United States Patent

Rigacci

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[54] **PLANT FOR DYEING YARN CONTINUOUSLY**

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**.....**B05c 3/138**

[58] **Field of Search**..68/5 D, 5 E, 9, 19.1, 20, 205 R, 68/43–45; 8/151

[56] **References Cited**

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[57] **ABSTRACT**

A plant for dyeing yarn discontinuously includes a perforate conveyor the upper run of which extends through a zone at which yarn is deposited in skeins or in continuous zig-zag formation, a zone in which dye is applied, a zone in which the dye is fixed by heating, a washing zone and a drying zone in which the yarn is alternately squeezed and expanded.

3 Claims, 6 Drawing Figures

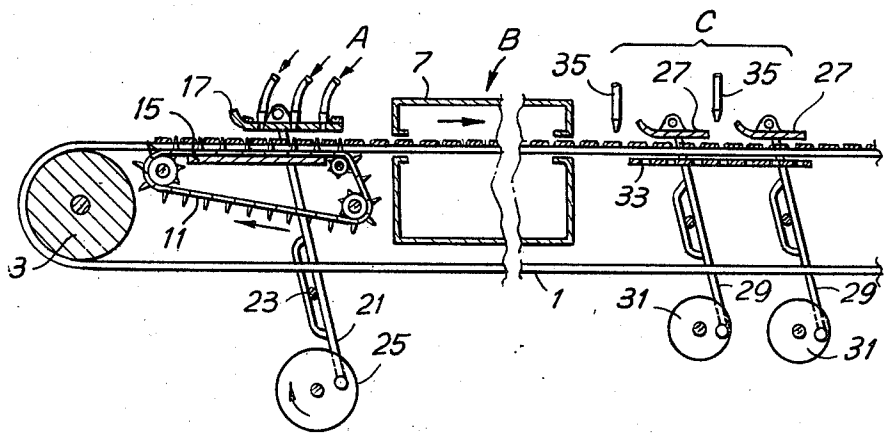


Fig. 1

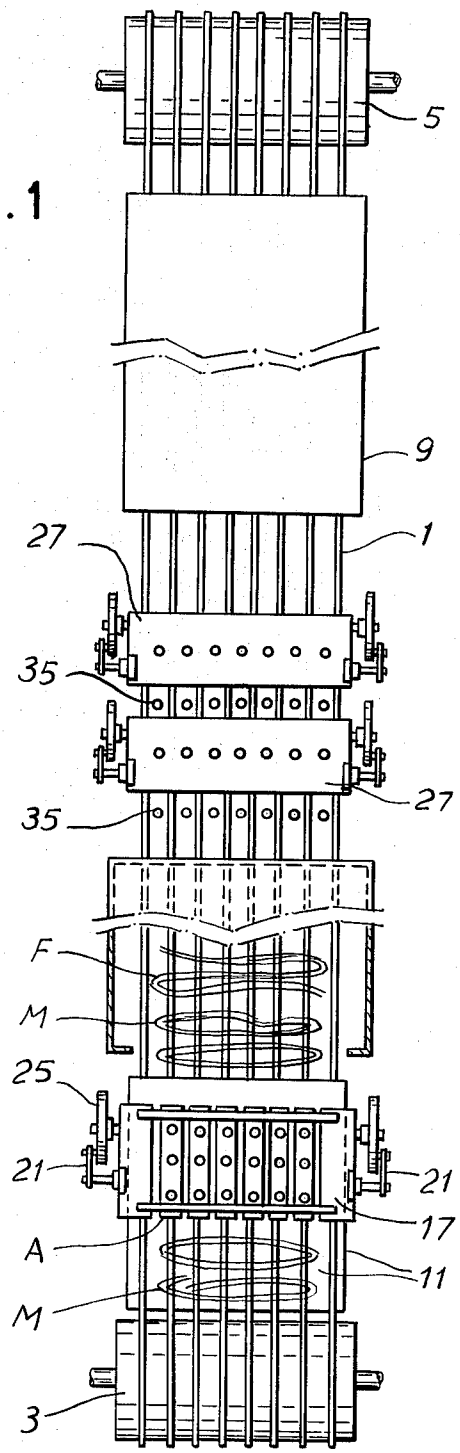
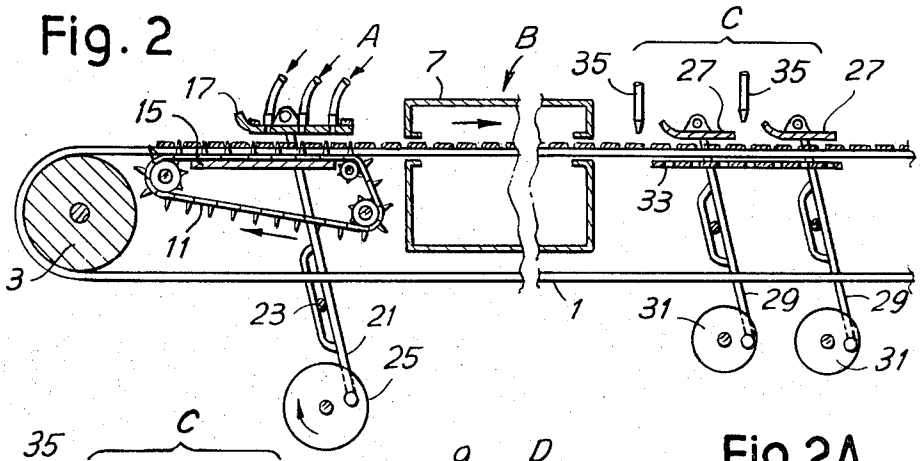


