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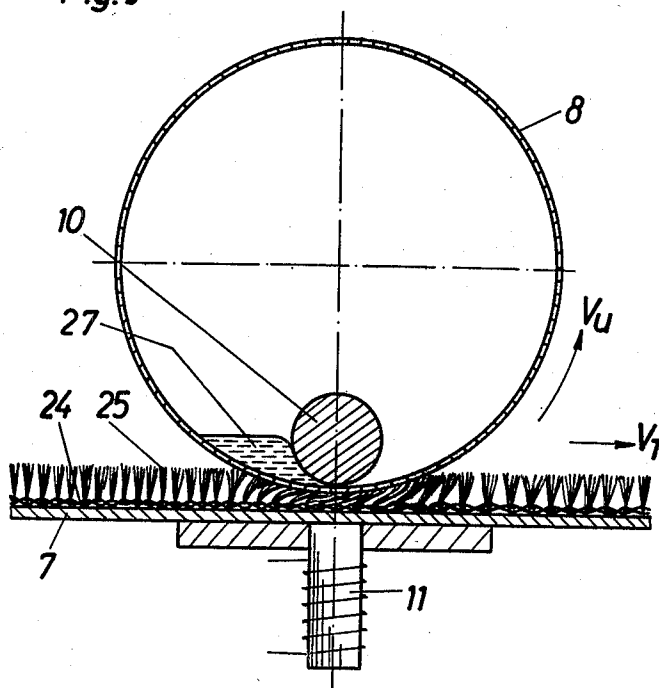
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PROCESS AND DEVICE FOR THE DYEING OF FLAT SHAPED GOODS

Filed Nov. 16, 1967

3 Sheets-Sheet 2

Fig. 3



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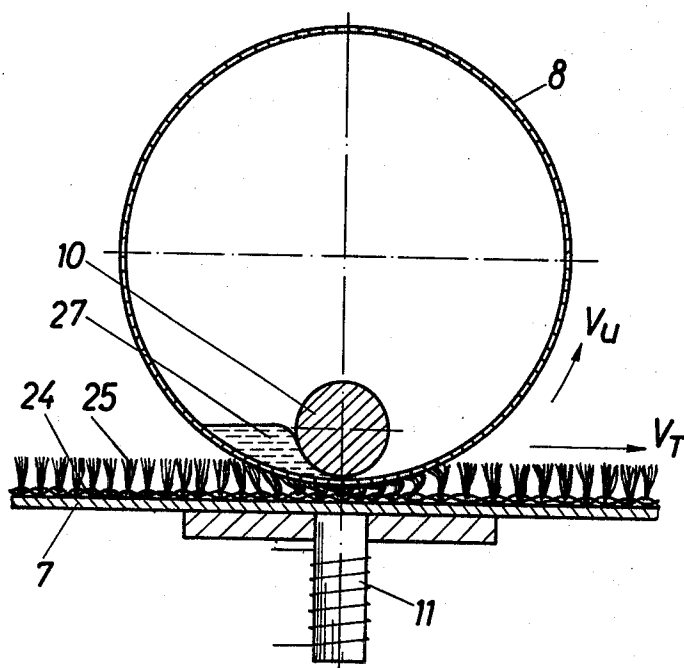
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Fig. 4



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**PROCESS AND DEVICE FOR THE DYEING OF
FLAT SHAPED GOODS**Peter Zimmer, 7 Engelhardstrasse,
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5 Claims

ABSTRACT OF THE DISCLOSURE

A process and apparatus for dyeing flat shaped textile goods wherein the goods are passed along at least one rotating screen cylinder transversely to the direction of the cylinder axis. The screen cylinder touches the goods along a strip-shaped zone lying parallel to the cylinder axis. The dyeliquor is applied to the goods from the inside of the cylinder through openings in the screen cylinder. The dyeing intensity is controlled by changing the speed of the circumference of the cylinder relative to the transport speed of the goods to be dyed. An endless support or transport blanket is used for supporting and transporting the goods.

The invention relates to a process and device for the dyeing of flat shaped goods, especially textile goods.

When dyeing textile goods (piece goods) according to the known methods the goods are treated in a solution called "dyeliquor." According to the exhaust process the piece goods are drawn through the dyeliquor in rope form or in a large state. When dyeing on the padder, the goods impregnated in the dyeliquor pass between squeezing rollers which press the dyeliquor into the goods. The known dyeing processes present certain disadvantages. Thus in the exhaust process the dye consumption and the dye loss are relatively important. Moreover, it is very difficult to control the dyeing intensity and finally, the dyeing according to the exhaust process demands much time so that only a small performance is achieved with this process. When dyeing on the padder, the disadvantages lie above all in the high pressure required between the squeezing rollers, which may result in damaging the quality of certain goods, for example pile goods. Moreover, when dyeing on the padder, the squeezing rollers are often bent, which endangers the dyeing uniformity. Finally, when dyeing on the padder, it is difficult to control the dyeing intensity and it is only possible in a restricted way.

