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(54) FOUNTAIN SOLUTION RECYCLING SYSTEM FOR COMMERCIAL PRINTERS

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Publication Classification

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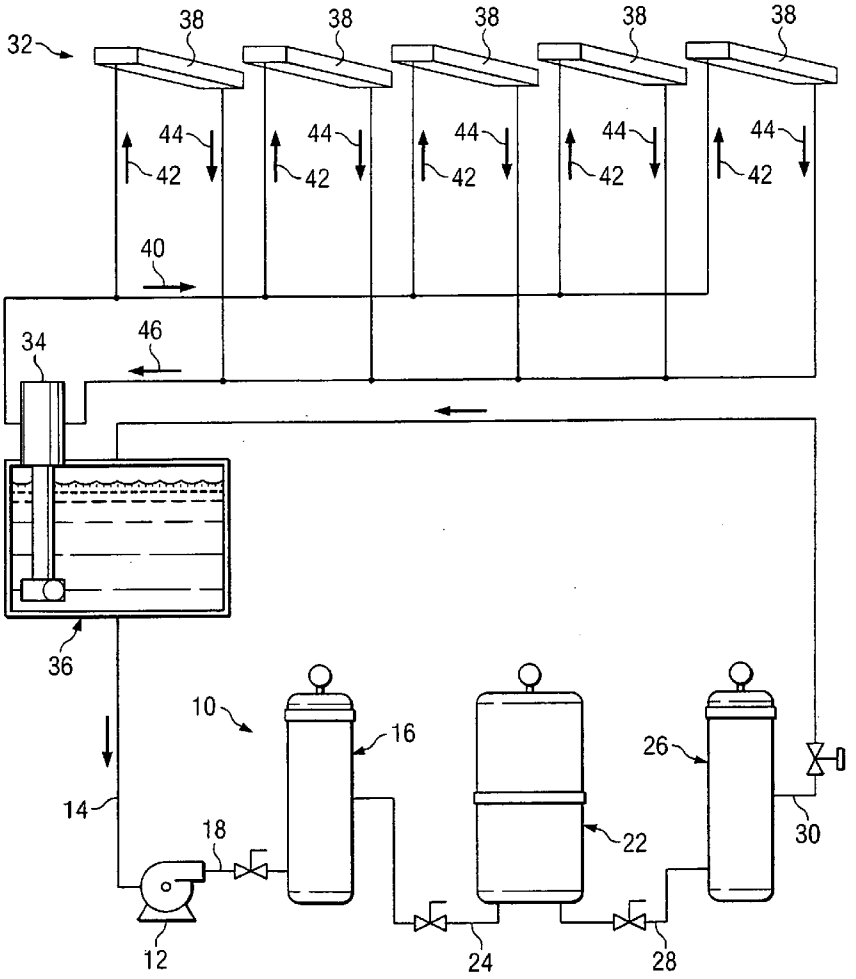
(57) **ABSTRACT**

A method of and apparatus for extending the life of fountain solutions used in commercial printing presses comprises withdrawing fountain solution from the dampener recirculation system of a printing press and directing the withdrawn fountain solution through a sediment prefilter, a separation filter, and a post treatment filter. The sediment prefilter preferably comprises a melt blown polypropylene filter; the separation filter preferably comprises a diatomaceous earth filter; and the post treatment filter preferably comprises a zeolite filter.



