a patent infringement action a defendant seeking summary judgment may satisfy its burden of production by "providing evidence that would preclude a finding of infringement, or by showing that the evidence on file fails to establish a material issue of fact essential to the patentee's case." Novartis Corp. v. Ben Venue Laboratories, Inc., 271 F.3d 1043, 1046 (Fed. Cir. 2001); Vivid Technologies, Inc. v. American Science & Engineering, Inc., 200 F.3d 795, 806 (Fed. Cir. 1999).

An infringement analysis is a two-step process requiring the court to construe the scope and meaning of the relevant patent claims and then compare the properly construed claims to the allegedly infringing device. CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1365 (Fed. Cir. 2002). Patent claims "define the invention to which the patentee is entitled the right to exclude." Innova/Pure Water, Inc. v. Safari Water Filtration Sys. Inc., 381 F.3d 1111, 1116 (Fed. Cir. 2004). To prove infringement the patentee must establish that the defendant's device meets each element of a patent claim, either literally or under the doctrine of equivalents. Dynacore Holdings Corp. v. U.S. Philips Corp., 363 F.3d 1263 (Fed. Cir. 2004). If the accused device does not meet every claim element, or its substantial equivalent, then there is no infringement. Warner-Jenkins Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 40

(1997).

Claim construction is a matter of law, leaving the court with "the power and obligation" to construe the language of the patent claims. Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed. Cir. 1995). Because we have held a Markman hearing, our analysis of the summary judgment motion will be in light of claim constructions we have determined, explaining why we have so determined as we go. Claim construction analysis begins with the language of the claims. Hockerson-Halberstadt, Inc. v. Avia Group International, Inc., 222 F.3d 951, 955 (Fed. Cir. 2000). Courts apply a heavy presumption that claim language means what it says. Texas Digital Systems, Inc. v. Telegenix, Inc., 308 F.3d 1193 (Fed. Cir. 2002). Thus, "unless compelled otherwise, a court will give a claim term the full range of its ordinary meaning as understood by persons skilled in the relevant art." *Id.* Nonetheless, to determine the ordinary meaning of a term, courts look outside the claim to the patent's written description, drawings, the prosecution history and dictionaries and treatises, all of which provide a context that illuminates the claim term's meaning. Gemstar-TV Guide International, Inc. v. International Trade Commission, 383 F.3d 1352, 1364 (Fed. Cir. 2004); Abtox v. Exitron Corp., 122 F.3d 1019, 1023 (Fed. Cir. 1997). As the Federal Circuit made clear recently in Phillips v. AWH Corp., ___ F.3d ___, 2005 WL 1620331 (Fed. Cir. 2005), when courts construe claims, intrinsic evidence, especially the specification, takes priority over extrinsic sources, such as dictionaries. "The presumption of ordinary meaning will be 'rebutted if the inventor has disavowed or disclaimed scope of coverage, by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope.'" *Id.* (quoting ACTV Inc. v. Walt Disney Co., 346 F.3d 1082, 1091 (Fed. Cir. 2003).

First, we look to the reissue patent. Plaintiff alleges that defendant infringed claim 32

of this patent, which defines the invention as:

> 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.

Defendant argues that its product does not meet two elements in this claim: "a pre-soaked fabric roll" and a "sealed sleeve." Defendant construes "a pre-soaked fabric roll" to be a single fabric roll, and "sealed sleeve" to mean a heat-sealed sleeve. Plaintiff contends that "a pre-soaked fabric roll" in the context of this claim means one or more fabric rolls, and that "sealed sleeve" is not limited to heat-sealed sleeves.

The question of whether claim 32 applies to a cleaning system that has more than one fabric roll is not simply answered by the singular article "a," modifying "pre-soaked fabric roll." As defendant recognizes, "a" can mean "one or more" when in a claim with the transitional phrase "comprising." *See* Scanner Technologies Corp. v. Icos Vision Systems Corp., N.V., 365 F.3d 1299, 1304 (Fed. Cir. 2004); KCJ Corp. v. Kinetic Concepts, Inc., 223 F.3d 1351, 1356 (Fed. Cir. 2000). Unless the patentee "evinces a clear intent" to limit the article "a" to a singular interpretation, it is properly construed as one or more. KCJ Corp., 223 F.3d at 1356. To determine if there is clear intent to limit "a" to one, the court looks to claim language and context, and to the patent specification and prosecution. *Id.*; Scanner Technologies, 365 F.3d at 1304-05; *see* Phillips, 2005 WL 1620331 at *9 ("It is therefore entirely appropriate for a court, when conducting claim construction, to rely heavily on the written description for guidance as to the meaning of the claim.").

Defendant contends that the claim's repeated reference to "said fabric roll" indicates that the patentee contemplated only one roll. In Abtox, the Federal Circuit addressed the significance of the word "said," while analyzing whether the phrase "a metallic gas-confining chamber" limited the claim to relevant devices with a single chamber. The court found that the claim's repeated reference to "said chamber," instead of "a chamber," reinforced "the singular nature of the chamber." Abtox, 122 F.3d at 1024. Similar to the patent in Abtox, claim 32 of the reissue patent repeatedly employs the term "said fabric roll" to refer back to the antecedent, "a pre-soaked fabric roll."

Plaintiff cites the Manual of Patent Examining Procedure (MPEP) to support the contention that "said" does not *per se* connote "single," but rather is an accepted term used to refer back to a previously cited object. While we agree that "said" does not *per se* connote single, plaintiff's citation to MPEP § 2173.05(e) only strengthens defendant's contention that the use of "said" in claim 32 evidences a limitation to a single fabric roll. Section 2173.05(e) discusses the confusion that can arise when a claim lacks a proper antecedent basis for a term. For example, a claim is unclear if it mentions "the lever," without first identifying an element of the claim to which this could refer, or references "said aluminum lever," even though the only prior reference to a similar element was the less specific, "a lever." *Id.* The section also explains, "if two different levers are recited earlier in the claim, the recitation of 'said lever' in the same or subsequent claim would be unclear where it is uncertain which of the two levers was intended." *Id.* Therefore, the use of "said fabric roll" implies that the prior reference to "a fabric roll" should be read as a single roll, not one or more rolls, in order to avoid confusion. As the Abtox court found, use of the word "said" evidences an intention that the modified term be singular. 122 F.3d at 1024.

The Federal Circuit faced the same issue in Insituform Technologies, Inc. v. Cat Contracting, Inc., 99 F.3d 1098, 1105 (Fed. Cir. 1996), as well. In that case the patent concerned a method of repairing underground pipes in which a vacuum drew heat-setting resin through a tube inserted in the pipe. The court considered whether the claim's reference to "a [vacuum] cup" and " the cup" limited the claim to a repair method that involved only one vacuum cup. *Id.* at 1105. It found that the claim's repeated reference to "the cup," as well as to a singular region of vacuum application, was inconsistent with a construction of the claim that covered methods involving more than one vacuum cup. *Id.* In Scanner Technologies, in which the court construed "an illumination apparatus" to mean one or more apparatuses, the Federal Circuit distinguished the outcome in Insituform Technologies, by emphasizing the claim's reference to "the cup." 365 F.3d at 1304. Like with "the cup," "said fabric roll" emphasizes the singularity of the term.