It is therefore an object of the invention to create a dyeing process which is characterized above all by an economical use of the dyeliquor, by careful mechanical treatment of the dyeing goods and by the possibility of simply but gradually controlling the dyeing intensity. Above all, the dyeing process is to be appropriate for the dyeing of pile goods, especially deep-piled goods, for example carpets.

These and further advantages are attained according to the invention in that the flat shaped goods to be dyed pass along at least one rotating screen cylinder transversely to the direction of the cylinder axis; said screen cylinder touches the flat shaped goods to be dyed along a strip shaped zone lying in parallel to the cylinder axis and the dyeliquor is applied to the flat shaped goods to be dyed through the openings of the screen cylinder from the inside of the screen cylinder along this strip shaped zone of contact between the screen cylinder and the flat shaped goods to be dyed.

The dyeliquor may be pressed, for example, through the openings of the screen cylinder by a squeegee plate or roller working at the inside of the screen cylinder, or for

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example, the dyeliquor may be pressed through a slit nozzle provided inside the screen cylinder to the inside wall of the screen cylinder passing through the openings thereof to the goods to be dyed. Thus there are no high compression stresses of the goods to be dyed.

In the process according to the invention the dyeing intensity may be controlled under most economical use of the dyeliquor in a simple manner in that the speed of circumference of the screen cylinder is changed with regard to the transport speed of the goods to be dyed. When the screen cylinder moves more slowly, less dyeliquor flows to the same point of the goods. The supply of dyeliquor is increased with the decline of the difference between the transport speed of the goods and the speed of circumference of the screen cylinder until the speed of circumference of the screen cylinder finally equals to the speed of transport of the goods. A further increase of dyeliquor supply is attained in that the speed of circumference of the screen cylinder is larger than the transport speed of the goods.

Thus the control is conveniently effected in a range which reaches from the synchronism of the screen cylinder and the goods at least to double the speed of circumference of the screen cylinder with regard to the speed of transport of the flat shaped goods to be dyed on the one side and at least to double the transport speed with regard to the speed of circumference of the screen cylinder on the other.

It is important to keep a difference of speed between the cylinder surface and the goods for another reason, when dyeing pile goods, especially deep-piled goods, for example carpets.

When applying the dyeliquor from the inside of a rotating screen cylinder it is possible that the fibres or filaments of the pile pass through through the perforation of the screen cylinder and are deformed or even bent and broken by the edges of the perforation or by the doctor or dyeing roller provided inside the screen cylinder. This disadvantage is prevented by the fact that the speed of circumference of the screen cylinder is chosen smaller or larger than the transport speed of the goods. From the cylinder surface rotating more slowly or more rapidly than the goods, the fibres of filaments of the pile are uniformly laid in one direction by friction; thus a combing effect is, so to say, exerted on the pile and the penetration of the fibres or filaments of the pile through the perforation is prevented.

Moreover, this combing effect has the advantage that the screen cylinder presses on the pile on the point of contact with the goods not in the direction of the fibres, but on the laid fibres or filaments of the pile so that the latter is not bent.

It is a special advantage of the aforementioned combing effect that substantially all fibres of the pile are uniformly applied with dyeliquor due to their uniform orientation, which would not be the case with highly irregular, intersecting fibres. Thus undesired colour shades may be eliminated by means of the process according to the invention.

The special effects as described, when dyeing pile goods, are the better the larger the difference of speed between the cylinder surface and the goods. It is favorable to choose double to quadruple of the speed of the cylinder surface with regard to the goods or in inverse order.

The process of the invention may be effected, for example, by means of a device provided with at least one conveniently endless support or transport blanket closed in itself for the goods to be dyed and with at least one rotating screen cylinder; the drive, however, is to be constructed in such manner that the speed of circumference

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of the screen cylinder is adjustable with regard to the transport speed of the support or transport blanket.

The invention is hereinafter described in greater detail with reference to the accompanying drawings without being limited to the embodiments described.

FIGURE 1 shows a view in elevation of a dyeing machine according to the invention.

FIGURE 2 shows a section A-B of FIGURE 1.

FIGURE 3 represents an exploded vertical section of the working place of the dyeing machine, the speed of circumference of the screen cylinder being larger than the transport speed of the goods.

FIGURE 4 represents an exploded vertical section of the working place of the dyeing machine, the speed of circumference of the screen cylinder being smaller than the transport speed of the goods.