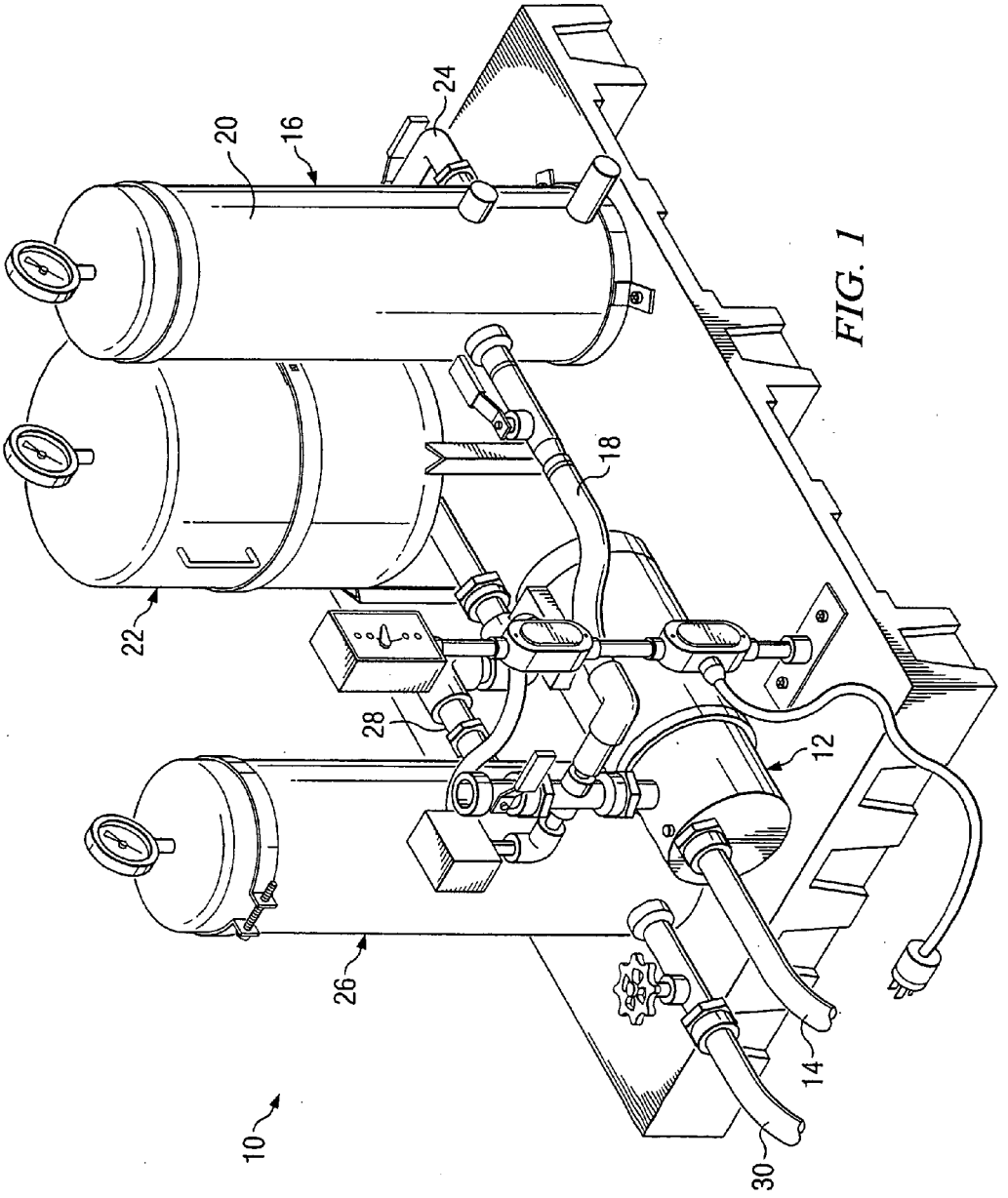


FIG. 1

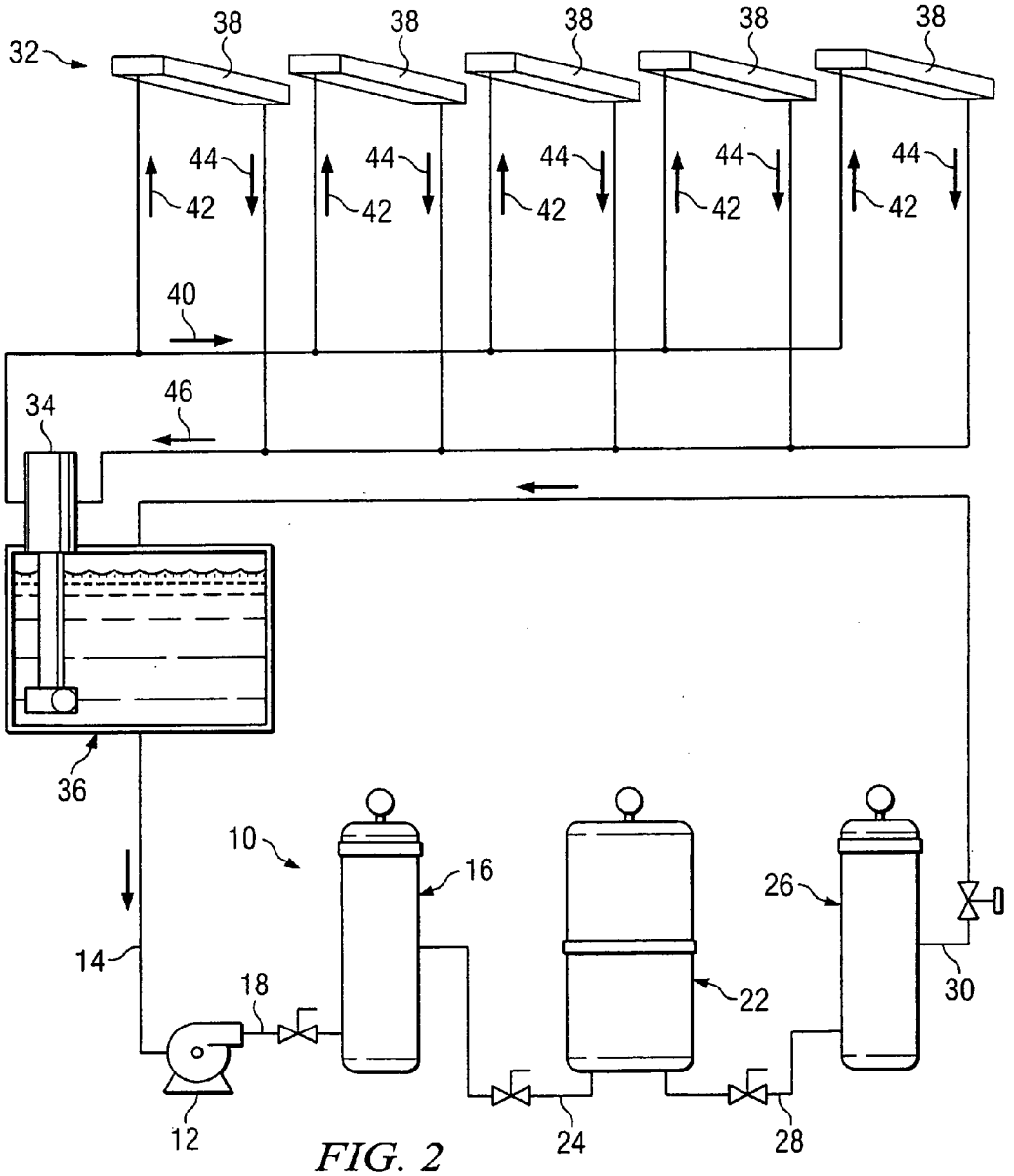

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FIG. 2

FOUNTAIN SOLUTION RECYCLING SYSTEM FOR COMMERCIAL PRINTERS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation application of application Ser. No. 10/910,862 filed Aug. 4, 2004, currently pending, which is a divisional application of application Ser. No. 10/392,215 filed Mar. 19, 2003, now U.S. Pat. No. 6,908,558.

TECHNICAL FIELD

[0002] This invention relates generally to improvements in commercial printing systems and more particularly to a system for removing contaminants from and thereby extending the life of fountain solutions utilized in commercial printing plants.

BACKGROUND AND SUMMARY OF THE INVENTION

[0003] A typical offset lithographic printing press has a plate cylinder upon which the negative of the text and illustrations to be printed are etched by a photographic and/or an electronic process. Dampening rollers apply a fountain solution to the plate cylinder which adheres to the plate cylinder except in the areas in which the text and illustrations are located.

[0004] Next, a series of form rollers, also known in the art as inking rollers, apply a layer of ink to the plate cylinder. The ink adheres to the plate cylinder only in the etched areas comprising the text and illustrations.

[0005] The plate cylinder then presses the inked text and illustrations onto a rubber blanket cylinder. An impression cylinder then presses a sheet of paper or other substrate to be printed against the blanket cylinder as the paper or other substrate passes between the blanket cylinder and the impression cylinder. The inked text and illustrations on the blanket cylinder are transferred onto the paper or other substrate to effect printing thereof.

[0006] Over time, ink, paper fiber, spray powder, and other contaminants build up in the fountain solution. These contaminants negatively impact print quality. Additionally, as the fountain solution degrades water adjustments are required. Eventually the fountain solution becomes so contaminated that it needs to be replaced. The present invention comprises a system for minimizing fountain solution contamination thereby extending the useful life of the fountain solution by a substantial period of time.