The Scanner Technologies opinion highlighted other reasons why the Insituform court properly limited the claim to a single cup, including that "neither the specification nor the drawings disclose[d] the use of more than one cup." Scanner Technologies, 365 F.3d at 1304. Similar circumstances compel us to construe "a pre-soaked fabric roll" to mean a single fabric roll. Not only does the specification not disclose a system involving more than one fabric roll, it indicates only one roll was intended. The patent specification states that the sleeve is "disposed around and in intimate contact with the fabric roll," which would not be fully possible with more than one roll in the sleeve. While plaintiff is correct that courts do not import limitations from the specification into a claim, *see* Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1186 (Fed. Cir. 1998), the Federal Circuit regularly turns to the specification for context when weighing whether the patentee evinced an intent to limit the

meaning of the article "a." *See* Scanner Technologies, 365 F.3d at 1305; KCJ Corp., 223 F.3d at 1357; Abtox, 122 F.3d at 1024; Insituform, 99 F.3d at 1106. As with the patent specifications in Abtox and Insituform, the reissue patent specification repeatedly modifies the relevant claim term, in this case fabric roll, with "the." Furthermore, Figures 1, 2 and 3 of the reissue patent all depict a single roll, just as the figure in Abtox depicted a single chamber and the figures in Insituform depicted a single vacuum cup. Abtox, 122 F.3d at 1024; Insituform, 99 F.3d at 1106. Thus, we construe the term "a pre-soaked fabric roll" in claim 32 of the reissue patent to mean a single pre-soaked fabric roll. Given that defendant never sold single pre-soaked fabric rolls, but only rolls in sets of three or in quantities between six and nine, it has not infringed the reissue patent.

Even if "a pre-soaked fabric roll" is properly construed to mean one or more fabric rolls, summary judgment for non-infringement of this claim would still be appropriate because the term "sealed sleeve" in claim 32 is properly limited to heat-sealed sleeves and it is an undisputed fact that defendant never sold pre-soaked fabric rolls in heat-sealed sleeves. As discussed above, there is a heavy presumption that a term means what it says, and thus, when a court construes a claim, it should give the disputed term the full range of its ordinary meaning, as understood by persons skilled in the relevant art. Of course, even a heavy presumption can be overcome. Though the plain meaning of the term "sealed" is much broader than "heat-sealed," intrinsic evidence reveals that the patentee disavowed the broader meaning of the term.

All references in the reissue patent specification to a sealed sleeve are to a "heat-sealed" or a "heat-shrunken and heat-sealed" sleeve, as are all references in the 28 claims that appeared in the original '157 patent. Given that limitations from the patent specification or

other claims are not imported to apply to terms in separate claims, this alone would not justify construing "sealed sleeve" in claim 32 to mean "heat-sealed sleeve." However, a review of the prosecution history for the reissue patent makes clear that in this context a person skilled in the art would understand this term to carry the narrower meaning.

In Gasparrini and Cano's application for the reissue patent, they sought, among other things, to replace the terms "heat-sealed" and "heat-sealable," which modified "sleeve" in the specification and abstract, to "sealed" and "sealable." The patent examiner rejected the changes requested in the reissue application. He explained that "the changes sought to be made to the disclosure constitute new matter, because they add to the invention originally disclosed, as opposed to merely broadening the scope of the claims." (Reissue Patent Prosecution, PTO Official Action 12/5/1995 at 4). To illustrate his point, he used the requested change from "heat-sealed" to "sealed":

> [T]he amendments to the specification in the reissue application now indicate that the invention encompasses other means of sealing the sleeve, when in the original disclosure, the sleeve was described as being a heat sealed or a heat-shrunken and heat sealed sleeve, whenever the method of sealing was referred to. The applicant has not shown where in the original disclosure, other than a heat-sealed or a heat-shrunken and heat sealed sleeve was contemplated, and if so, what those other kinds of sealing and/or sleeve might be.

Id. In their response to the PTO's rejection of the substitution of terms, the patentees contended that the revisions do not introduce new matter, "but merely explain in more detailed language subject matter which is already disclosed therein." (Reissue Patent Prosecution, Amendment 3/6/1996 at 9). They argued that since the '157 patent specification included more specific aspects of the patented method, such as using a vacuum to draw the heat-sealable plastic sleeve into intimate contact with the fabric roll, the specification "clearly teaches that broadly the sleeve could be a sleeve which need not be plastic and/or which is not

heat sealable by actually requiring application of heat from an external source." *Id.* at 10.

Once again the patent examiner rejected the proposed changes. He soundly dismissed the patentees' contention that the more specific aspect of the method involving the use of a vacuum with the heat-sealable plastic sleeve taught that the sleeve did not need to be plastic nor heat-sealable. He writes, "It is inconceivable that the applicants can find such a teaching in the above quoted language of the original specification, which by its own terms refers to the sleeve as a heat sealable plastic sleeve. Why would one of ordinary skill in the art upon being informed that a sleeve was a heat sealable plastic sleeve, infer that what was really intended was that the sleeve need not be plastic and/or need not be heat sealable?" (Reissue Patent Prosecution, PTO Official Action 5/16/1996 at 5).

After this final rejection by the PTO, the patentees withdrew their proposed amendments substituting "heat-sealed" and "heat-sealable" for the broad term "sealed." In their Amendment After Final Rejection, filed September 18, 1997, the patentees still sought various changes concerning issues unrelated to the heat-sealed sleeve, as well as the approval of new claims 44, 45, 46, and 57 (which when accepted was renumbered as claim 32). Arguing for the acceptance of these changes, the patentees stated, "Moreover, with the cancellation of the material submitted in the Preliminary Amendment of April 10, 1995, also renders moot the objection to the Specification on grounds of new matter, under 35 U.S.C., Section 132, with the cancellation of such Amendment." In other words, the patentees argue that the patent examiner's objection on the grounds of new matter concerning the term "sealed sleeve" is no longer valid because their revised amendments do not seek to broaden the term "heat-sealed sleeve" to "sealed sleeve." Under such circumstances, the term "sealed sleeve" in the proposed claims can only be read as the more limited term, "heat-sealed sleeve." A broader reading

would be wholly incongruous with the patent prosecution, the patent examiner's blunt rejection of the contention that the patent specification supports the broader term, and the patentees' own acknowledgment that their revised amendments no longer sought to broaden this terminology.

Plaintiff argues that, to the contrary, the patent examiner has established that the specification supports the claim term "sealed sleeve." Plaintiff contends that despite the patent examiner's initial objections to the claims on the basis of new matter, he ultimately concluded that the broader term was supported in the specification, as evidenced by the withdrawal of his objection and the approval of four claims that contained the term "sealed sleeve" in the reissue patent. Plaintiff quotes the examiner's Official Action dated June 20, 1997, as evidence that he did not intend for this term to be narrowly defined: "In view of the latest amendments to the specification and the applicant's arguments, the previous rejections and objections on grounds of New Matter are hereby withdrawn or have been rendered moot." However, the examiner opened that same Official Action by stating it was intended to respond to the current requested changes, and that "it would appear that the only remaining substantial changes to the original specification (the patent specification) are those having to do with the thickness of the fabric roll and with the specific types of organic compound solvent which may be employed in carrying out the practice of the invention." Thus, the examiner was not addressing the term "sealed sleeve." This official action provides no indication that the examiner re-evaluated his prior objections concerning the term "sealed sleeve," nor his opinion that it is inconceivable that the specification teaches that the sleeve need not be plastic and/or need not be heat-sealable. As he points out, his objections were merely rendered moot because the patentees made such significant changes in the amendments they were seeking, including

dropping all requests that the terms "heat-sealed" and "heat-sealable" in the '157 patent be replaced by "sealed" or "sealable" in the reissue patent. Based on this patent history, "sealed sleeve" in claim 32 must be construed to mean "heat-sealed sleeve."

Now, we turn to the '976 patent. Plaintiff alleges that defendant infringed claims 1, 7, 9, 14 and 25, induced the infringement of claim 23, and contributorily infringed claim 12. Defendant once again argues that it is entitled to summary judgment because its product does not meet an element present in each claim. Claims 1 and 14 are independent claims on which claims 7, 9, 12, 23 and 25 depend. Therefore, if plaintiff is entitled to summary judgment of non-infringement on claims 1 and 14, it is also entitled to summary judgment on the dependent claims. Wahpeton Canvas Co. v. Frontier, Inc., 870 F.2d 1546, 1552, n. 9 (Fed. Cir. 1989)("One who does not infringe an independent claim cannot infringe a claim dependent on (and thus containing all the limitations of) that claim."). Claim 1 of the patent defines the invention as:

> 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 temperatures, 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.

Claim 14 reads:

> 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.

