

[54] **METHOD AND APPARATUS FOR DYING TEXTILES**

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[58] Field of Search. **68/210, 183, 184, 144, 145**

[56] **References Cited**

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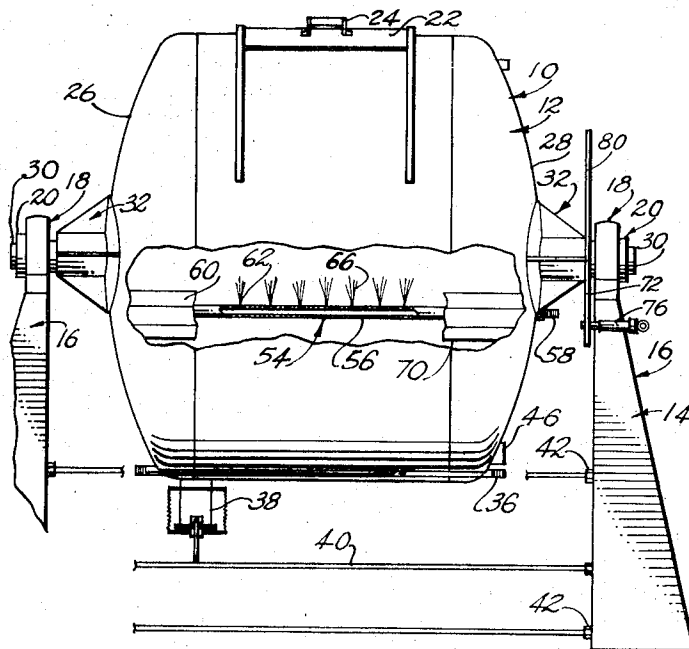
