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[54] **APPARATUS FOR DYEING TEXTILE ARTICLES**
2 Claims, 2 Drawing Figs.

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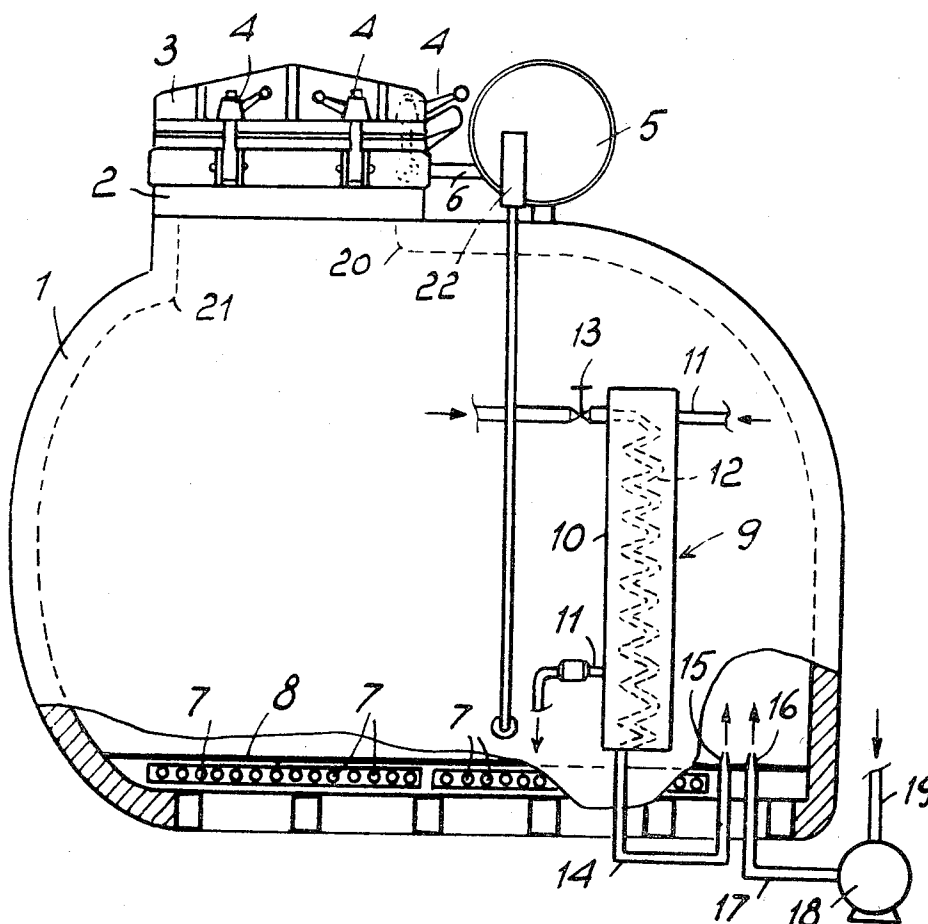
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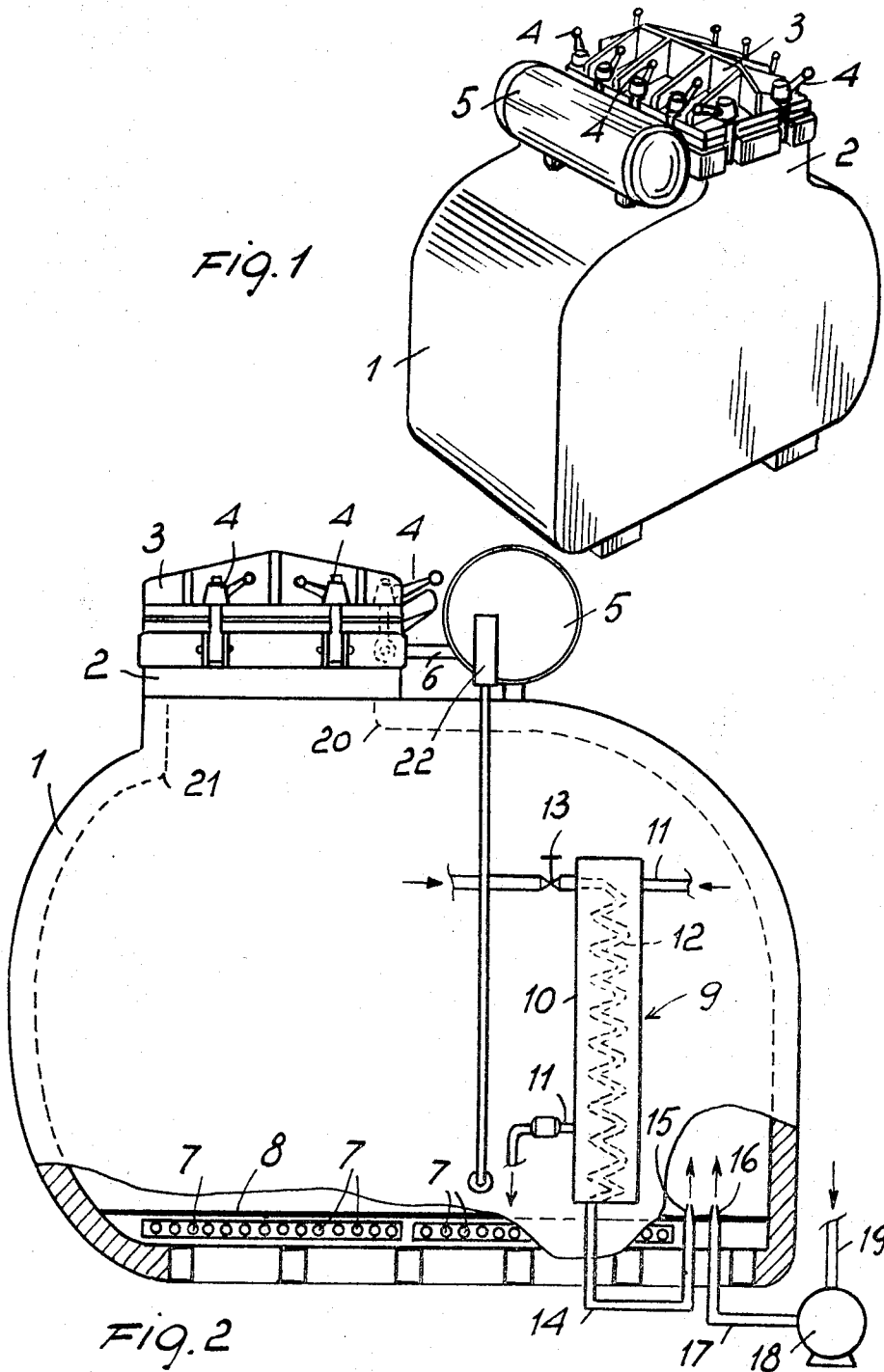
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ABSTRACT: An apparatus for dyeing textile articles including a tank for the dye bath and heating means, said tank comprising a top opening for the introduction withdrawal of the articles to be processed, an outer cover for sealingly close said opening, at least one nozzle for compressed air supplied by a suitable source, and at least one nozzle for a dyeing liquid which is drawn from said dye bath, the said nozzles being arranged in said tank in such manner as to cause circulation stream in said dye bath throughout the said tank.