Defendant contends that its product does not employ the claim element: a "reduced air content cleaning fabric." The parties dispute the proper construction of this term. Though claim 14 contains slightly different language – "reducing air content of a strip of cleaning fabric" – plaintiff and defendant agree that the term from claims 1 and 14 are substantially similar. Thus, we address both claims by construing "reduced air content cleaning fabric." Defendant construes this term to mean a fabric that has undergone calendering or some other process that reduces the fabric's air content, but not fabric that simply has been wound on a roll. Plaintiff construes the term to mean fabric in which the air content has been reduced by mechanical means, including by winding on a roll with sufficient tension.[1]

Obviously, defendant does not find its proposed limitation on the meaning of "reduced air content cleaning fabric" in the claim language. Neither claim 1 nor claim 14 discusses methods for reducing the air content in the fabric. Defendant argues that the specification, the prosecution history, and plaintiff's original litigation theory, establish that reduced air content fabric cannot be construed to include fabric that has merely been wound on a roll. First, defendant points to the patent specification, which mentions only calendering as a method of reducing the air content of fabric. Defendant also argues that the patentees' failure to present the winding of fabric on a roll as a method for reducing its air content evidences that they did not intend for the disputed term to apply to fabric that had only undergone this process.

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[1] Plaintiff refers to this process as rewinding, while defendant speaks only of winding fabric on a roll. Plaintiff's terminology acknowledges that the fabric rolled onto cores for use in the cleaning of printing presses is taken from large source rolls onto which the fabric has already been rolled. We use the term "winding," though it should be read as synonymous with plaintiff's "rewinding."

While defendant relied on specification language to illuminate the disputed claim in the reissue patent, here it attempts to rely on the absence of language to support its claim construction. However, as plaintiff correctly highlights, it is an error of law to limit a patent claim to preferred embodiments in the specification. Phillips, 2005 WL 1620331 at 15-16. Ekchian v. Home Depot, Inc., 104 F.3d 1299, 1303 (Fed. Cir. 1997). The patentees' failure to mention winding, or any other air content reduction method, does not preclude fabric whose air content has been reduced by those methods from falling under the definition of a "reduced air content fabric." Furthermore, the patent specification is clear that calendering is not the only method of creating reduced air content fabric. It states, "The preferred, *but not exclusive*, method of reducing the air content in the fabric is calendering." (emphasis added). This language provides no basis on which to exclude some methods of air content reduction.

Defendant argues that the prosecution history of the '976 patent evidences the limitation on the disputed term. It contends that the patentees conceded during the application process that "reduced air content fabric" does not contemplate fabric wound on a roll in order to attain the '976 patent over their earlier '157 patent. Now, defendant claims, plaintiff is attempting to broaden the term despite the patentees' explicit limitation. The crux of defendant's argument rests on the patentees' statement to the examiner that "[b]ecause [the '157 patent] is not directed to a reduced air content cleaning fabric, Applicants respectfully submit that the claimed invention is novel over the art cited." ('976 Patent Prosecution, Response 6/26/1996 at 9). Defendant asserts that since the '157 patent claimed a cleaning system in which fabric was wound on a roll, and the patentees stated that the patent was not directed to a reduced air content cleaning fabric, then fabric that has only been wound on a roll does not fall under the definition of "reduced air content fabric."

The patentees' statement in the prosecution history does not serve as a manifest exclusion or clear disavowal modifying the plain language of the unqualified claim term "reduced air content fabric." A plain reading of the statement reveals only the uncontroversial assertion that the '157 patent does not claim, disclose, or teach a cleaning system involving reduced air content fabric. The fact that the '157 patent involves fabric wound on a roll does not preclude the '976 patent from claiming fabric that has reduced air content due to a method of winding it on a roll. Claims 1 and 14 of the '976 patent do not limit the methods for producing reduced air content fabric, and nothing in the '157 patent, nor in the patentees' arguments during the patent prosecution, mandates a limitation on the term.

Finally, plaintiff's initial mistaken belief that defendant's product infringed the '976 patent because it used calendered fabric, has no bearing on claim construction. Plaintiff's theories of infringement do not alter the plain meaning of the term, nor evidence the patentees' intent to limit it. Plaintiff's pre-suit investigation obviously led it to focus on defendant's alleged calendering of fabric, but this focus does not dictate the scope of the claim term. Even if plaintiff filed suit unaware that methods of winding fabric could create a reduced air fabric it would not affect the construction of the term. Claim terms do not expand nor contract, based on the plaintiff's litigation strategy. The term "reduced air content cleaning fabric" does not exclude fabric whose air content has been reduced by a method of winding or rewinding the fabric on a roll. Given this construction of "reduced air content cleaning fabric," defendant is not entitled to summary judgment for non-infringement of the '976 patent. A question of fact exists as to whether defendant's pre-soaked cleaning rolls employed reduced air content cleaning fabric created by winding or rewinding the fabric. The claims do not cover any and all fabric wound on a roll, but only fabric wound in such a fashion as to

reduce air content. Whether or not defendant's rolls are so wound we leave to another day.

Defendant offers an additional argument concerning plaintiff's claim of contributory infringement of claim 12. To establish contributory infringement, a plaintiff must prove that the alleged product constitutes a material part of the patented device and does not have a substantial non-infringing use. 35 U.S. C. § 271(c). As discussed above, defendant has failed to establish that the term "reduced air content cleaning fabric" precludes its device from constituting a material part of the patented device. However, defendant argues that it is still entitled to summary judgment because its product has a substantial non-infringing use – cleaning paint, ink and other substances from surfaces other than printing press cylinders. Defendant bases this argument on the opinion of its expert that the pre-soaked fabric rolls can be used for such non-infringing applications. In his deposition, however, defendant's expert admits that only once has he seen someone use a roll for a non-infringing purpose, and that roll was damaged. This testimony does not establish a substantial non-infringing use for which defendant is entitled to summary judgement on plaintiff's contributory infringement claim. Thus, defendant's motion for summary judgement on plaintiff's claims of infringement, contributory infringement, and induced infringement of the '976 patent, is denied.

We turn now to plaintiff's motion for leave to file an amended complaint. Plaintiff seeks to make two significant changes to its original complaint, to delete count III for infringement of U.S. Patent No. 6,035,483 and to add another defendant, Siebert's chief executive and president, James Mulcahy. Though defendant did not consent to plaintiff's elimination of count III, and offers a brief argument against allowing this amendment, the real dispute does not center on this change. As plaintiff is not pursuing its claim of infringement of patent '483, it would be dismissed if not dropped from the action by amendment of the

complaint. The briefs reveal that the parties are focused on whether plaintiff should be allowed to add Mulcahy as a defendant. Under Federal Rule of Civil Procedure 15(a), the court shall freely grant leave to amend a complaint "when justice so requires." Adding a party to an action is governed by Rule 21, which similarly allows parties to be dropped or added "at any stage of the action and on such terms as are just." However, Rule 16, which governs pretrial scheduling and management, provides a different standard relevant to our analysis. Where an order has issued limiting the time to join additional parties and amend the pleadings, the "schedule shall not be modified except upon a showing of good cause and by leave of the district judge." In this case, the parties' schedule set December 31, 2003, as the last day on which to file motions to join other parties or amend the pleadings. Thus, plaintiff must have good cause to modify the schedule before we decide whether justice permits leave to amend the complaint a year after the scheduled deadline.

To determine whether there is good cause to alter the schedule, the court looks to whether the moving party exercised due diligence, despite its failure to satisfy the deadline. *See* Humphrey v. East Manufacturing Corp., 2003 WL 21361780 at *4 (N.D.Ill. 2003); Caliber One Indemnity Co. v. Millard Chicago Window Cleaning, LLC, 2005 WL 1206472 at *3 (N.D.Ill. 2005). Plaintiff argues that it exercised due diligence by filing its motion to amend soon after learning of its necessity. It contends that it filed the amended complaint only a month-and-a-half after learning that defendant did not have the ability to satisfy the estimated damages, which amounted to over $1,000,000 as of July 2004. Plaintiff states that it "came to the realization" that defendant would not be able to satisfy a judgment on December 20, 2004, and it filed the motion to amend on February 3, 2005.