Fig. 2



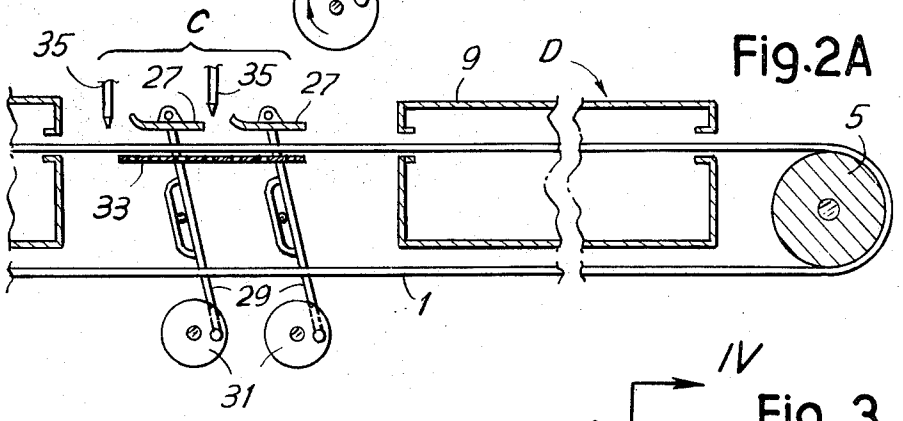


Fig.2A

Fig. 3

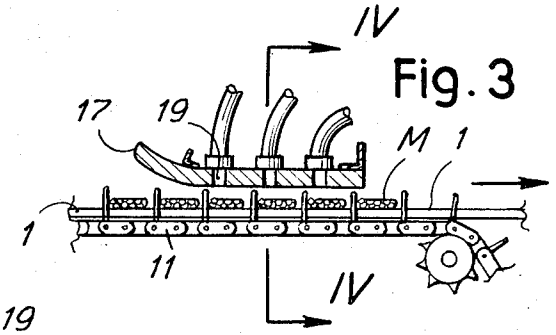


Fig. 4

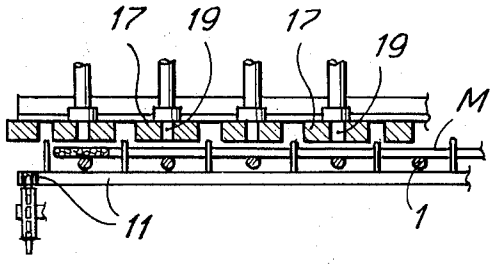
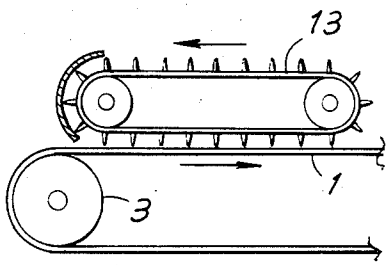


Fig. 5



PLANT FOR DYEING YARN CONTINUOUSLY

BACKGROUND OF THE INVENTION

This invention relates to plant for flamme yarn dyeing, that is with discontinuous coloring of the yarn.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a yarn dyeing plant comprising a conveyor for receiving yarn to be dyed, means for applying dye to the yarn on the conveyor, means for fixing the dye in the yarn by raising the temperature thereof, means for washing the yarn while continuing motion on the conveyor, and means for drying the yarn.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described, by way of example, with reference to the accompanying diagrammatic drawing, in which:

