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L. J. LEDERER ET AL

2,488,208

DYEING APPARATUS

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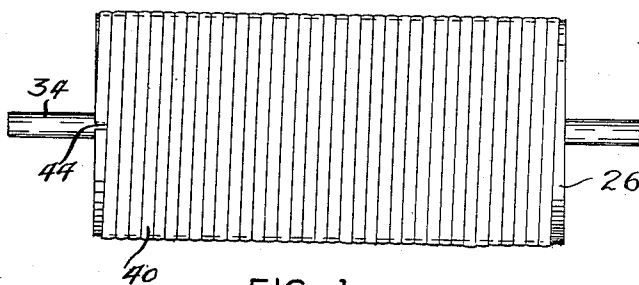


FIG. -1-

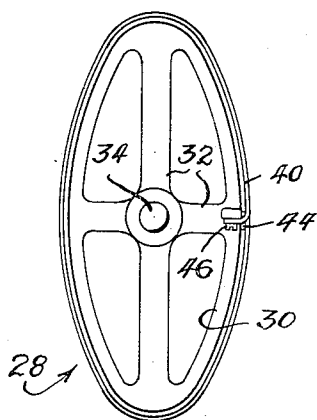


FIG. -2-

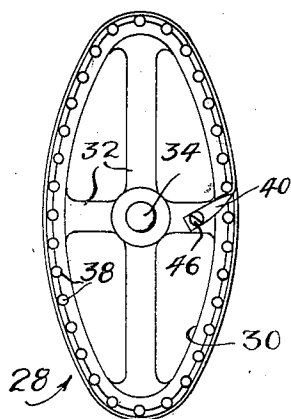


FIG. -3-

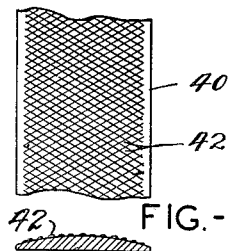


FIG. -4-



FIG. -5-

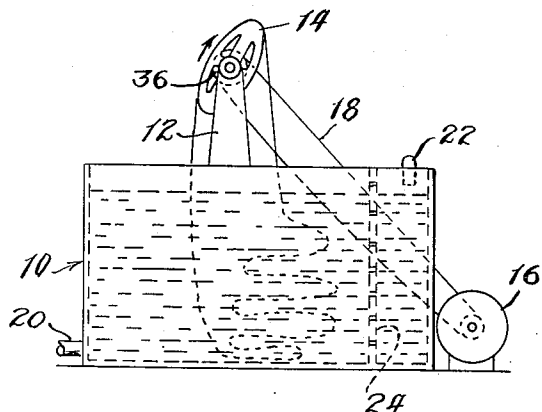


FIG. -7-

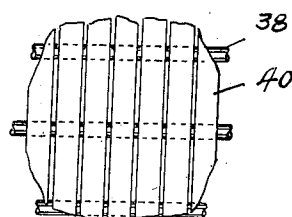


FIG. -6-

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DYEING APPARATUS

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2 Claims. (Cl. 68-212.)

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This invention relates to improvements in dyeing apparatus and is particularly directed to improvements in reels employed in such apparatus.

In dyeing apparatus a web of the material to be dyed, which may be cotton, linen, silk or any other textile fabric, is drawn over a reel supported above a dye tub and rotated by motor driven means, the ends of the web of material are stitched or otherwise secured together to provide a continuous web of considerably greater length than the distance between the reel and the bottom of the tub, so that the major portion of the web is submerged in a dye bath in the tub. As the reel is rotated the web of material is continuously drawn from a portion of the tub at one side of the reel thence over the reel and is deposited in folds in the portion of the tub at the other side of the reel. The material is slack when in the tub and floats through the dye bath as it is withdrawn from the folds continuously by the reel, whereby to permit impregnation by the dye.

