March 12, 1957 J. DUNGLER 2,784,583

FOULARDS OR PADDERS

Filed July 19, 1954 2 Sheets-Sheet 1

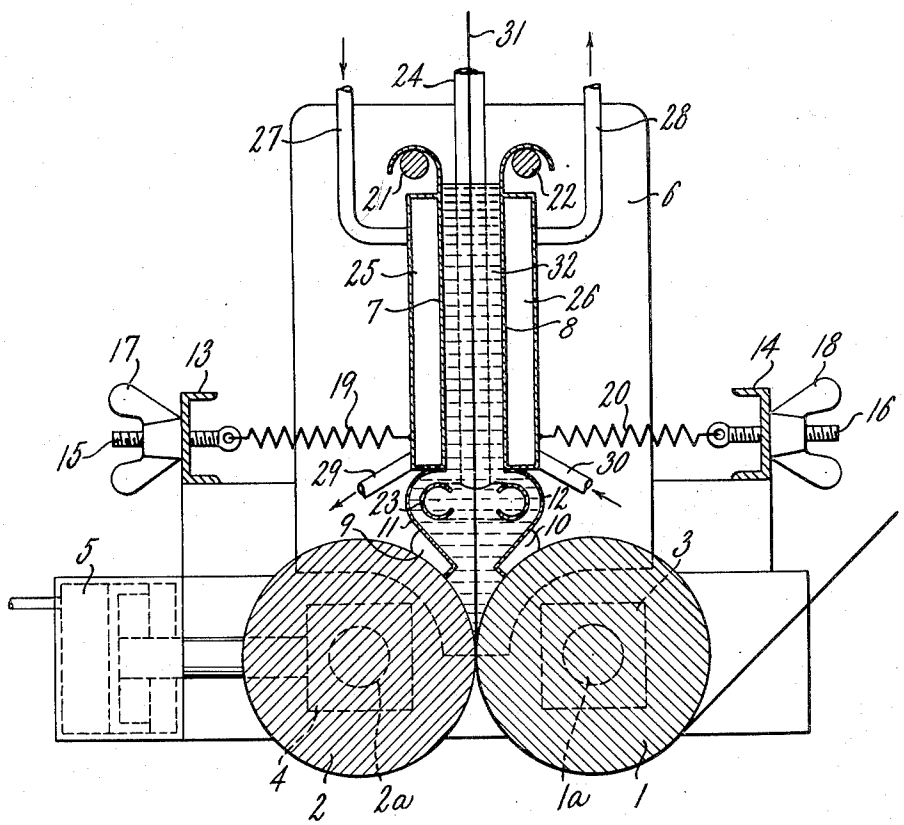


Fig. 1

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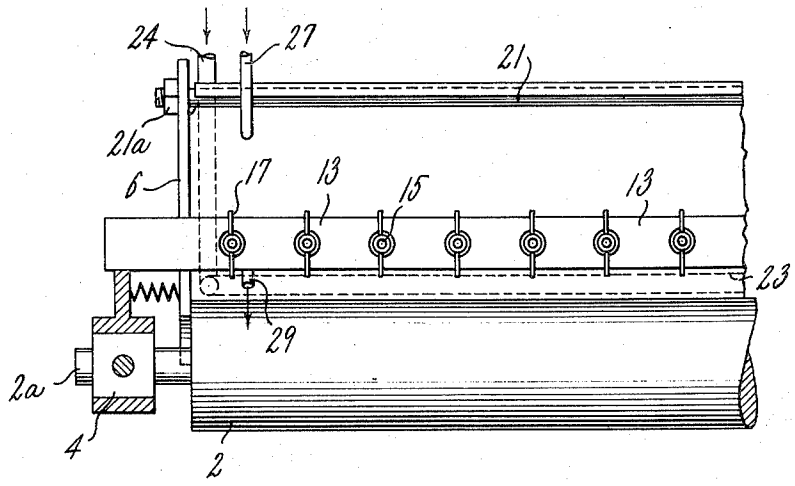