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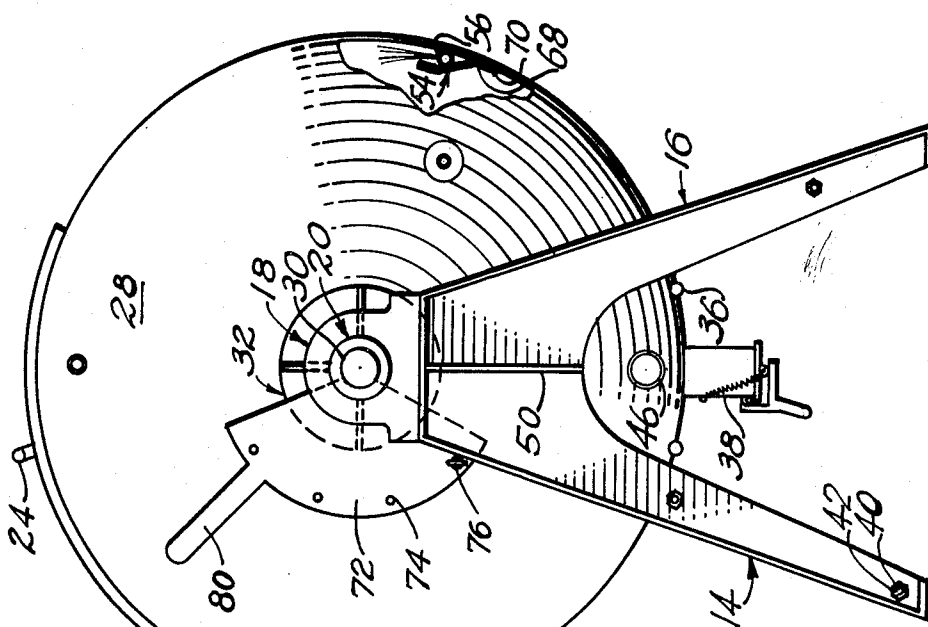
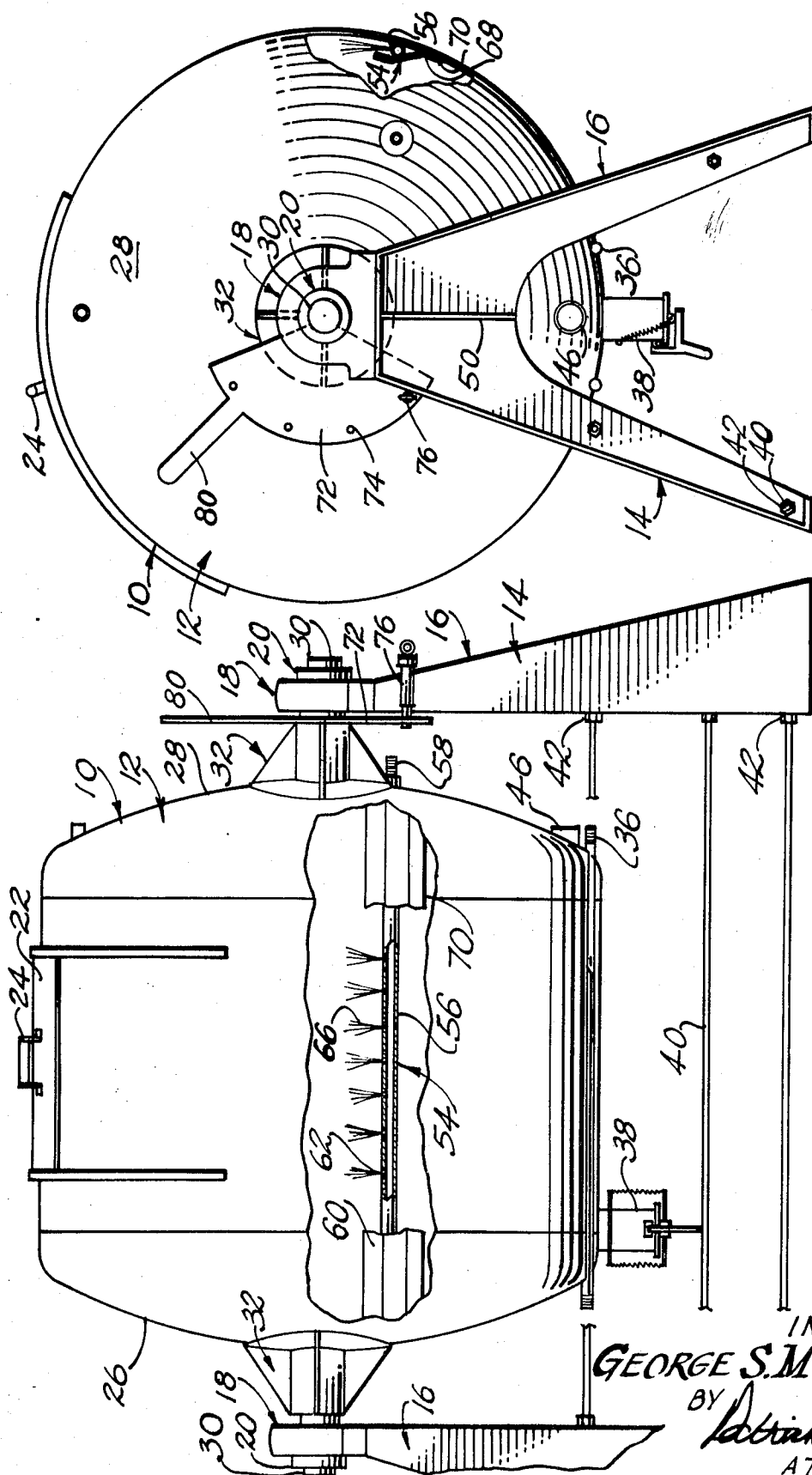
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[57] **ABSTRACT**