In apparatus of the character indicated as at present constructed, the reels are covered with cloth, preferably cotton, whereby to insure pulling of the web of material being dyed in the manner described. The cloth covering may be used in several dyeing operations, so long as the dye is of the same or a darker color. However, when it is desired to change to a lighter dye the cloth covering must be bleached to remove the dye of the previous bath, or the covering replaced with a new one. Such bleaching is objectionable for several reasons, among which are the expense of the bleach and the delay in the dyeing operations required by reason of the shutting down of the apparatus during the bleaching operation. Another objection to the cloth covering is that its useful life is of very short duration, because of wear and of the deterioration of the cloth due to the acid of certain dyes, whereby shutting down of the apparatus is necessitated also during the removal of the useless covering and the stitching or otherwise securing of a new covering in its place, with the resultant loss of man hours and delay in the dyeing operation, as well as the necessity of keeping a supply of cloth on hand for new coverings in addition to the expense involved in the cost of the number of coverings required in a given period.

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One of the objects of the present invention resides in the provision of dyeing apparatus of the class described, and particularly a reel for use therewith which will overcome all of the disadvantages of and objections to such apparatus and reels, as at present constructed.

Another object resides in the provision of a reel wherein the covering therefor will have a much longer life than the conventional cloth covering, whereby the expense of frequent replacing of the covering is reduced to a minimum.

Another object of the present invention resides in the provision of a covered reel which is acid resistant, water repellant, resilient, will not require bleaching, will not be adversely affected by acids or dyes, and which can be rinsed very readily and quickly to condition the apparatus for dyeing with different colors.

Another object resides in the provision of a covered reel which will have better pulling qualities than conventional cloth covered reels.

A further object resides in the provision of a covering for reels of the character indicated which can be readily secured to the reels, and which will perform its functions efficiently, effectively and economically.

Other and further objects of the invention will be manifest from the following description and the accompanying drawing, in which drawing:

Fig. 1 is an elevational view of a reel made in accordance with our invention;

Fig. 2 is an end view of the reel of Fig. 1;

Fig. 3 is an end view of another form of reel embodying our invention;

Fig. 4 is a plan view of a section of the material employed in covering the reel;

Fig. 5 is a sectional view of the material of Fig. 4;

Fig. 6 is a fragmentary view of the peripheral face of the reel of Fig. 3; and

Fig. 7 is a schematic side elevational view of dyeing apparatus employing our invention.

Referring to the drawing in detail, and first to the apparatus illustrated in Fig. 7, dyeing apparatus generally comprises a conventional dye tub 10 for containing dyestuff in the form of a liquid bath. Such apparatus also includes a pair of standards 12 on either side of the tub supporting a reel 14 which is driven from a source of power such as an electric motor 16 through a drive belt

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18. Some dyeing apparatus employ more than one reel, but for the purpose of description of the present invention the illustration of an apparatus employing a single reel is deemed sufficient.

The dye tub is provided with a drain 20 for removal of the dye bath, and has an inlet pipe 22 for supplying water to the tub for diluting the dye and for washing the tub after a dyeing operation. A perforated partition 24 may be interposed between the water inlet and the tub proper to prevent splashing of the incoming water.

The reels of the present invention, while shown as elliptical in cross-section in the drawing, may be circular in cross-section, and for purpose of description will be referred to as drums or cylinders. The drum or cylinder of Figs. 1 and 2 comprises a sheet of stainless steel or other suitable material 26, secured at each of its ends by riveting, welding or in any other suitable manner, to frame members 28 comprising a rim 30 carried by a spider or spokes 32. The spokes each have a central apertured bushing for the reception of a shaft 34 which is keyed thereto. One end of the shaft is provided with a pulley 36 (Fig. 7) over which the drive belt 18 passes, whereby rotary motion is imparted to the reel, in the manner previously described.

The reel shown in Fig. 3 comprises a plurality of rods 38, instead of the steel sheet of Fig. 2. These rods are secured to frame members 28 similar to those of Fig. 2. As will be seen from Figs. 3 and 6, the rods 38 are disposed in spaced relation to each other, the purpose of which will be explained presently.

A novel covering is provided for the reels of Figs. 2 and 3 in accordance with the present invention. The material of the covering of the reel, for accomplishing the objects of our invention, is a plastic composition, preferably a vinyl chloride product. This composition may be extruded in a narrow strip 40, as shown in Figs. 4 and 5, of approximately one inch in width, and during the extruding operation, or following that operation, the material is knurled on one surface whereby to provide a plurality of small protuberances 42 thereon.