We are uncertain why plaintiff measures its due diligence from December 20, 2004, the

date defendant's damages expert released a rebuttal report to plaintiff's expert's report. This implies that plaintiff's realization regarding its damages hinged on defendant's expert's assessment of its claims. On November 1, 2004, plaintiff's own expert released a report estimating the company's economic damages. Upon the release of this report plaintiff had an estimated figure for its damages and could see that defendant's assets would not come close to satisfying an award in plaintiff's favor. Thus, plaintiff should have realized no later than November 1, 2004, that defendant would not be able to cover a damages award.

Defendant argues that plaintiff knew or should have known even before November 1, 2004, that it would not be able to cover the damages sought. We agree. Plaintiff's original complaint asserts claims for the willful and deliberate infringement of three patents, for which it requests compensatory damages, exemplary damages equal to three times the compensatory damages, and reasonable attorneys' fees. Defendant asserts, and plaintiff does not contest, that in March 2004, it produced documents concerning its financial status. Plaintiff attached defendant's balance sheet as of December 31, 2003, to its motion to amend. The balance sheet reveals defendant's net equity to be $75,666.30. Yet, after receiving these documents revealing defendant's worth, plaintiff waited approximately ten months to file its motion to amend, adding Mulcahy. Plaintiff claims it had no reason to add Mulcahy to the complaint before receiving the reports of the damages experts. This is only true if plaintiff had a reason to believe, prior to receiving its own expert's report, that its damages were only worth about $75,000. Given that plaintiff's original complaint requested compensatory damages, exemplary damages, and attorneys' fees, and that plaintiff's expert determined compensatory damages alone to be over a million dollars, it would have been unreasonable for plaintiff to believe that defendant's net equity would be able to cover the damages sought. Thus,

plaintiff's due diligence in seeking to add Mulcahy is properly measured from the time it learned of defendant's net equity – March 2004. Plaintiff did not exercise diligence in filing its motion to add Mulcahy ten months later. Plaintiff's motion to file an amended complaint is granted in part and denied in part. It is granted as to the elimination of all claims related to the '483 patent and denied as to the addition of Mulcahy as a defendant.

CONCLUSION

For the foregoing reasons, defendant's motion for summary judgment of non-infringement is granted as to the reissue patent, but is denied as to the '976 patent. Plaintiff's motion to amend is also granted in part and denied in part – it may eliminate all claims related to the '483 patent, but may not add Mulcahy as a defendant.

James B. Moran

JAMES B. MORAN
Senior Judge, U. S. District Court

July 28, **2005.**

EXHIBIT B

EF

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

BALDWIN GRAPHIC SYSTEMS, INC.,	)	
	)	
Plaintiff,	)	
	)	
vs.	)	No. 03 C 7713
	)	
SIEBERT, INC.,	)	
	)	
Defendant.	)	

MEMORANDUM OPINION AND ORDER

Plaintiff Baldwin Graphic Systems, Inc. (Baldwin) brought this suit against Siebert, Inc. (Siebert) alleging infringement of three patents for technology devoted to cleaning printing press components. Only one patent, U.S. Patent No. 5,974, 976 (the '976 patent), remains in dispute after plaintiff elected not to pursue claims relating to Patent No. 6,035.483, and after the court granted defendant summary judgement on non-infringement grounds for Reissue Patent No. 35,976. The court denied defendant's motion for reconsideration regarding the construction of the claim term, "reduced air content cleaning fabric," since defendant did not posit anything in that motion that the court found new or not previously considered. Defendant now moves for summary judgment based on invalidity, or, in the alternative, for reconsideration of claim construction based on a new theory, and summary judgment, based on non-infringement, if the claim construction is reconsidered. We grant defendant's motion to reconsider our claim construction, and grant its motion for summary judgment based on non-infringement.

BACKGROUND

The background of this case has been sufficiently set out in our previous opinions. *See*

e.g. Baldwin Graphic Systems, Inc. v. Siebert, Inc., 2005 WL 1838451 (N.D. Ill. July 25, 2005); Baldwin Graphic Systems, Inc. v. Siebert, Inc., 2005 WL 4034698 (N.D. Ill. Dec. 21, 2005); Baldwin Graphic Systems, Inc. v. Siebert, Inc.,2006 WL 1554529 (N.D. Ill. June 1, 2006); Baldwin Graphic Systems, Inc. v. Siebert, Inc., 2006 WL 3718074 (N.D. Ill. Dec. 14, 2006). We revisit this background only to the extent necessary to decide the pending motion.

Baldwin initially filed the instant action against Siebert based on its belief that Siebert calendered its fabric, a process by which air is reduced in the fabric by pressing it between two heated rollers. After discovery, Baldwin learned that Siebert's accused fabric was in fact not calendered, nor was its air reduced by any other mechanical process prior to being wound on the roll. At the Markman hearing on June 16, 2005, Baldwin argued that the claim term, "reduced air content cleaning fabric," did not exclude fabric whose air content was reduced by the process of winding or rewinding on a roll. Siebert argued that the patent, the prosecution history, and Baldwin's initial basis for infringement, precluded such a construction, and that calendering was the only method of air content reduction envisioned by the patent. We disagreed, noting that claim construction is an analysis wholly independent from plaintiff's theory of infringement and is not influenced by such. Baldwin, 2005 WL 1838451. We further found that the patent, while mentioning only the method of calendering for reducing air content, specifically stated that calendering was "not the exclusive method" of reducing air content. *Id.*

Siebert moved for reconsideration of that decision on September 1, 2005, on grounds that we gave too much weight to extrinsic evidence, namely the report of John McPhee, plaintiff's expert. We denied Siebert's motion, finding that we did not principally rely on McPhee's report, but relied mainly on the claim language and other intrinsic evidence.

Baldwin, 2005 WL 4034698.

In its current motion, Siebert devotes most of its attention to its contentions that the patent is invalid based on anticipation, obviousness and indefiniteness. There may well be merit to one or more of its contentions. The specification does not suggest reducing air content by winding on a core, and neither do the claims (with the possible exception of claim 26) – winding on a core may well result incidentally in some reduction of air content, and that procedure has been around for a very long time. A person with ordinary skill in the art would have a difficult time trying to determine what level of tension might trigger patent infringement. We do not, however, determine whether any of those contentions justifies summary judgment. Rather, we revisit claim construction.

Alternatively, Siebert puts forth a new theory that it contends requires us to reconsider our construction of the claim term. Siebert argues that it is clear from the language of the patent, its claims and specification, and the prosecution history, that the term "reduced air content cleaning fabric" indicates a fabric whose air content is reduced by some means prior to winding on a core to form a roll. Siebert goes on to argue that in light of this construction, and since there is no genuine issue of material fact that Siebert's fabric does not go through any mechanical process before being wound on the roll, it is entitled to summary judgment on grounds of non-infringement. Upon close consideration of parties' arguments, the patent, and the prosecution history, we agree with Siebert's proposed claim construction and grant its motion to revise our construction of the claim term "reduced air content cleaning fabric." We further grant its motion for summary judgment based on non-infringement.[1]

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[1]Additionally, we grant Siebert's motion to file an over-length brief in support of its motion for summary judgment. Furthermore, we find moot Baldwin's argument that we should disregard Siebert's exhibits 28B and 28C (as they were not disclosed during discovery) because, as will be evident below, we do

ANALYSIS

Generally motions for reconsideration are only appropriate to correct manifest errors of law, or to present newly discovered evidence. Oto v. Metropolitan Life Ins. Co., 224 F.3d 601, 606 (7th Cir. 2000); United Mun. Leasing Corp. v. Lexington Corporate Properties, Inc., 1997 U.S. Dist. LEXIS 14428, 1997 WL 587753, *2 (N.D.Ill. 1997). Such motions are valuable where the court misunderstands a party, makes a decision outside of the adversarial issues presented by the parties, or makes an error of apprehension. Bank of Waunakee v. Rochester Cheese Sales, Inc., 906 F.2d 1185, 1191 (7th Cir. 1990). Baldwin argues that Siebert's theory that any reduction in air content must occur prior to the fabric being wound on the roll is not new, but merely a rehashing of its prior theory that calendering is the only process envisioned by the '976 patent to reduce air content. We do not agree. Siebert's earlier argument was that calendering was the only method of reducing air content. We disagreed with that argument because, among other reasons, the patent specifically stated that calendering was not the exclusive method of reducing air content. Here, Siebert is not arguing that there is only one method of reducing air content. Rather, it appears to concede that there may be many methods. What Siebert argues here is that regardless of the method used to reduce air content, the reduction of air content as envisioned by the patent occurs prior to winding the fabric on the roll. Because Siebert suggests that we made an error of law with respect to our construction of the claim term, and because we find this new theory to be different from the one it posited earlier in this litigation, its motion to reconsider is appropriate. *See* Chamberlain Group, Inc., v. Lear Corp., 2007 U.S. Dist. LEXIS 12004, *5 (N.D. Ill. 2007).

