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APPARATUS FOR DYEING

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Fig. 1

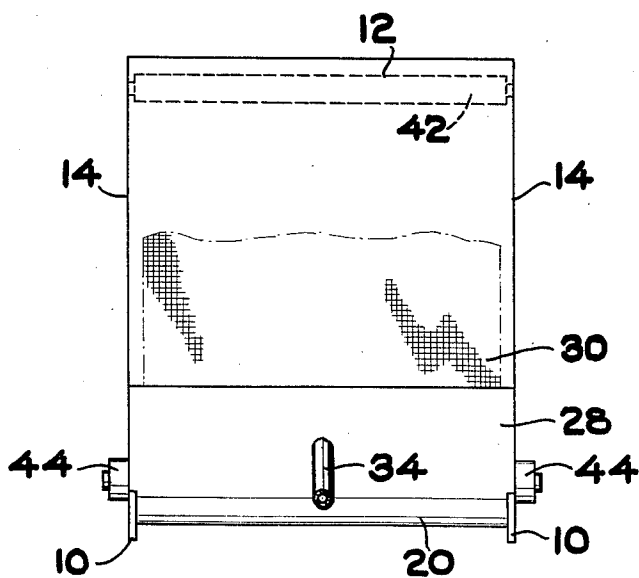
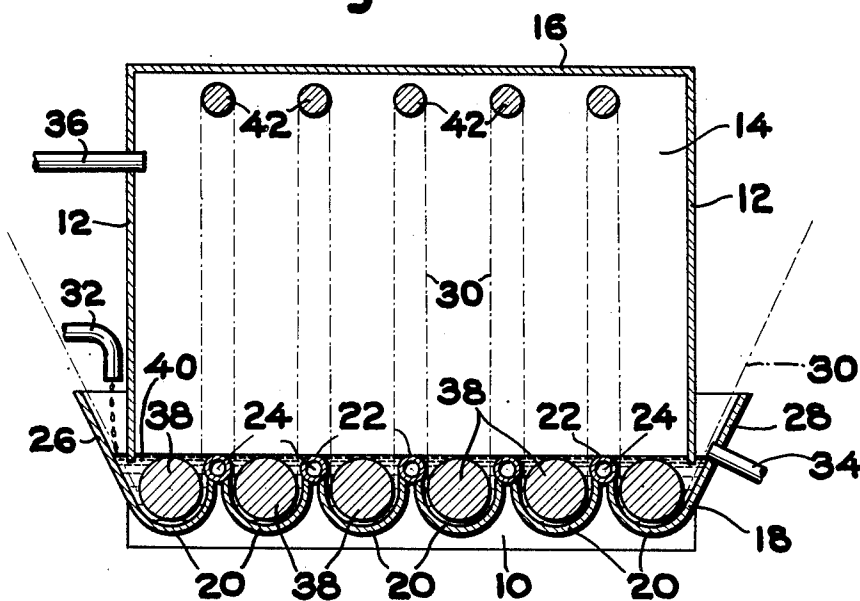


Fig. 2

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APPARATUS FOR DYEING

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This invention relates to new and improved apparatus for dyeing continuous lengths of textiles in open width with a maximum of uniformity and speed and with a minimum of dyestuff.

Objects of the invention include the provision of apparatus of relatively simple nature for carrying out the continuous open-web process of dyeing textiles while using a minimum of dyestuffs, and comprising an enclosed tank having a ribbed or corrugated bottom surface, the concave trough portions thereof receiving rolls taking up a major portion of the troughs and forming narrow passages for an open web trained under the rolls, said troughs being filled with dye liquid for passage of the web therethru, the web passing upwards in the tank and over idler rolls disposed above and parallel to the convex crest portions of the corrugated bottom surface of the tank, so that the web passes continuously thru the tank and thru a series of dye filled passages; and the provision of continuous dyeing apparatus as aforesaid wherein the tank is provided with means supplying steam thereto for heating and impregnating the web when the latter is not in the dye and for the purpose of keeping the dye heated, there also being separate heating means for the dye if desired.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a longitudinal section; and

Fig. 2 is an end elevation showing the invention.

It is well known to those skilled in the art that it is greatly advantageous to dye textiles in open width continuously instead of in batches for speed, efficiency, and uniformity, but heretofore it has not been possible to dye continuously in efficient manner due to the excessive quantities of dyestuffs needed in the vat unless special equipment of cumbersome nature is used.

For instance, it has been proposed to form a series of narrow vertical "wells" in an open tank and to removably dispose blocks in the wells to take up the spaces therein to form narrow passages for the cloth. This apparatus is relatively complicated and expensive and the present invention provides a less expensive and more efficient apparatus for the purpose described.

The essential features of the apparatus are clearly disclosed in Fig. 1, wherein supports 10 mount an enclosed tank having ends 12, sides 14, and a closed top 16. The bottom of the tank

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is deeply ribbed or corrugated by a sheet member 18 forming parallel troughs 20 and crests 22, the latter being provided with heating pipes 24 if desired.