FIG. 1 is a plan view, partly in section of a dyeing plant in accordance with the invention;

FIG. 2 is a vertical section of the plant of FIG. 1;

FIG. 2*a* is another vertical section of the plant of FIG. 1;

FIG. 3 illustrates a detail, to an enlarged scale;

FIG. 4 is a cross-section on the line IV—IV of FIG. 3; and

FIG. 5 illustrates a modification of a device for depositing and counting of the material.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A permeable endless conveyor 1 extends between rollers 3 and 5, each of which may be fabricated from a plurality of flanked wires and a metal mesh. The upper active run of the conveyor 1 passes through a zone A where the dyeing takes place, through a treatment zone B defined by a steam chamber 7, through a zone C where washing of the dyed material is effected, and through a zone D defined by a drying unit 9.

Provision is made for loading the material between the transmission roller 3 and the dyeing zone A. The material is arranged either as transversely orientated elongate skeins M or as a continuous zig-zag bundle of yarns F as shown in FIG. 1. An endless web 11 acting as a distributor is shown in FIG. 2 or as modified at 13 in FIG. 5. The endless web 11 or 13 serves both to facilitate the orientation of the skeins or bundle of yarns respectively to count the working, and also to facilitate the desired passage of the material.

At the zone A a table 15 or other support is provided to support the wires of the conveyor 1. A single color dye distribution device for producing flamme effects or a multi-dye distribution device for multi-color flamme effects, acts from above and in the direction of motion of the upper run. The distribution device includes a structure with a plurality of longitudinal tubes 17 each of which has spaced vertical holes 19 joined to a respective color dye supply, by means of flexible conduits or the like, and advantageously with metering pumps.

The structure formed by the tubes 17 is operated for cyclic raising and lowering motion synchronized with horizontal motion in the direction of the upper run of the endless conveyor 1. Connecting rods 21 are movable for sliding and angular adjustment with respect to pins 23 and are driven by eccentrics 25. The control of the structure 17 must be such as to provide adequate force on the advancing material, accompanying the material in the longitudinal direction during the lowering stage and thus of the pressing stage, while return movements of the tubes 17 have to take place without any contact with the material. As one or more dyes can be metered through the holes 19 at different points on the loaded material, it is possible to obtain an intentionally discontinuous dyeing of the yarns, with one or more colored dyes.

The material which has received the dye is passed into the steam chamber 7 in the zone B for thermal and conditioning treatment. Subsequently the material is passed into the washing zone C, in which table structures 27 are provided. The latter structures act as squeezers, being driven by connecting rod-crank systems 29, 31, the squeezers 27 cooperating with a support surface 33 to squeeze and then re-expand the material during passage through the zone. The structures 27 and the support surfaces 33 are made like grids or are drilled with a multiplicity of holes. In front of each squeezing structure a multi-nozzle distributor 35 is provided, said nozzles being arranged transversely so as to supply a washing fluid to the dyed material. The structure 27 and the support surfaces 33 being perforate enable cyclic absorptions and squeezings of the material as it passes through the zone C. Liquid may be delivered at an intermediate position of the grid.

Downstream of a washing zone for the rinsing of the material, and a squeezing zone, the drying of the material treated takes place in the zone D to the desired moisture content.

I claim:

1. A yarn dyeing plant comprising
a conveyor for receiving yarn to be dyed,
means for applying dye to the yarn on the conveyor,
means for fixing the dye in the yarn by raising the temperature thereof,
means for washing the yarn while continuing motion on the conveyor,
means for drying the yarn,
means for raising and lowering the dye-applying means with respect to the conveyor, and
means defining a support surface disposed below the conveyor working run and opposed to the dye-applying means.

2. A plant according to claim 1, wherein the conveyor is permeable and the washing means include
a non-permeable structure,
a permeable structure disposed on the opposite side of the working run of the conveyor to said rigid structure,
means for reciprocating the non-permeable structure relatively to the permeable structure whereby to squeeze and release the yarn material on the conveyor, the reciprocating motion including a component in the direction of movement of the yarn, and
spraying means for delivering a washing liquid to the yarn.

3. A plant according to claim 1, comprising
a yarn material distribution device including

an endless flexible belt which co-operates with the working run of the belt to distribute the yarn evenly thereon.

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