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APPARATUS FOR DYEING TEXTILE ARTICLES

BACKGROUND OF THE INVENTION

This invention relates to an apparatus for dyeing textile articles.

The dyeing of textile articles as it is at present carried out does not always give completely satisfactory results, mainly because of the difficulties met with in moving the articles inside the dye bath in a uniform and rational manner.

In fact the systems at present in use for the movement of articles of clothing in the bath are not always efficient for all types of cloth, because of which some of them can leave the dyeing process with even considerable defects.

The main object of this invention is to provide an apparatus by means of which it is possible to obtain a perfect dyeing of cloth of any type, mainly because of a particular system of agitation of the bath.

Another important object of the invention is to provide an apparatus that can be made to operate simply and reliably and with high efficiency.

SUMMARY OF THE INVENTION

These and still further objects are attained by an apparatus according to the invention for the dyeing of textile articles which includes a tank for the dye bath provided with a top opening which can be tightly closed for the introduction and withdrawal of the articles to be treated, and heating means in said tank, said apparatus comprising the improvement wherein inside the said bath there are provided a first nozzle arrangement for the introduction of compressed air and a second nozzle arrangement for the introduction of dyeing liquid withdrawn from the said bath, the said nozzles being positioned so as to obtain in the bath rotatory liquid streams extending along path trajectories lying in substantially vertical planes, the walls of the said tank having such a configuration as to form a guide for the rotatory currents.

BRIEF DESCRIPTION OF THE DRAWING

Further characteristics and advantages of the invention will be better appear from the detailed description of a preferred but not exclusive embodiment of an apparatus for the dyeing of textile articles according to the invention, illustrated as indicative and not limitative example in the accompanying drawing in which:

FIG. 1 is a perspective view of the apparatus according to the invention;

FIG. 2 is a side view partly in section of the same apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the said figures, the apparatus for the dyeing of textile articles according to the invention includes a tank 1 which contains a dye bath. At the top of the tank an opening 2 is formed which can be tightly closed by means of a cover 3 provided with clamp member 4.

A container 5 is attached above the tank 1 for receiving the vapors and is connected to the tank 1 by means of a pipe 6.