The ends of the bottom sheet member extend beyond the ends of the tank and rise forming an entrance 26 and an exit 28 for the web 30. Some means such as a pipe 32 leads dyestuff into the tank at the cloth entrance thereof, and a drain 34 emits dyestuff at the exit end. A pipe 36 leads steam into the tank.

Each trough 20 is provided with a relatively large roll 38 taking up the major portion of the volume of the trough, the periphery of each roll however being slightly spaced from the interior wall of its trough, as clearly shown, to provide narrow curved passages for the web trained under the rolls. The tops of the rolls are shown as being approximately on a level with the crests 22 and with the drain pipe 34, so that the level 40 of the dye liquor remains constant as illustrated, but this relation of the parts, while preferable, is not essential, and variations thereof come within the scope of the invention.

Vertically spaced from each roll 38 there is provided an idler roll 42 for bringing the web upwardly out of the dye liquor and into the steam atmosphere, so that the cloth is steam impregnated between each liquor bath in a corrugation 20. The rolls 38 are driven in unison by any desired or convenient means such as pulleys 44 so that the web is evenly progressed thru the tank.

It will be seen that this invention provides a simple and economical continuous dyeing apparatus which uses a minimum of dyestuff and alternately dips and steams the web for improved dyeing. The apparatus is inexpensive to manufacture, use and maintain, and performs the dyeing operation quicker and in a more uniform manner.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. Apparatus for the treatment of a web with a liquid comprising a tank having a corrugated bottom forming substantially parallel substantially arcuate horizontal troughs having crests therebetween, a lower web guide roller mounted coaxially within each of said arcuate troughs and being of such size as to displace the major portion of the volume of each of said troughs, the exterior surface of said rollers being radially spaced from the surface of the associated trough

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to form a thin arcuate chamber for the treatment liquid, an upper guide member mounted above each of said crests, said web being passed successively through the arcuate liquid chambers and over said upper guide members of said apparatus so that the web serves to agitate the liquid in said arcuate chambers during treatment by the liquid to maintain uniformity thereof, the top level of said crests being on approximately that of the tops of said lower guide rolls whereby the web is free of restraint over the major portion of its runs between said guide rollers and upper guide members, said apparatus including an inlet and an outlet for said web, means for introducing the treatment liquid into said tank, means for maintaining the liquid level in said tank slightly above said crest, and means for moving said web through said tank from said inlet to said outlet.

2. In the combination defined in claim 1, a treatment liquid heating element disposed along said trough crest.

3. Apparatus for the treatment of a web with a liquid comprising a tank having a corrugated bottom forming substantially parallel substantially arcuate horizontal troughs having crests therebetween, a lower web guide roller mounted coaxially within each of said arcuate troughs and being of such size as to displace the major portion of the volume of each of said troughs, the exterior surfaces of said rollers being radially spaced from the surface of the associated trough to form a thin arcuate chamber for the treatment liquid, an upper guide member mounted above each of said crests, said web being passed alternately through the arcuate liquid chambers and over said upper guide members of said apparatus so that the web serves to agitate the liquid in said arcuate chambers during the treatment by the liquid to maintain uniformity thereof, the top level of said crests being approximately that of said lower guide rollers whereby the web is free of restraint over the major portion of the web runs between said guide rollers and upper guide members, said apparatus including an inlet and an outlet for said web, means for introducing the treatment liquid into said tank, means for maintaining the liquid level in said tank slightly above that of said crests, and means for moving said web through said tank from said inlet to said outlet including means for driving said rollers in the direction of web feed.

4. Apparatus for the treatment of a web with a liquid comprising a tank having a corrugated

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bottom forming substantially parallel substantially arcuate horizontal troughs having crests therebetween, a lower web guide roller mounted coaxially within each of said arcuate troughs and being of such size as to displace the major portion of the volume of each of said troughs, the exterior surfaces of said rollers being radially spaced from the surface of the associated troughs to form a thin arcuate chamber for the treatment liquid, an upper guide member mounted above and so spaced from each of said crests that the distance between the bottom of said upper guide members and the tops of said rollers is not less than twice the outside diameter of said guide rollers, said web being passed alternately through the arcuate liquid chambers and over said upper guide members of said apparatus so that the web serves to agitate the liquid in said arcuate chambers during treatment by the liquid to maintain uniformity thereof, the tops of said crests extending above the top level of said rollers a distance not greater than the outer diameter of said rollers whereby the web is free of restraint over the major portion of its runs between said guide rollers and upper guide members, said apparatus including an inlet and an outlet for said web, means for introducing the treatment liquid into said tank, means for maintaining the liquid level in said tank slightly above said crests, and means for moving said web through said tank from said inlet to said outlet.

5. The combination defined in claim 4 wherein said last named means includes means for driving said rollers in the direction of web feed to prevent such web from becoming excessively taut as it passes through the apparatus.

HAROLD H. BELCHER.

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