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3,491,561

RANDOM PRINTING OF YARNS OR THREADS

Filed Sept. 6, 1967

3 Sheets-Sheet 1

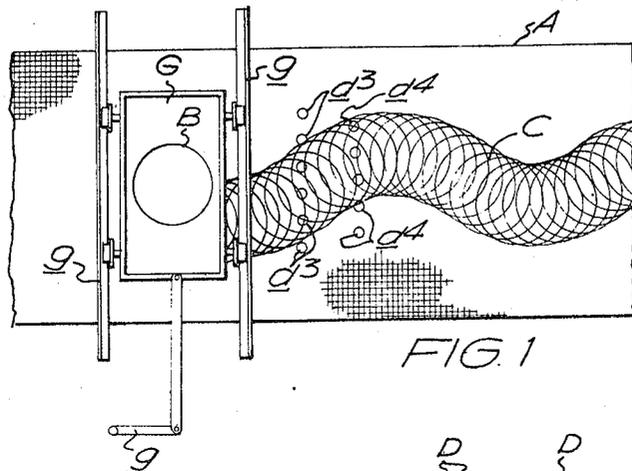


FIG. 1

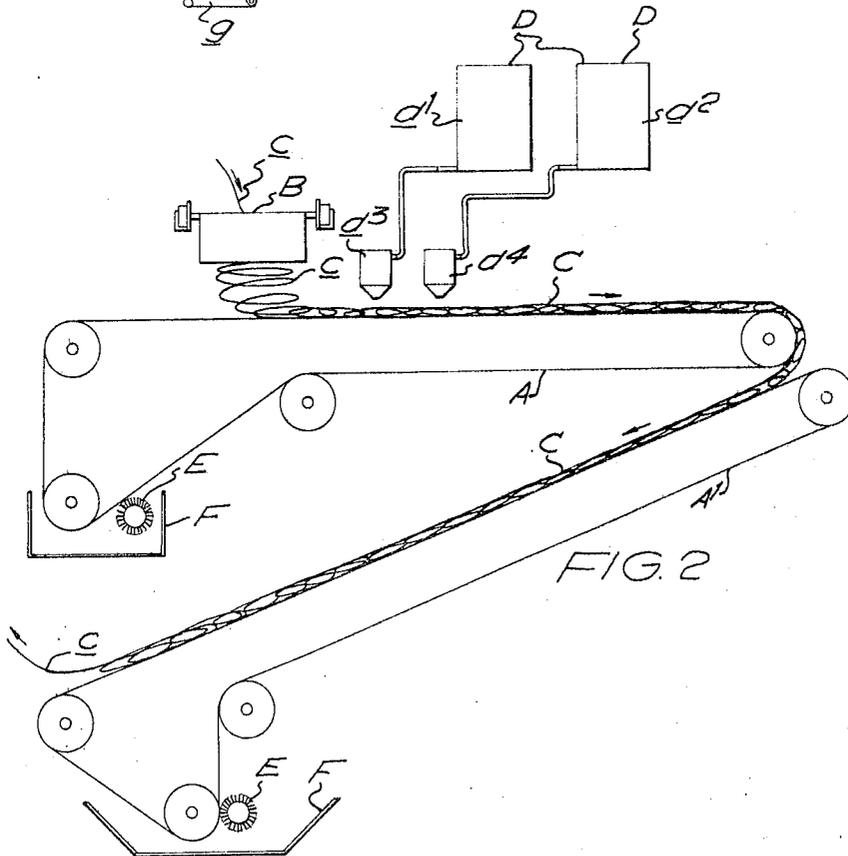


FIG. 2

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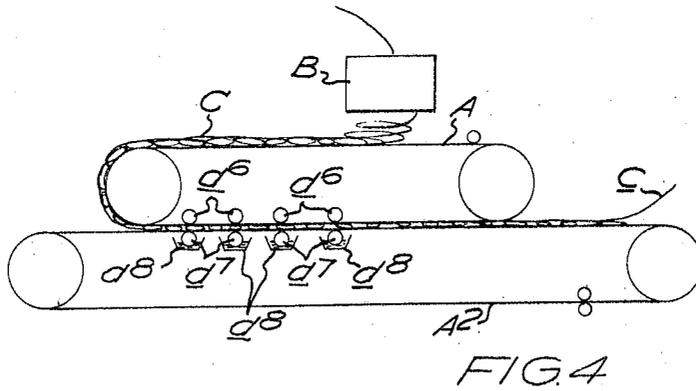
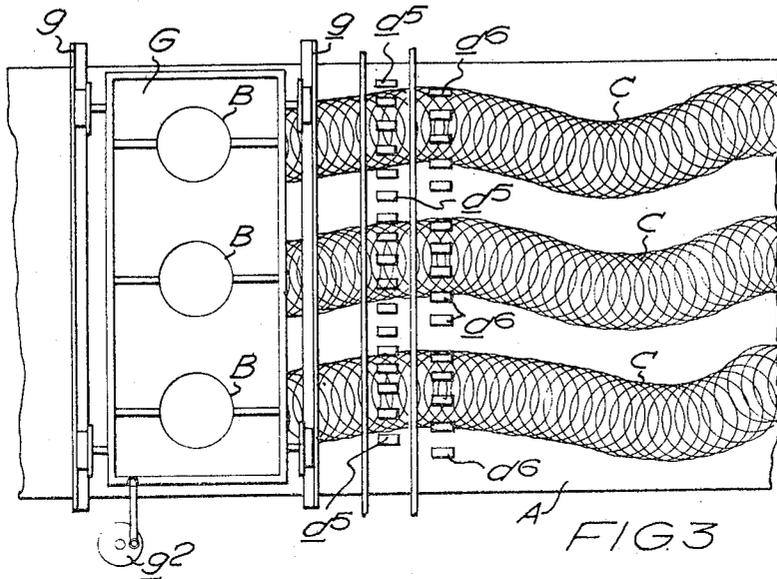
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