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not rely on them in our analysis (Baldwin's response to motion for summary judgment at 10). We also find moot Siebert's motion to strike certain paragraphs in Baldwin's statement of material facts for the same reason.

Claim Construction

In order to determine the proper construction for a claim term, we first look at the term as used in the claims themselves. Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed. Cir. 2005). The two independent claims, claims 1 and 14, standing alone, do not aid much in our construction analysis, for while both recite the term, "reduced air content cleaning fabric," both claims are very broad and vague, neither teaching the winding of the fabric on a core. At first glance, these claims appear to envision an invention that does not require a core. But given that every manifestation of Baldwin's invention throughout the specification and prosecution history includes a fabric roll on a core, and given that the patent was an improvement on an earlier pre-soaked fabric roll wound on a core, we decline to read these claims as being so much broader than what the invention as a whole teaches. *See* Phillips, 415 F.3d at 1316 (citing Markman v. Westview Instruments Inc., 517 U.S. 370, 389 (1996)("[A claim] term can be defined only in a way that comports with the instrument as a whole.")) Yet, because of the lack of specificity in the independent claims, we must look to the other claims to determine the construction of the disputed term. Forest Laboratories, Inc. v. Abbott Laboratories, 239 F.3d 1305, 1310 (Fed. Cir. 2001) ("We ... construe independent claims consistently with the claims that depend from them.").

Once outside claims 1 and 14, our analysis is complicated by the fact that the term "reduced air content cleaning fabric" does not appear in any of the other claims. Instead, the dependent claims use a variety of ambiguous terms, including "cleaning fabric," "fabric," "strip," "strip of cleaning fabric," and in one instance, "strip of cloth." These terms are ambiguous because they are often used to indicate both a "reduced air content cleaning fabric" and a fabric whose air content has not yet been reduced. In order to determine the meaning

of the disputed term, we must first discern which instances of the word "fabric," and its equivalents, translate to "reduced air content cleaning fabric." To do so, we resort to the rules of construction.

To interpret the meaning of the word "fabric," and its equivalents, we will first look at the word in the context of the dependent claim we are looking at, in light of the independent claim upon which that claim relies. Gart v. Logitech, Inc., 254 F.3d 1334, 1341(Fed. Cir. 2001). Where possible, we give claim terms their ordinary and plain meanings, so as to be understood by a person of ordinary skill in the art. Smithkline Diagnostics, Inc. v. Helena Laboratories Corp., 859 F.2d 878, 882 (Fed. Cir. 1988). Additionally, under a principle of consistency, it is presumed that "the same terms appearing in different portions of the claims should be given the same meaning unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims." Fin Control Systems Pty, Ltd. v. OAM, Inc., 265 F.3d 1311, 1318 (Fed. Cir. 2001). We understand that consistency is especially important when discussing multiple instances of a claim term within any one claim. Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1345 (Fed. Cir. 1998)("[T]he same word appearing in the same claim should be interpreted consistently."). We also read the term in light of the specification and the prosecution history, as "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." Phillips, 415 F.3d at 1313; Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342-43 (Fed. Cir. 2001).

We will begin our analysis with the two claims that appear to be the most appurtenant to the issue at hand, claims 18 and 26. However, in order to interpret these claims we first

must set out and interpret the independent claim upon which they both depend, claim 14. That claim reads:

> 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.

Reading the terms of claim 14 in context, we find that the patentee used two different terms to mean two different things. "Where claims use different terms, those differences are presumed to reflect a difference in the scope of the claims." Forest Laboratories, 239 F.3d at 1310. The first term, "strip of cleaning fabric," refers to a cleaning fabric whose air content has not yet been reduced. We find this to be so because that term, a noun, is being modified by the verb "reducing." Thereafter in the claim, the term used is "reduced air content cleaning fabric," because the reducing of the air content has already occurred. The strip of fabric which comes into contact with the solvent, then, is already reduced in air content.

Additionally, while claim terms should generally be read consistently throughout a claim, here there is a clear manifestation that these two terms be read differently. First, the terms themselves are different, one being merely "cleaning fabric," while the other is "reduced air content cleaning fabric." Second, as stated above, reading the first term in context with a modifier such as "reducing," indicates that the patentee intended that term to mean a non-reduced air content cleaning fabric.

This reading is not only clear from the claim itself, but is supported by both the specification and the prosecution history. The specification states that "the reduced air content provides for an absorptive solvent amount and a reduced displacement of solvent

during storage and thus less 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" ('976 patent, col. 7, ln. 20-25, Bald. App. 4). During prosecution of the patent, Baldwin made clear that the air content of the fabric is reduced prior to soaking it in the solvent. In response to an objection by the examiner, Baldwin asserted that "[b]y reducing the air content of the cleaning fabric prior to saturation, the present invention improves the wettability of the fabric and improves the distribution of the solvent in the fabric" ('976 patent prosecution history, FH 0764-65, FH 0783-84, Bald. App. 19). Baldwin also made clear that saturation itself is not a method for reducing the air content of the fabric as taught by the invention ('976 patent prosecution history, FH 0665-6, FH 0764-65, Bald. App. 19). Therefore, while steps in a method need not necessarily be performed in the order they are listed in a patent, here it is clear that the step of reducing air content of a fabric necessarily must occur prior to saturation. *See* Loral Fairchild Corp. v. Sony Corp., 181 F.3d 1313, 1332.

We turn to claim 18, which reads:

> 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.

Here we find that in both instances in claim 18, the term "strip of cleaning fabric" refers to "reduced air content cleaning fabric." It is clear that in the second instance, the term "strip of cleaning fabric," means "reduced air content cleaning fabric." This is because, as discussed above, the invention requires that the air content in the fabric be reduced prior to coming in contact with the solvent. Reading the term as indicating a non-reduced air content cleaning fabric would go against the principles of the invention, as it would be reading the claim to involve contacting non-reduced air content cleaning fabric with solvent. Secondly,

we must attempt to construe all like terms alike, unless it is clear from the patent that they are to be construed differently. Unlike the distinction made between terms in claim 14, here there is no modifying verb used in conjunction with the first use of the term, "strip of cleaning fabric," which would make clear the manifest intent that the term denote a non-reduced air content cleaning fabric. Without that manifest intent, we must construe these claims to mean the same thing, and thus we construe them both to mean "reduced air content cleaning fabric."

We then turn to claim 26, which states:

> 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 [sic] the diameter of said fabric roll after the *cleaning fabric* has been wound about a core.

This claim is also dependent on claim 14, which delineates the general method for the invention. Claim 26 permits an additional step to the method -- that of increasing the length of the cleaning fabric. We find that although generally we are required to construe like terms consistently, here, as in claim 14, it is clear from the context that these two terms refer to different states of the fabric. The terms "strip of cleaning fabric" and "cleaning fabric," when mentioned in the first clause of the claim, refer to non-reduced air content cleaning fabric, because in both instances the terms are being modified by a word signifying an element of an air reduction process, *i.e.* "reducing" or "step of increasing". Because "increasing" is an additional step in the air-reduction process, it necessarily implies the fabric at issue has not already had its air content reduced. However, the term "cleaning fabric," in the second clause of the claim, refers to "reduced air content cleaning fabric" because it is no longer being used in conjunction with the process of reducing air content (of which increasing length is a step), but with the result of the air content reduction – that the diameter of the roll after the cleaning

fabric is wound is not substantially affected.