FIG. 2

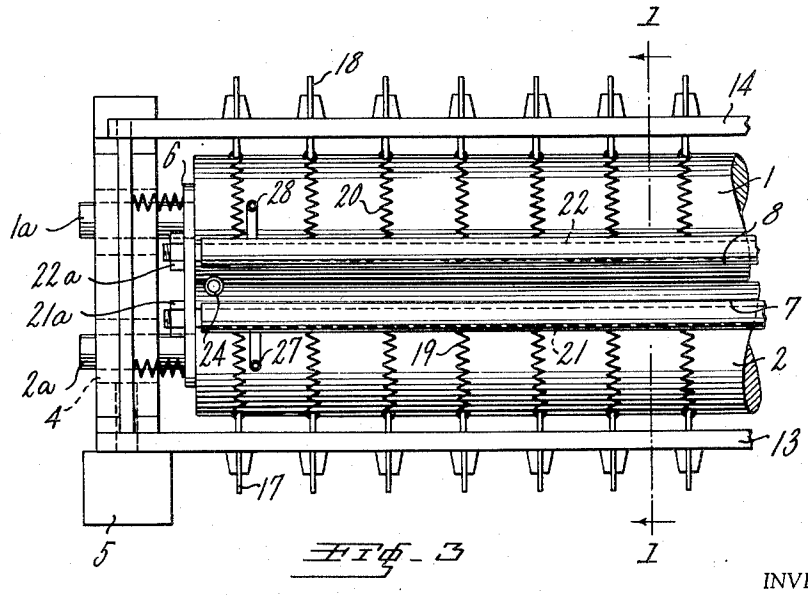


FIG. 3

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FOULARDS OR PADDERS

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Application July 19, 1954, Serial No. 444,327
Claims priority, application France July 24, 1953
7 Claims. (Cl. 68—15)

This invention refers to means for dyeing fabrics and like lengthy materials.

The use of padder or foulard dyeing is becoming more and more widespread and replaces jigger dyeing as well as vat dyeing. It has been recognized that jigger dyeing shows the following drawbacks: it cannot be performed as a continuous operation since the frequent reciprocatory movement of the fabric through the bath under alternating winding and unwinding conditions leads to a considerable loss of time and to an objectionable stretching of the fabric. It frequently occurs that the selvedges are oxidized and assume a shade which is different from that of the remainder of the fabric. Although a jigger has an extremely small output, the cost price of such a modern machine is high and out of range with the expected yield.

As concerns dyeing in vats, it is executed on fabrics arranged in rope formation and consequently there is always a risk of a break or of a modification in shade between the two sides of the fabric. Furthermore, this known operation is generally executed in a closed circuit and requires a long operational time.

Padder or foulard dyeing has been perfected recently and its use is becoming more and more widespread. The vertical padder originally used for dyeing has been replaced gradually by a horizontal padder and, with a view to reducing the volume of the dyeing bath, the latter is arranged between the rolls while fluidtight plates have been provided at the ends of said rolls. This arrangement would form an ideal solution of the problem if it did not lead to various drawbacks which are as follows:

The depth of the bath depends on the diameter of the rolls and this depth cannot extend beyond a height corresponding to the radius of the roll. Furthermore, certain dyeing procedures, in particular in the case of substantive or direct dyes, require an impregnating temperature which sometimes lies at or near the boiling point and it is difficult and often even impossible to heat rubber rolls to a suitable temperature and to keep them at the said temperature.

With a view to eliminating this first drawback, i. e. with a view to increasing the duration of passage of the fabric through the bath, it has been proposed to multiply the number of baths by producing for instance padders with three rolls forming two baths, but this is far from forming a rational solution, since certain fabrics shrink or expand as they pass out of one bath into the other, whereby difficulties are met with in the guiding of the fabric. Moreover, this procedure does not provide a solution for the problem of adjusting the temperature.