A method of dying textiles such as hosiery, socks, rugs, tubular knit goods or the like, submerged in a tank of dye liquor which is agitated by means of air pressure from orifices beneath the surface of the dye liquor. A conventional dying tub mounted for partial rotation on a stand is filled to its uppermost level with the dye liquor. An airline inside the tank is a hollow pipe or pipes extending through the tank below the central axis thereof and has a plurality of spaced air orifices therein from which air emits under pressure controls from an air supply line outside the tube which is connected to the airline inside the tub. The dye liquor level can be increased because the conventional paddle wheel has been eliminated and the capacity has thereby been increased.

3 Claims, 2 Drawing Figures





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METHOD AND APPARATUS FOR DYING TEXTILES

BACKGROUND OF THE INVENTION

1. Field of the Invention

Textile dyeing apparatus especially stationary dyeing tubs with means for agitating the dye liquor therein.

2. Description of the Prior Art

The prior art includes the presently known practice of a large dyeing tub which is mounted on small shafts on each end thereof on a large metal frame or stand which is bolted to the floor of the plant. Inside the tub there is a mechanical agitator (known as a paddle wheel) similar in some respects to the paddle wheel on a steamer boat and to the agitator found in a common washing machine, except being in a horizontal position, which is mechanically driven to agitate the dye liquor inside the tank in which the textiles, such as hosiery or socks, are submerged for dyeing. The tub is mounted for partial rotation for the purpose of loading and unloading and a closure is provided on the tub for this purpose. An important thing in textile dyeing of this sort is consistency in dyeing throughout the textile product and accomplishing same within a minimum of time with lowest unit cost. From a cost standpoint the more articles that can be properly dyed in the same number of cubic feet of space inside the tub the less cost per unit of dyed material. Mechanical agitators do not produce the best consistency and evenness of dyeing and the agitator itself takes up a good bit of space inside the tub. The present invention eliminates mechanical agitation altogether and substitutes at least as good agitation and consistency and evenness as the mechanical agitator plus providing more space inside the tub.

SUMMARY OF THE INVENTION

By using air under pressure from small orifices inside the dyeing tub and eliminating the mechanical agitator more space is provided in the tub for the articles to be dyed and at least as good results is obtained as to evenness and consistency of dyeing. Rejects by pulls or fraying are no longer experienced as a result of eliminating the mechanical agitator. Also, the maintenance of the mechanical agitator and its related parts has been eliminated and replaced by a simple arrangement of a conduit with small orifices which is easily maintained and very inexpensively replaced.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevation view of a conventional dyeing tub with a portion broken away showing the air orifices of the present invention.

FIG. 2 is an end elevation view of the dyeing tub shown in FIG. 1.

DESCRIPTION OF THE PREFERRED METHOD AND EMBODIMENT

In FIG. 1 the entire apparatus is designated generally by reference numeral 10 and comprises a large dyeing tub or tank designated generally by reference numeral 12 which is mounted on a stand or support arrangement designated generally by reference numeral 14 which comprises an A-shaped frame designated generally by 16 on each side which has a bearing jour-

nal arrangement 18 at the uppermost apex thereof in which is mounted a conventional bearing arrangement 20.

The tub 12 is a large hollow shell or housing made from welded metal plate somewhat like a large tank with a large sliding door 22 thereon having a handle 24. The tub 12 is supported on opposite ends 26, 28 thereon on respective stub shaft 30 supported in a reinforced steel plate shaft support assembly 32. Tub 12 is mounted for limited rotation so that the textile articles or the like may be loaded and unloaded. Conventionally, steam lines 36 are provided inside the tank and there is a drain arrangement 38 in the bottom of the tank. The stand 14 is reinforced by transverse reinforcing rods 40 extending longitudinally from each frame 16 to the other frame 16 and fastened in place by nuts 42. There is a thermowell 44 and a fill line 46. Various parts of the tub 12 and the stand 14 may be reinforced by steel gusset plates 50.

The foregoing conventional prior art structure not present in the tub 12 is the mechanical agitator arrangement which is conventional in the prior art and has been entirely eliminated by the present invention. Agitation is accomplished by means of air to be described hereinafter.