Just as in claim 14, we have claim terms that are defined differently within the claim. While here, unlike in claim 14, the claim terms themselves are not different, there is the presence of the modifiers, "reducing" and "step of increasing," which demonstrate a manifestation of the intent that those terms, as used with those modifiers, relate to non-reduced air content cleaning fabric. Yet, it would be illogical to construe the last term as also meaning non-reduced air content cleaning fabric, as construing the term in that way would read, "without substantially effecting [sic] the diameter of said fabric roll after the *non-reduced air content cleaning fabric* has been wound about a core." This reading makes no sense because only the action of reducing the air content would increase the length of the fabric without increasing the diameter of the fabric roll. Winding non-reduced air cleaning fabric onto a roll would either not increase the length of the fabric, or it would increase the diameter of the roll. Nor do we see how the step of reducing air content could be achieved after the fabric is wound on the roll. If one of the advantages of reducing air content is increasing the length of the fabric, that is not an advantage that can be wrought from a process that reduces air content after the fabric is already wound. Thus, we find that the only logical meaning of the term "cleaning fabric," in the context of the last clause of claim 26, is "reduced air content cleaning fabric."

There is a possibility that the clause as a whole could support an argument that claim 26 envisions reduction in air content through winding the fabric on the roll. We find this possibility unlikely, however, as we find it would require more specificity than is present with regards to the method of winding. As Baldwin's expert John McPhee conceded, not every winding of fabric onto a roll has the effect of reducing air content (expert rebuttal report of

John McPhee, at 20, Siebert App. 25). We find that to interpret this claim to cover air content reduction through winding or rewinding would require additional language that is not present here, and thus the claim should not be so construed. [2]

Having parsed the term "fabric," and its equivalents, in the relevant claims 18 and 26, into the more precise terms of "reduced air content cleaning fabric" and non-reduced air content cleaning fabric, we can then determine whether or not the term "reduced air content cleaning fabric" should be construed as requiring that the air content of the fabric be reduced prior to being wound on the core to form a roll. It is clear from the discussion above that claims 18 and 26, dependent on claim 14, envision that the air content of the fabric is reduced prior to it being wound on the roll. Claim 18, as construed, teaches the wrapping of the reduced air content fabric about an elongated core prior to its contact with the solvent. This implies the air content is reduced prior to the wrapping because, as the claim reads, what is wrapped around the core is reduced air content cleaning fabric. Claim 26 teaches that the step of increasing the length of the non-reduced air content fabric can be achieved without affecting the diameter of the fabric roll after the subsequently reduced air content fabric is wrapped around the core, again implying reduction in air content prior to wrapping.

By performing this same analysis throughout the claims, we are able to distinguish the patentee's intent to refer to non-reduced air content cleaning fabric, from its intent to refer to

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[2]Even if this claim were construed in a way as to support an argument of air reduction through winding or rewinding, we find that the construction of this claim in this way cannot be imported to the other claims in the patent, which we find clearly do not envision air reduction through winding or rewinding. Furthermore, claim 26 covers an increase in the length of the fabric (through air reduction) of at least about 25%. There has been no evidence that Siebert's fabric's length has been increased by this amount, and Baldwin has not even asserted that Siebert infringed claim 26. Thus, even if we were to construe this claim alone to cover reduction in air content through winding or rewinding, there has been no allegation of infringement, nor has there been any evidence of the same, and thus Siebert would be entitled to summary judgment on that point.

"reduced air content cleaning fabric," in almost all the claims. The only claims where, even after our analysis, the term could still mean either substance, is in claims 8 and 10, which talk about the composition of the fabric in general. However, the use of either term in these two claims has no effect on the question of whether or not "reduced air content cleaning fabric" means a fabric whose air content is reduced prior to winding it on a core to form a roll.

Our position that the claim term does require a reduction in air content prior to winding is further supported by the patent specification. The abstract states: "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 elongate core to form a fabric roll" ('976 patent, col. 2, ln. 34-39, Bald. App. 4).

Here, like in claim 14, the term "cleaning fabric" is modified by its treatment to reduce air content. Thereafter in the abstract, the term "cleaning fabric" necessarily refers to "reduced air content cleaning fabric," which necessitates the reduction in air content prior to the fabric being wound on the roll.

The summary of the invention states this even more clearly when it states that "[a] cleaning fabric with a reduced air content is wrapped around the core to form a fabric roll" ('976 patent, col. 3, ln. 65-66, Bald. App. 4). The use of the word "with" implies that the fabric being wound on the roll has already had its air content reduced prior to winding. Later, in the broad recitation of the method, the patent states that "[t]he saturated cleaning fabric is wrapped around a core to form a pre-soaked fabric roll" ('976 patent, col. 4, ln. 32-33, Bald. App. 4). Because, as discussed above, the air content of the fabric must be reduced prior to saturation, it follows that here the air content is reduced prior to winding.

The preferred embodiment, in conjunction with the relevant claims, teaches that the invention covers not only saturation of the fabric prior to winding, but saturation after winding as well, or both saturating before and after winding. In one section it states: "The fabric is pre-soaked and saturated with a low volatility organic compound solvent, as described in more detail herein below, before or after it is wrapped around the core to form roll in any convenient manner" ('976 patent, col. 5, ln. 58-61, Bald. App. 4). It is clear that the term, "fabric," means "reduced air content cleaning fabric," because just as in claim 18, it is being used in conjunction with contacting the solvent, which can only be done with fabric whose air content is already reduced, according to the invention. The subsequent pronoun, "it," then necessarily refers to the same term, and thus means "reduced air content cleaning fabric." By reading this sentence as such, the patent clearly envisioned the reduction in air content taking place prior to winding on the roll, because the soaking of the reduced air content cleaning fabric can occur either before or after the reduced air content cleaning fabric is wrapped around the core, which can be done "in any convenient manner."

The preferred embodiment further states:

> 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. 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. ('976 patent col. 9, ln. 1-10, Bald. App. 4.)

Here, again, the term, "fabric," indicates "reduced air content cleaning fabric." The term is used both in the context of saturating prior to winding (which requires the fabric to have its air content already reduced), and then, without any modification of the term, in the context

of winding on a roll prior to saturation. Because no modification of the term has occurred, we should construe it consistently, which requires us to construe it as "reduced air content cleaning fabric." Additionally, if we were to construe this term to include non-reduced air content cleaning fabric, it would not follow that the wrapping could be done in any convenient manner, but would have to be done in such a way as to reduce the air content of the fabric. Thus, construing "fabric" here to mean "reduced air content cleaning fabric," is the only logical construction in light of the context in which the term is used. We find similar examples throughout the specification, thus solidifying our determination that the term "reduced air content cleaning fabric" must be construed as a fabric whose air content is reduced prior to its being wound on a core to form a roll.

The fact that Baldwin's patent states that descriptions in the summary and the preferred embodiment should not be construed as to limit the variations and advantages of the invention to those disclosed, does not alter our determination. (*See* '976 patent, col. 4, ln. 49-54, col. 11, ln. 49-55, Bald. App. 4). We are not importing a limitation from the specification into the claims. *See* SciMed Life Systems, Inc. v. Advanced Cardiovascular Systems, Inc., 242 F.3d 1337, 1340 (Fed. Cir. 2001)("...one of the cardinal sins of patent law-reading a limitation from the written description into the claims"). Rather, we are interpreting the claim terms first in light of their context and logical construction, and referring to the specification and prosecution history to ensure that our construction is the proper one. The one limitation that we draw from the prosecution history, that reduction in air content must occur prior to saturation, is not a "limitation" at all, but part of what makes the invention patentable over

prior art.[3] Hence, our construction of the claim term is not importing a limitation from the specification, but construing the claim in the context of the necessary limitations in the patent itself. We are not limiting the various ways that the reduction in air content can be achieved, rather, we construe the term to indicate that any reduction in air occurs prior to winding the fabric on the roll. We therefore reconsider our prior construction of the term, "reduced air content cleaning fabric," and construe that term to mean "a fabric whose air content has been reduced by some method prior to being wound on a roll."