In order to eliminate the drawbacks of these known arrangements, I provide improvements of such known arrangements including juxtaposed rolls associated with terminal fluidtight plates, these improvements consisting in resorting to terminal flanges which extend substantially above the rolls and in providing, furthermore, lateral walls the outer edges and the lower parts of which engage

in fluid-tight manner the aforementioned terminal plates and the peripheries of the rolls, respectively.

According to a further feature of my invention, the lateral walls are designed in a manner such that they may pivot each round an axis parallel with the axes of the rolls.

According to a still further feature of my invention, the lower parts of the lateral walls are constituted by separate members matching the peripheries of the associated rolls and connected with the remainder of the lateral walls through the agency of yielding members.

According to yet another feature of the invention, heating means are associated with the bath, the said heating means extending preferably throughout or at least almost throughout the operative surfaces of the lateral walls and being designed so as to ensure a uniform constant temperature for the bath.

According to a still further feature of the invention, the fluidtight engagement of the lower parts of the lateral walls with the cooperating rolls is ensured by elastic means which urge the said walls into a pivotal movement in the desired direction.

Further features and advantages of my invention will appear from the following description, reference being made to the accompanying drawing wherein:

Fig. 1 is a diagrammatic end view, partly shown in section, of the arrangement according to my invention;

Fig. 2 is a partial front view, at 90° with reference to that of Fig. 1; and

Fig. 3 is a plan view of the same arrangement.

In the drawing, 1 and 2 designate two rotary rolls carried, respectively, by the spindles 1*a* and 2*a* which revolve in corresponding bearings 3 and 4 respectively.

Whereas the bearings 3 are stationary, the bearings 4 are movably connected with suitable means 5 which allows submitting them to a pressure urging the roll 2 against the roll 1. The rolls 1 and 2 cooperate as is well known in the art with terminal fluidtight plates of which only one, to wit the plate 6, is illustrated in the drawing (Fig. 2), the said plates forming with the rolls a trough adapted to receive a dyestuff or like material.

According to my invention, the plates extend considerably above the peripheries of the roll 1 and 2. Furthermore, lateral walls 7 and 8 are provided, which extend substantially parallel to the spindles 1*a* and 2*a*, the said walls being designed so that their vertical edges engage in leak-proof manner the fluidtight terminal plates such as 6, while their lower parts engage in leak-proof manner the rolls 1 and 2. To this end, the lower ends of the walls 7 and 8 form independent sections or portions 9 and 10, respectively, matching the shape of the rolls 2 and 1, and connected with the corresponding walls through the agency of intermediate elastic elements 11 and 12, respectively.

To ensure a leak-proof seal between the said independent sections or portions 9 and 10 and the corresponding rolls 2 and 1, respectively, there are provided, for instance, shaped members 13 and 14 extending parallel to the rolls 1 and 2. Through openings in members 13 and 14 a number of threaded rods 15 and 16, respectively, are caused to pass, the threaded rods 15 and 16 engaging corresponding wing nuts 17 and 18 while tensioned springs 19 and 20 connect the lower ends of the corresponding walls 7 and 8 with the inner ends of the corresponding threaded rods 15 and 16. An adjustment of the wing nuts 17 and 18 with reference to the threaded rods 15 and 16 permits adjustment of the tractional action exerted on the lateral walls 7 and 8. The upper ends of the latter are bent outwardly so as to engage the corresponding spindles 21 and 22 from which the lateral walls are thus suspended. The said spindles 21 and 22 are threaded so as to be en-

gaged by the fastening nuts 21*a* and 22*a* and to serve thus as stays between the opposite fluidtight terminal plates 6.

The spindles 21 and 22 form pivotal axes for the lateral walls 7 and 8 and, consequently, they allow the sections 9 and 10 to be urged against the rolls 2 and 1, respectively, through the tractional stress exerted on the lateral walls by the springs 19 and 20, the engagement with the rolls being obtained through a slight pivotal movement of the walls 7 and 8 round the corresponding spindles 21 and 22.