Inside the tank 1 at the bottom thereof a coil 7 is arranged for the passage of heating steam, while a protective grill 8 (FIG. 2) is provided above this coil.

At one side of the tank 1 is provided a heat exchanger 9 consisting of a container 10 into which heating steam is passed through pipes 11. A coil 12 is arranged inside the container 10 with the top extremity thereof being connected to a valve 13 for controlling the entry of compressed air supplied by a source not shown. The lower end of this coil is connected to a pipe 14 which terminates in at least one nozzle 15 arranged on the floor of the tank 1 at a corner thereof and pointing upwards.

Close to the said nozzle 15 there is at least another nozzle 16 which is also pointing upwards and is connected by means of a pipe 17 to a pump 18 which is connected to the inside of the tank 1 by means of a further pipe 19.

With such an arrangement the liquid in the dye bath is made to circulate by means of the pump 18 so as to obtain a liquid flow directed upwards.

In addition control means are provided to operate either agitation device of the dye bath. This agitation is thus caused either by the action of the compressed air or by the action of the dyeing liquid.

As can be seen from FIG. 2 the walls of the tank are suitably shaped, according to a continuous curvature in the left-hand portion (with reference to the said figure) and in the right hand portion. The arrangement is such that the inside corners 20 and 21 at the opening 2 are at different levels (the corner 20 is higher than the corner 21) so as to facilitate the formation of the circulation currents or streams inside the dye bath.

In FIG. 2 a contact thermometer 22 is also visible for measuring the temperature of the liquid in the tank 1. Pressure gauges and safety valves, not shown in the drawing, are also provided.

The operation of the dyeing apparatus according to the invention is the following. Articles to be treated are introduced into the tank 1 and the cover 3 is closed. Then the dye bath is heated by means of the coil 7 and agitated by means of compressed air or circulation of liquid drawn from the dye bath.

Either agitation system will be used according to the type of articles to be treated.

Thus for example if the material to be treated consists of artificial fibers, knitwear or stockings, which have no tendency to float, the system of air agitation will be used and compressed air will flow through the coil 12. The compressed air is heated in the heat exchanger 9 and through the nozzle 15 causes circulation currents along a substantially annular path.

In the case materials which are sensitive to the action of the air, have to be processed, for example the so-called beaten stockings which tend to float, or in the case in which so-called vat colors are used which oxidize before time in the presence of compressed air, the agitation system involving circulation of liquid is used. When the pump 18 is put into operation, liquid is passed through the nozzle 16 and circulation streams or currents inside the dye bath occur.

Both by means of the compressed air system and by that of liquid circulation, a cushion action of fluid in motion occurs above the nozzles 15 and 16, which avoids the stagnation of the articles immersed in the bath and favors their movement upwards.

The curving of the internal walls of the tank 1 defines a guide for the circulation currents of the bath which thus follows a regular and continuous rotatory path, according to steam trajectories lying in substantially vertical planes.

The top container 5 serves to collect the vapors and possible foam from the dye bath.

As can be seen the dyeing apparatus according to the invention has a very rational structure and serves to process accurately any type of cloth, by making use of the one or the other of the agitation systems.

The invention so conceived is susceptible to numerous modifications and variations all of which fall within the scope of the inventive concept.

Thus for example the nozzles 16 could be arranged in an horizontal plane in the left hand portion of the tank 1 (with reference to FIG. 2) immediately above the grill 8 (this solution not being shown).

In this way the dyeing liquid directed horizontally above the grill 8 would form a type of cushion able to impede sliding of the articles on the grill 8 while, at the same time, would cause a rotatory circulation movement, substantially as described above.

I claim:

1. An apparatus for the dyeing of textile articles including tank for the dye bath provided with a top opening which can be tightly closed for the introduction and withdrawal of the articles to be treated, heating means in said tank, inside the said bath, a first nozzle arrangement for the introduction of compressed air and a second nozzle arrangement for the introduction of dyeing liquid withdrawn from the said bath, the said

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nozzles being positioned so as to obtain in the bath rotatory liquid streams extending along bath trajectories lying in substantially vertical planes, the walls of the said tank having such a configuration as to form a guide for the rotatory currents, said nozzles being arranged laterally at the bottom of the tank, to form a cushion of fluid in motion above the said nozzles, a coil arranged inside the tank close to the bottom and through which a heating fluid flows, a heat exchanger having an inlet and outlet for a heating fluid and an inlet and an outlet for the

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compressed air being passed to its respective nozzle and wherein, according to the improvement the apparatus further comprises a container for the vapor situated above said tank and connected with it by means of tubes.

5 2. An apparatus for the dyeing of textile articles as claimed in claim 1, wherein inside the said tank the corners at the top opening are staggered in height in order to facilitate formation of the substantially rotatory circulation streams.

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