[0007] The fountain solution recycling system of the present invention utilizes a unique multi-stage separation technology and a recirculation pump to clean and restore the fountain solution. Removal of contaminants is achieved by processing the solution through three separate treatment stages resulting in a reusable, stabilized fountain solution. Components of the fountain solution which are consumed due to carry-off by the printing substrate and evaporation are replaced in the conventional manner.

[0008] Use of the fountain solution recycling system of the present invention easily and reliably reduces costs and improves productivity in an aspect of the commercial printing business that has traditionally been neglected. Simply extending the life of the fountain solution typically adds 1-2 hours of productivity per week per printing press because changing the fountain solution and cleaning the system are no longer required.

[0009] Additionally, by extending the life of the fountain solution waste disposal costs associated with fountain solution replacement are dramatically reduced. In those instances in which spent fountain solution is drained, use of the present invention greatly reduces the copper, zinc, ink, glycols, phosphates and suspended solids going into the drain thereby lessening the impact on the environment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A more complete understanding of the present invention may be had by reference to the following Detailed Description when taken in connection with the accompanying Drawings, wherein:

[0011] **FIG. 1** is a perspective view of a fountain solution recycling system for commercial printers incorporating the invention; and

[0012] **FIG. 2** is a schematic illustration of the fountain solution recycling system of **FIG. 1** and the interaction thereof with a commercial printing press.