A container 32 is thus formed between the rolls 1 and 2, the fluidtight terminal plates 6, the lateral walls 7 and 8 including the associated lower sections 9 and 10 and the intermediate yielding elements 11 and 12. This container is filled with a treating liquid, such, for instance, as a dyestuff bath, through the perforated distributor pipes 23 to which the liquid is fed through a pipe 24.

Certain liquids and in particular certain dyestuffs must be brought to a predetermined temperature for operation. To this end, the lateral walls 7 and 8 form the inner surfaces of the heating jackets or chambers, 25 and 26, respectively, which jackets or chambers are fed, for example, with steam through the corresponding pipes 27 and 28, the condensed water being exhausted through the pipes 29 and 30, respectively.

In the case of a padder for dyeing of fabrics, the fabric is caused to enter the dyestuff container 32 at location 31 and to pass through the gap separating the rolls 1 and 2, between which it is squeezed and beyond which it passes out of the padder as shown at 33.

The operation of the apparatus is obvious. The container 32 is first filled with the desired dyeing bath up to the desired level. This being done, the automatic level-adjusting mechanism for the bath (not illustrated) is adjusted so as to maintain the said level at the desired height. The bath is then heated to a predetermined temperature through admission of steam into the chambers or jackets 25 and 26 through the corresponding pipes 27 and 28. As soon as the bath has reached the desired temperature, the fabric 31 is fed into the bath and the apparatus is then ready to operate.

The operation of the padder is in principle the same as that of any known padder or foulard, showing the main following advantages:

The path of the fabric inside the bath is considerably lengthened so that the fabric has enough time to be treated or impregnated throughout. The fabric thus completely impregnated is squeezed between the rolls 1 and 2, which squeezing furthers the introduction of the dyestuff inside the fibres of the fabric. It should be remarked that a great length of travel is obtained with a very reduced volume of the bath. The heating arrangement constituted by the chambers or jackets 25 and 26 allows the bath to be maintained at optimum temperature which is not the case in any known padder. By reason of the permanent heating of the bath and of the continuous feeding of fresh dyestuff through the pipe 24, the conditions of operation remain perfectly constant and this permits perfectly homogeneous results to be obtained even in the case of a great length of fabric.

Obviously, the embodiment described hereinabove and illustrated in the accompanying drawing is given solely by way of exemplification and it is possible to modify in any desired manner the shape, nature, arrangement and mounting of its component members without unduly widening thereby the scope of the invention as defined in the accompanying claims. Thus the tightness of the seal along the lower edges of the lateral walls may be obtained by merely forming the said edges into the shape of scrapers so that they may assume an increased elasticity.

On the other hand, the arrangement for heating the bath may be different from that disclosed and illustrated and it may be constituted, for instance, by electric resistances, by a liquid mass in which is immersed a heating coil or by the like known or suitable means.

The two pivoting lateral walls and the heating means associated therewith may be replaced by a unit forming a box-shaped structure the lower edge of which is urged tightly against the peripheries of both rolls.

As already mentioned, an automatic feeding mechanism of any suitable or known type may be used for maintaining the dyeing bath at a constant level. It is also possible to provide a thermostat dipping inside the bath and ensuring a uniform temperature inside the latter by acting on the valves (not shown) controlling the feed pipes 27 and 28. Instead of forming independent elements, the perforated tubular distributors 23 for the bath may be integral with the lateral walls 7 and 8. In this case, a portion of the wall is designed so as to form a distributor communicating with the inside of the container 32.

The leak-proof character of the lateral walls may also be obtained in any suitable manner different from that illustrated.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. In a padder for dyeing baths, the combination of two parallel contiguous horizontal rolls adapted to revolve in opposite directions, terminal plates fluid tightly engaging the terminal cross-sections of the rolls and extending substantially above the latter, and two lateral substantial vertical walls extending in parallelism with the axes of the rolls and engaging fluidtightly through their lateral edges the inner surfaces of the terminal plates, said walls being provided with lower parts fluidtightly engaging the cylindrical peripheries of the corresponding rolls, respectively, to form with the said plates and rolls a container for a fabric-treating bath.