Summary Judgment

Based on our revised construction of the claim term, we find that Siebert has not infringed Baldwin's patent as a matter of law. Summary judgment is proper where there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. Celotex Corp. v. Catrett, 477 U.S. 317, 322-23 (1986). "Summary judgment on the issue of infringement is proper when upon construction of the claims and with all reasonable factual inferences drawn in favor of the non-movant, it is apparent that only one conclusion as to infringement could be reached." ADT Corp. v. Lydall, Inc., 159 F.3d 534, 540 (Fed. Cir. 1993).

There is no genuine issue of material fact that Siebert does not reduce the air content of its fabric prior to that fabric being wound on a roll. Siebert's expert, who is also the vice-president of the company that provides the dry wrapped fabric rolls to Siebert, states that neither they nor their supplier, DuPont, performs any mechanical process to reduce the air content of the fabric prior to winding it on the roll (Lombardo expert report at 4, Bald. App.

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[3]In fact, the possibility that the air content could be reduced by saturation, or after saturation, was a major sticking point for the patent examiner. The examiner indicated in its rejections that reduction in air content after saturation rendered the invention obvious in light of the Meisen patent (U.S. Patent No. 4,712,472, FH 0623, Bald. App. 19), and reduction in air content by saturation rendered the invention unpatentable over Baldwin's earlier '157 patent, which taught a pre-soaked fabric roll. Baldwin distinguished its invention by making clear that reduction in air content had to occur prior to saturation.

24). Baldwin has produced no evidence controverting these statements. Rather, all of Baldwin's evidence centers on the argument that Siebert infringes on Baldwin's patent because Siebert reduces air content in its fabric by winding it on the roll with tension. Baldwin's expert testified that Siebert's fabric appeared to have a reduced air content, and that the reduction in air content was achieved by the winding of the fabric on the roll (McPhee expert report at 13, 26, Siebert App. 11). While there is a dispute as to whether Siebert's fabric does in fact have a reduced air content (*compare* Siebert App. 11 with Baldwin App. 24),this issue is inapposite in light of our revised claim construction. Because it is not controverted that the fabric used by Siebert undergoes no mechanical air reduction process prior to being wound on the roll, we find there to be no genuine issue of fact on that point. Siebert does not infringe Baldwin's patent because Siebert's conduct falls outside the patent's scope with regard to the element of possessing "reduced air content cleaning fabric," as that term is construed. Cole v. Kimberly-Clark Corp., 102 F.3d 524, 532 (Fed. Cir. 1996)("Literal infringement of a claim exists when every limitation recited in the claim is found in the accused device, i.e., when the properly construed claim reads on the accused device exactly.") Therefore, Siebert is entitled to judgment of non-infringement as a matter of law.

CONCLUSION

For the foregoing reasons we grant Siebert's motions to file an overlong brief and to reconsider our earlier claim construction. In light of the revised claim construction, we grant Siebert's motion for summary judgment on grounds of non-infringement.

James B. Moran

JAMES B. MORAN
Senior Judge, U. S. District Court

March 21, 2006.

EXHIBIT C

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

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

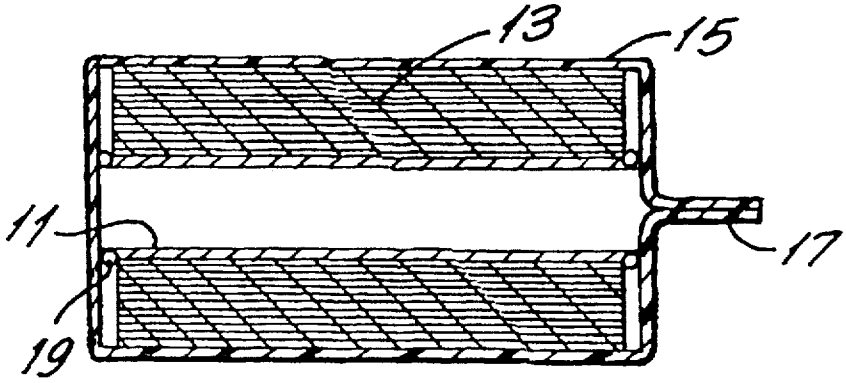
[57] **ABSTRACT**

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



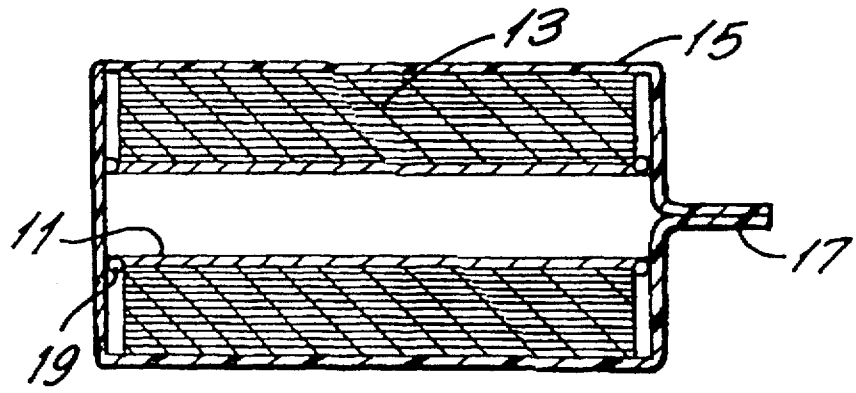


FIG.1

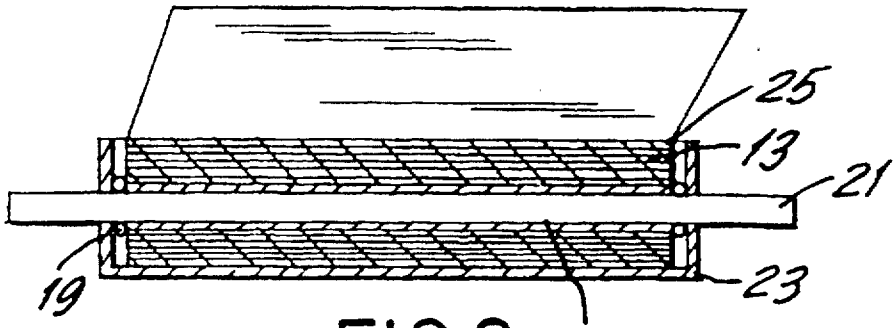


FIG.2

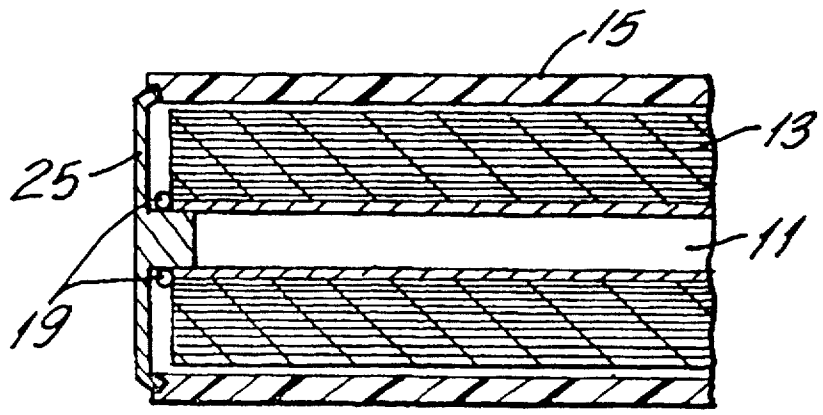


FIG.3

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-sealable 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 D