DETAILED DESCRIPTION

[0013] Referring now to the Drawings, and particularly to **FIG. 1** thereof, there is shown a fountain solution recycling system **10** incorporating the present invention. The system **10** includes a pump **12** which receives fountain solution from a commercial printing press through a line **14**. The output of the pump **12** is directed to a sediment prefilter **16** through a line **18**. The sediment prefilter **16** comprises a housing **20** which contains a strainer or filter formed from melt blown polypropylene and having a consistency generally similar to that of a fibrous web. The function of the sediment prestrainer **16** is to remove relatively large particles from the flowing fountain solution.

[0014] From the sediment prefilter **16** the fountain solution is directed to a separation cartridge **22** through a line **24**. The separation cartridge **22** comprises a housing which contains a diatomaceous earth filter and functions to remove submicron sized particles from the flowing fountain solution. Thus, having passed through the sediment prefilter **16** and the separation cartridge **22** the fountain solution is substantially free of particulate and colloidal contaminants.

[0015] From the separation cartridge **22** the fountain solution is directed to a post treatment cartridge **26** through a line **28**. The post treatment cartridge **26** comprises a housing which contains a natural zeolite filter material which removes copper ions, zinc ions, and other ions from the flowing fountain solution thereby substantially removing metal ion contaminants from the fountain solution. After flowing through the post treatment cartridge **26** the fountain solution is returned to the dampener recirculating device of the commercial pressing press through a line **30**.

[0016] The sediment prefilter **16**, the separation filter **22**, and the post treatment filter **26** comprise a three stage treatment system in which each stage has a symbiotic relationship with the former stage. The use of the combined

system comprising the prefilter **16**, the separation filter **22**, and the post treatment filter **26** affords two highly beneficial results. First, the use of the combined system substantially extends the life of fountain solution flowing therethrough. Second, the combined system renders the fountain solution much more environmentally friendly upon ultimately disposal.

[**0017**] **FIG. 2** illustrates the use of the fountain solution recycling system **10** in conjunction with a commercial printing press **32**. A recirculation pump **34** withdraws fountain solution from a fountain solution recirculation tank **36** and directs the fountain solution to one or more printing press dampener pans **38** as indicated by the arrows **40** and **42**. From the printing press dampener pans **38** the fountain solution is applied to dampening rollers which in turn apply the fountain solution to the plate cylinder of the printing press **32**. In the operation of the printing press **32** fountain solution is continuously withdrawn from the printing press dampener pans **38** and returned to the tank **36** as indicated by the arrows **44** and **46**.

[**0018**] The fountain solution recycling system **10** of the present invention withdraws fountain solution from the tank **36** through the line **14** and returns the fountain solution to the tank **34** through the line **30**. Thus, the system **10** of the present invention functions to maintain the fountain solution within the tank **36** in a substantially clean condition characterized both by a lack of particulate contamination and a reduction of metal ion contamination.

[**0019**] As is best known in **FIG. 1**, the components of the fountain solution recycling system of the present invention may be mounted on a pallet. By mounting all of the components of the system on a pallet installation of the system at convenient location within a commercial printing plant is readily accomplished. All that remains to be done is the connection of the lines **14** and **30** to one or more printing presses within the plant, whereupon operation of the system can be commenced.

EXAMPLE

[**0020**] A typical eight-color 40" printing press requires the disposal of about 40 gallons of fountain solution per week, or about 2100 gallons per year. 2100 gallons equals about 40 barrels of spent fountain solution that must be disposed of annually. At a typical disposal cost of about $250/barrel the annual fountain solution disposal cost is about $10,000 per year per printing press. Conversely, when the present invention is used the annual fountain solution disposal requirement is about 2 barrels or about $500 per year per press. Elimination of press downtime for fountain solution change out is another benefit resulting from the use of the present invention. At just one hour of eliminated downtime per week the use of the present invention saves over $15,000 per year per press. When down time savings are combined with disposal cost savings use of the present invention results in about $25,000 in annual savings per press.

[**0021**] Although preferred embodiments of the invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitutions of parts and elements without departing from the spirit of the invention.

1-25. (canceled)

26. For use in conjunction with a printing press of the type having a fountain solution circulation system comprising a fountain solution recirculation pump for withdrawing fountain solution from a fountain solution tank and circulating the fountain solution through the printing press and back to the fountain solution tank thereby facilitating a continuous flow of fountain solution through the printing press, the improvement comprising:

side stream loop means independent from the fountain solution circulation system for withdrawing fountain solution from the fountain solution tank and for subsequently returning the withdrawn fountain solution to the tank;

said side stream loop means comprising means for removing particulate matter from the fountain solution flowing therethrough.

27. The improvement according to claim 26 wherein the side stream loop means comprises at least one filter housing and a filter mounted therein.

28. The improvement according to claim 26 wherein the side stream loop means comprises multiple filter housings each having a filter mounted therein.

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