Inside the tub 12 at the back thereof and below the centerline of the tank represented by the longitudinal axis through the stub shaft 30 is an air line arrangement designated generally by reference numeral 54 and comprising an air conduit, tube or pipe 56 extending from one side of the tank which has a projecting pipe fitting portion 58 thereon across the inside of the tank in the manner shown in FIG. 1 and to the other side of the tank where the end of the pipe 56 is supported at 60. Pipe 56 has a plurality of air orifices 62 therein which are small holes drilled through the wall of the pipe in spaced relationship in the manner shown in FIG. 1. An air line (not shown) from any compressed air source is attached to the pipe 56 at the fitting 58. Air is pumped under pressure through the pipe 56 and emits therefrom through the various orifices 62 therein in the form of small jet streams represented by the brush-like lines 66 in FIG. 1. Pipe 56 is supported across the inside of the tub 12 by means of a small curved plate 68 welded along one edge 70 inside the tank.

The air line 56 inside the tank and the air 66 emitting therefrom causes agitation or mixing of the goods which may be socks, hosiery, rugs or other textile products in the dye liquor and the speed of agitation can be controlled by the air pressure. It is also possible to change the direction of the agitation by the changing of the direction of the movement of the air during the dye cycle. It will be apparent to one having skill in the art familiar with the present invention that additional pipe such as 56 may be put inside the tank 12 with the air orifices 62 therein and the air 66 therefrom emitting at a direction different from that shown in FIG. 1 such as downwardly or outwardly or inwardly or at any desired angle. This is simply a matter of providing additional air lines 56 or changing the air lines within the tank from time to time and/or the size and number of orifices 62.

Tub 12 is latched in place by means of a latching plate 72 attached to one of the stub shafts 30 as shown in FIG. 2, and plate 72 has a series of holes 74 therein

which selectively receive a removable pin device 76 which bears against a leg of the A-shaped frame 16. There is an actuating means to control the movement of the tub 12 and plate 72 in the form of a handle 80 extending from plate 72 which is manually held when pin device 76 is removed from the lowermost hole 72, which places the tub in the upright loading position shown in FIG. 2, and the tub is allowed to tilt or rotate to the dumping or unloading position where the door 22 is facing towards the ground and the contents is easier to remove. Pin device 72 may be placed in any of the series of holes 74 thereby positioning, selectively, the tube 12 in any one of several positions — for example, the tub 12 does not have to be lowered to lowermost position but can be manually stopped by the actuating means handle 80 at a point where the door 22 faces outwardly rather than downwardly or upwardly.

The dye liquor level inside of the tank 12 has increased because there is no longer any paddle wheel or agitator and the space formerly utilized by it in the same size tank 12 may now be utilized for dye liquor and additional objects to be dyed.

While I have shown and described a particular embodiment of my invention together with a suggested apparatus and a method to be practiced this is by way of illustration only and does not constitute any limitation on the invention since various alterations, changes, deviations, additions, subtractions, omissions, integrations, separations, substitutions and departures may be made in the apparatus and method shown without departing from the scope of the invention as defined by proper interpretation thereof in the appended claims.

What is claimed:

1. Apparatus for agitating a dye liquor and goods therein such as hosiery, socks, carpet and the like:

- a. a tank having opposite ends supported for movement on a support means,
- b. closure means on said tank for placing the goods to be dyed in the tank and for removing same therefrom, said closure means being in the up position on the top of said tank for loading and said tank being movable to place said closure at the bottom for dumping the contents therefrom and vice versa to reload said tank,
- c. air means within said tank from which air emits for agitating the goods and/or the dye liquor inside said tank,
- d. said support means comprising a pair of spaced bearing supports and said tank being supported on respective shafts on respective ends thereof and in said respective bearing support, whereby said tank is rotatable from an up loading position to a down dumping position and to move said closure from one position to the other,
- e. adjustable latching means releasable to unlock the tank for rotation from one position to another, and
- f. actuating means operable to control the movement of said tank from one position to another.

2. The device claimed in claim 1, wherein:

there is a conduit inside said tank through which said air travels, said conduit having a plurality of air orifices therein.

3. The device in claim 2 said conduit being located below the center line of said tank and near one side thereof.

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