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**

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

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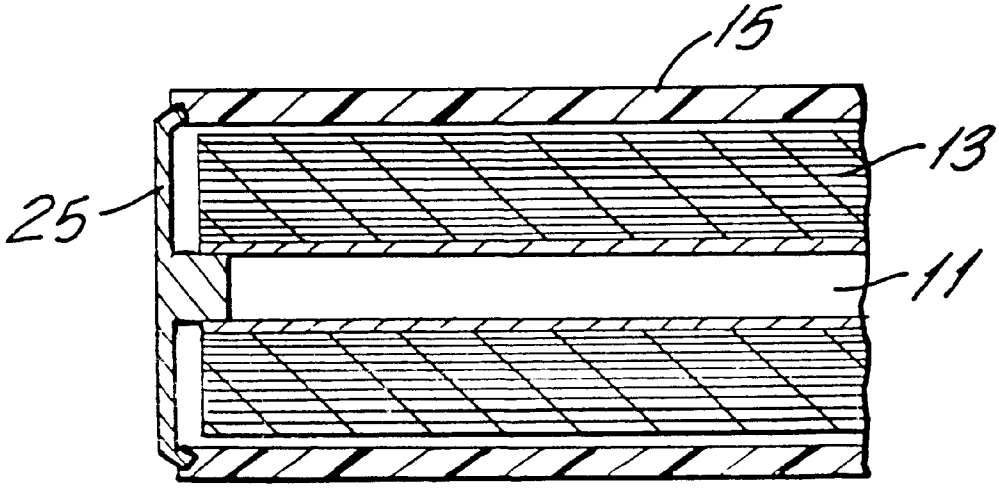
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Primary Examiner—Edgar Burr
Assistant Examiner—Anthony H. Nguyen
Attorney, Agent, or Firm—Morgan & Finnegan, L.L.P.

[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



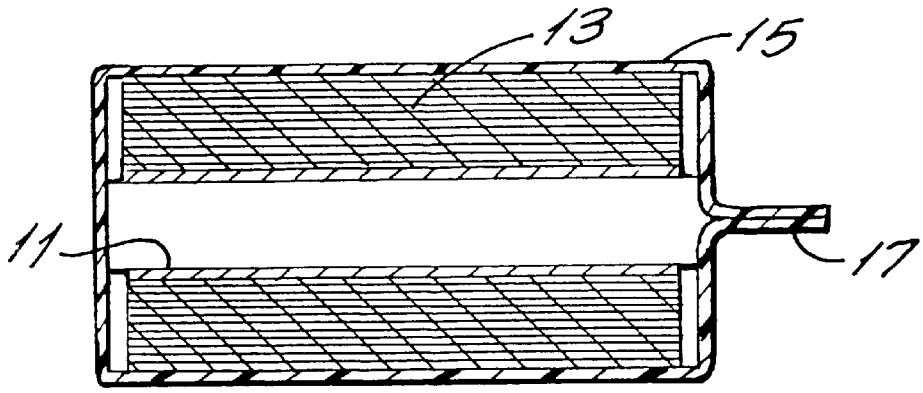


FIG.1

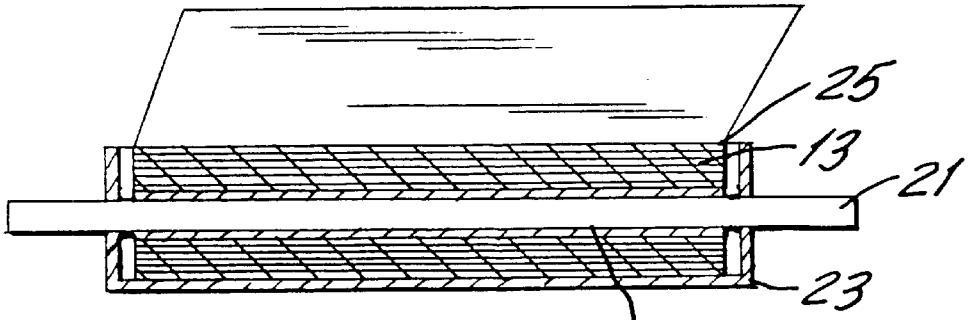


FIG.2

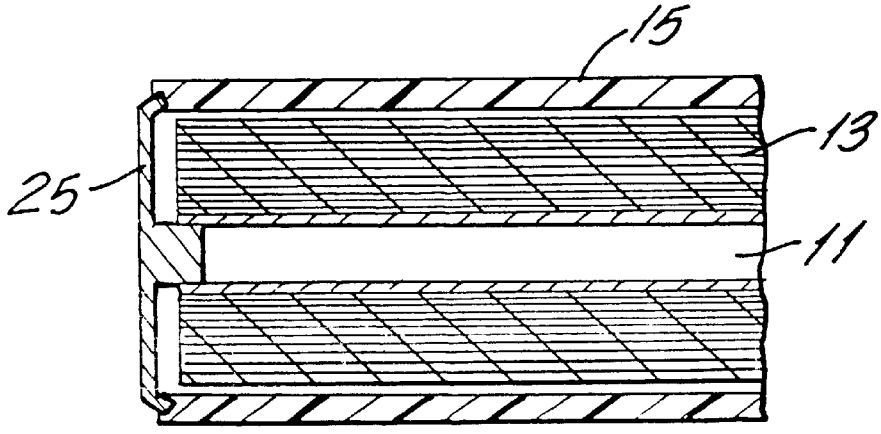


FIG.3

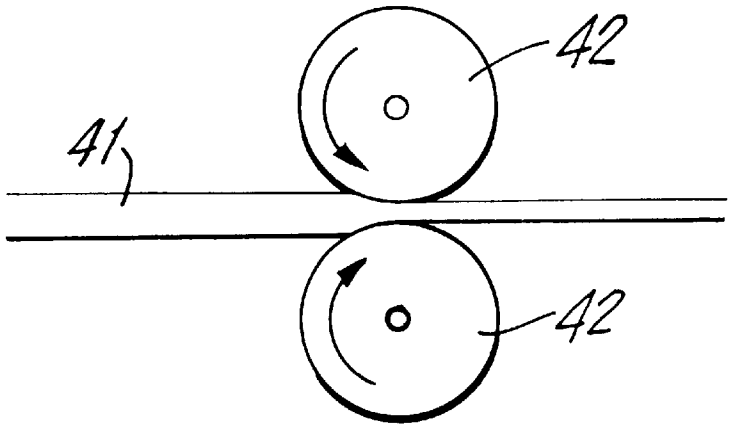


FIG.4

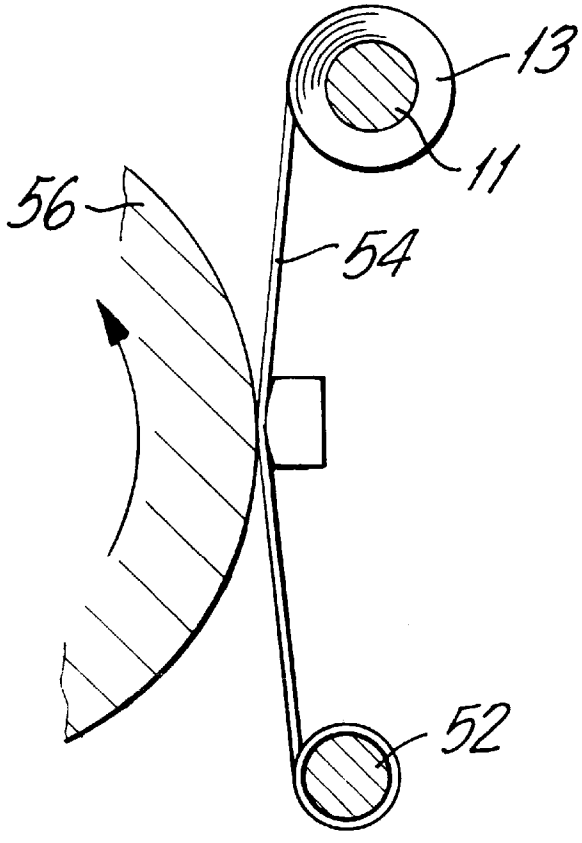


FIG.5

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