2. In a padder for dyeing baths, the combination of two parallel contiguous horizontal rolls adapted to revolve in opposite directions, terminal plates fluidtightly engaging the terminal cross-sections of the rolls and extending substantially above the latter, two lateral walls pivotally secured to and between the terminal plates and adapted to rock round axes parallel with the axes of the rolls and extending between the upper ends of the said terminal plates, said walls each being provided with outer edges and a lower part, and means whereby the said lateral walls engage fluidtightly through their outer edges and through their lower parts the inner surfaces of the terminal plates and the cylindrical peripheries of the corresponding rolls, respectively, to form with the said plates and rolls a container for a fabric-treating bath.

3. In a padder for dyeing baths, the combination of two parallel contiguous horizontal rolls having engaging surfaces adapted to revolve in opposite directions, terminal plates having inner surfaces and fluidtightly engaging the end faces of the rolls and extending substantially above the latter, two lateral substantially vertical walls having outer edges and extending in parallelism with the axes of the rolls and engaging through said outer edges fluidtightly said inner surfaces of the terminal plates, and portions yieldingly carried by said lateral walls and engaging fluidtightly the cylindrical peripheries of the corresponding rolls throughout the length of the latter, to thereby form with the lateral walls, the terminal plates and the engaging surfaces of the rolls, a substantially fluidtight container.

4. In a padder for dyeing baths, the combination of two parallel contiguous horizontal rolls having engaging surfaces adapted to revolve in opposite directions, terminal plates having inner surfaces and fluidtightly engaging the terminal cross-sections of the rolls and extending substantially above the latter, two lateral substantially vertical walls having lateral edges and extending in parallelism with the axes of the rolls and engaging fluidtightly through their lateral edges the inner surfaces of the terminal plates, said walls being provided with lower parts fluidtightly engaging the cylindrical peripheries of the corresponding rolls, respectively, to form with the said plates and rolls a container for a fabric-treating bath, and

means for heating at least the major part of each lateral wall.

5. In a padder for dyeing baths, the combination of two parallel contiguous horizontal rolls adapted to revolve in opposite directions, terminal plates fluidtightly engaging the terminal cross-sections of the rolls and extending substantially above the latter, two lateral walls pivotally secured to and between terminal plates and adapted to rock round axes parallel with the axes of the rolls and extending between the upper ends of said terminal plates, means whereby said lateral walls engage fluidtightly the inner surfaces of the terminal plates and the cylindrical peripheries of the corresponding rolls, respectively, to form with said plates and rolls a container for a fabric-treating bath, and a heating jacket rigid with each lateral wall.

6. In a padder for dyeing baths, the combination of two parallel contiguous horizontal rolls adapted to revolve in opposite directions, terminal plates having inner surfaces and fluidtightly engaging the terminal cross-sections of the rolls and extending substantially above the latter, two lateral walls pivotally secured to and between said terminal plates and adapted to rock round axes parallel with the axes of the rolls and extending between the upper ends of said terminal plates, means whereby said lateral walls engage fluidtightly the inner surfaces of the terminal

plates and the cylindrical peripheries of the corresponding rolls, respectively, to form with said plates and rolls a container for a fabric-treating bath, means for heating at least the major part of each lateral wall, means for feeding a bath into the container thus defined, and adjustable means urging the lateral walls into their operative fluidtight substantially vertical position.

7. In a padder for dyeing baths, the combination of two parallel contiguous horizontal rolls with engaging surfaces adapted to revolve in opposite directions, terminal plates having inner surfaces and fluidtightly engaging the terminal cross-sections of the rolls and extending substantially above the latter, two lateral substantially vertical walls exending in parallelism with the axes of the rolls and engaging fluidtightly the inner surfaces of the terminal plates, and means conforming to and engaging fluidtightly the cylindrical peripheries of the corresponding rolls throughout the length of the latter, and means elastically connecting said conforming means with the corresponding lateral walls, said connecting means forming with said conforming means and with the lateral walls, the terminal plates and the engaging surfaces of the rolls, a substantially fluidtight container.

No references cited.