This strip is then applied to the drum 26 (Fig. 1) by first applying a coating of adhesive to the surface of the drum, then anchoring one end of the strip to the drum by inserting the same through an aperture 44 in the wall thereof and clamping it to the frame or spider 32 by screws 46 or other suitable clamping means. The strip is then spirally wound on the drum with its knurled surface outward and with the side edges of adjacent convolutions of the strip in abutment. After the winding is completed the other end of the strip is then similarly secured at the opposite end of the drum. If desired the ends of strip may be secured to the drum by adhesive instead of anchoring the same in the manner described, or both methods may be employed.

The same method or methods may be employed to secure the strip to the reel shown in Fig. 3. In this form the rods 38 are coated with adhesive, and the ends passed between the rods and anchored to the end frames 32 in the manner described in connection with the reel of Figs. 1 and 2.

With the covering applied to the reel or reels in the manner described, the apparatus is ready for operation. The material to be dyed is then thrown over the reel and its ends secured to each other in the conventional manner to provide a continuous web, and the dyeing fluid placed in the tub.

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The motor is then set in operation to rotate the reel, and as the same rotates, the protuberances provided on the outer surface of the covering will tractionally engage the material to be dyed and draw the same over the reel in the manner previously described, without any slippage between the material and the reel, whereby the material will be pulled uniformly through the dye bath resulting in a uniform dyeing operation.

After one dyeing operation, it is conventional practice to drain off the dye liquid, substitute clean water therefor and then operate the apparatus with the clean water in the tub for a short duration, whereby to wash the dye pigment out of the cloth covering on the reel. This practice can be practiced with the present invention, or the reel may be rinsed with a hose. In either event, however, the time required to wash the reel covering will be reduced to a minimum because of the novel covering and its characteristics hereinbefore mentioned.

In the form of reel shown in Fig. 3, the convolutions of the windings of the strip, instead of being abutted, are spaced from each other approximately a thirty-second of an inch, so that when cleaning the reel, in the manner just described, the cleansing water will pass through the spaces between the convolutions and between the spaced rods 38 of the reel into the tub.

We have chosen a vinyl chloride product for the covering of the reel because it can readily be extruded and knurled, and because of its acid resistant, water repellant, resilient and durable characteristics.

It is to be understood that the covering, instead of being in the form of a narrow strip of approximately one inch in width, it may be of any desired width and, if desired, it may be in the form of a sheet of the material mentioned, which sheet may be the full width of the reel and secured thereto by adhesive, and have the surface formations or protuberances on its outer surfaces.

It is to be understood also that the surface formations on the material of the covering for the reel of the present invention, instead of being formed by knurling, may be provided in any desired manner; the desideratum of the invention, insofar as the surface formations are concerned, being the provision of a reel having a covering capable of insuring the desired traction between the material being dyed and the reel surface to accomplish effective pulling or drawing of the material without any slippage or injury to the material being dyed.

From the foregoing it will be seen that the present invention provides a reel for dyeing apparatus which overcomes all of the objections to, and disadvantages of, former reels and provides longer life, better pulling qualities and a considerable saving in expense, in manpower and in time over prior reels employed in dyeing apparatus.

While we have illustrated and described preferred embodiments of our invention it is to be understood that we do not wish to be limited to the precise construction and arrangement of parts of those embodiments, as obviously various changes and modifications may be made therein without departing from the spirit and scope of our invention.

What we claim is:

1. In dyeing apparatus, the combination of a reel, a narrow web of plastic material on said reel spirally wound thereon with the convolutions

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of the windings in spaced relation, and means for anchoring the ends of the web to the reel.

2. A reel for dying apparatus comprising a pair of substantially elliptical end members, a plurality of rods having their ends connected to the periphery of said members to form a reel, a covering of vinyl chloride product on said reel, surface formations on the outer face of said covering, said covering being applied to the reel in a spirally wound strip with the convolutions of the windings in spaced relation, and means for securing the strip to the reel.

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LEONARD J. LEDERER, JR. 15

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