The dyeing machine according to FIGURES 1 and 2 is provided with a support 1 for the roll 2 of the raw material in front of the cloth feeding side of the machine. In the support 4 of the dyeing machine two blanket rollers 5, 6 are provided over which passes an endless support or transport blanket 7 closed in itself. A screen cylinder 8 is rotatably mounted above the support and transport blanket 7. A colour feeding pipe 9 projects into the screen cylinder 8. Moreover, a roller 10 consisting of a cylindrical iron rod is provided in the screen cylinder 8 which is magnetically drawn by a beam shaped magnetic body 11 provided below the support and transport blanket 7 and rolls off along the inside wall of the screen cylinder 8 upon rotation of the screen cylinder 8.

A motor 12 is provided for driving the machine which is connected with the blanket roller 6 of the support and transport blanket 7 over a chain driving 13, thus driving said blanket roller.

Another chain driving 14 is connected with an infinitely variable transmission 15. From the end of the transmission 15 a chain driving 16 passes to the driving shaft 17 of the screen cylinder 8. The rotation of the driving shaft 17 is transferred by means of gears 18, 19 to the toothed rim 20 of the screen cylinder 8.

In operation the goods 21 are supplied to the dyeing machine in direction of the arrow 22, run with the upper strand of the support and transport blanket 7, pass through the screen cylinder 8 and are led to a dyer not shown in direction of the arrow 23.

FIGURES 3 and 4 show the goods to be dyed as pile goods consisting of bottom 24 and pile 25. FIGURE 3 represents the case in which the speed of circumference v_u of the screen cylinder 8 is larger than the transport speed v_t of the support and transport blanket and thus of the goods 24, 25. Thus the pile fibres 25 are given a combing effect in direction of the passage of the goods. According to FIGURE 4, however, the speed of circumference v_u of the screen cylinder 8 is smaller than the transport speed v_t of the support and transport blanket 7. In this case the pile 25 is given a combing effect opposite to the passage of the goods.

In both cases (FIGURE 3, FIGURE 4), the dyeliquor 27 is applied to the laid pile fibres 25 through the perforation upon rotation of the screen cylinder 8 due to the hobbing roller 10.

The screen cylinder 8 consists, for example, of a nickel tube of approximately 0.3 mm. thickness having perforations regularly spread over the whole circumference.

What I claim is:

1. A process for the dyeing of flat shaped goods, especially textile goods, wherein the flat shaped goods to be

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dyed pass along at least one rotating screen cylinder transversely to the direction of the cylinder axis, said screen cylinder touching the flat shaped goods to be dyed along a strip shaped zone lying in parallel to the cylinder axis, the dyeliquor being brought into the inside of the screen cylinder and being applied to the flat shaped goods to be dyed through the openings of the screen cylinder from the inside of the screen cylinder along said strip shaped zone of contact between the screen cylinder and the flat shaped goods to be dyed, and in order to control the dyeing intensity, the peripheral speed of the screen cylinder is varied according to the speed of movement of the flat shaped goods to be dyed.

2. A process according to claim 1 characterised in that the control is effected in a range which reaches from the synchronism of the screen cylinder and the goods to be dyed at least to double the speed of circumference of the screen cylinder with regard to the transport speed of the flat shaped goods on the one hand and at least to double the transport speed with regard to the speed of circumference of the screen cylinder on the other.

3. A process for the dyeing of pile goods characterised in that the pile goods pass along at least one rotating screen cylinder transversely to the direction of the cylinder axis, said screen cylinder touching the pile goods along a strip shaped zone lying in parallel to the cylinder axis, the dyeliquor being brought into the inside of the screen cylinder and being applied to the pile goods through the openings of the screen cylinder from the inside of the screen cylinder along said strip shaped zone of contact between the screen cylinder and the pile goods; the screen cylinder is given a speed of circumference which is larger or smaller than the transport speed of the goods.

4. A process according to claim 3 characterised in that the speed of circumference of the screen cylinder is double to quadruple of the transport speed of the goods or a half to a quarter of the transport speed of the goods.

5. A device for the dyeing of flat shaped goods, especially textile goods, and preferably pile goods, comprising a conveniently endless support or transport blanket closed in itself for supporting and transporting the goods to be dyed and by at least one rotating screen cylinder having a dyeliquor supply into the inside of the screen cylinder, means for pressing the dyeliquor through the openings of the screen cylinder, means for adjusting the speed of the circumference of the screen cylinder with regard to the transport speed of the support or transport blanket, a common drive for said screen cylinder and said support or transport blanket and said screen cylinder being driven over a blanket roller of the support or transport blanket which is preferably driven over another blanket roller and an infinitely variable transmission being provided between the blanket roller of the support or transport blanket and the screen cylinder.

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WILLIAM I. PRICE, Primary Examiner

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