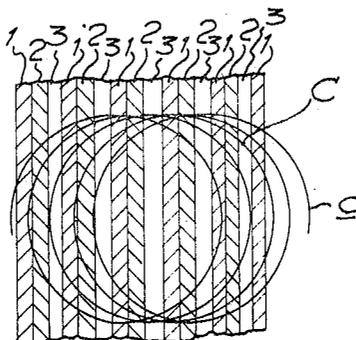


FIG. 5

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RANDOM PRINTING OF YARNS OR THREADS
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ABSTRACT OF THE DISCLOSURE

Yarns or threads are printed with more than one colour so that the sequence of lengths of each colour and the occurrence of such lengths will be random or will not repeat except at very long intervals. A reciprocating coiler lays coils of yarn in a sinuous path on a moving endless conveyor. Spray nozzles or rollers then apply colours to the yarn.

This invention relates to an improved method of printing of yarn or similar fibrous material in two or more colours so that the width of each band of colours and the sequence of the colours will vary over a considerable length of the yarn, i.e. there will be not repeat for such length and consequently when the yarn is made into a fabric long length of the latter will have a "random" motley appearance.

To obtain the aforesaid result said according to the present invention the yarn is delivered in the form of coils, each coil overlapping the preceding coil, onto a travelling band which carries the coils into a printing zone where bands of colour are applied to the coils transversely of the travelling band.

In order that the invention may be fully understood it will be described with reference to the accompanying drawing which shows diagrammatically several embodiments of apparatus capable of carrying out the invention.

FIG. 1 is a plan of one embodiment.

FIG. 2 is a side elevation of same,

FIG. 3 is a plan of a second embodiment,

FIG. 4 is a side elevation of a further embodiment,

FIG. 5 illustrates the effect obtained by the method of printing illustrated in FIG. 4.

All the embodiments of apparatus shown comprise an endless conveyor band A the upper run of which is horizontal, one (FIGS. 1 and 2 and 4) or a plurality of coiler mechanisms B (FIG. 3) of any suitable known type in the textile industry and a colour applying head or heads D each head supplying two or more stripes of colour to the coils C of yarn *c* as they are carried by the conveyor past the colour supply head D.

In the embodiment shown in FIGS. 1 and 2 a single coiler mechanism B is shown which lays a single length of coils C of yarn *c* on the conveyor A and a single colour supplying head is therefore only necessary. The head D shown in FIGS. 1 and 2 comprises two compartments d^1 and d^2 each being connected to a row of jets or nozzles d^3 and d^4 which direct the colour from the compartments onto the coils C. The jets or nozzles d^3 of one row are staggered in relation to the jets or nozzles d^4 of the other row and the jets or nozzles of each row are spaced apart a distance which will give alternate stripes of the colours without there being uncoloured stripes between them.

Further in the embodiment shown in FIGS. 1 and 2 the conveyor A delivers the coloured coils to a second conveyor A¹ which yarn is drawn off and wound into a suitable yarn package either before or after being heated, steamed or otherwise treated to fix the dyes with which the yarn has been treated.

It will be seen from the drawing that each of the con-

veyors A and A¹ during its lower run is guided into contact with a rotating brush E which wipes off any dye adhering to the conveyor into a suitable receptacle F.

In the embodiment shown in FIG. 3 three coiler mechanisms B are shown so that three lengths of coils C are laid side by side on the conveyor A. This embodiment also shows the colours from the compartments d^1 and d^2 of the colour supplying head being connected to two rows of rollers d^5 and d^6 arranged to be contacted by the coils C as the conveyor A carries them below the head. As in the case of the jets or nozzles d^3 and d^4 of FIGS. 1 and 2 the rollers d^6 of one row are staggered in relation to the rollers d^5 of the other row and the width of each roller is such that the stripes of colour applied to the coils are close together so as not to leave intervening stripes which are not coloured.

It is found that better results may be obtained if the coils C are laid on the conveyor A in a sinuous path as shown in FIGS. 1 and 3 and to obtain such a path a transverse reciprocating movement is given to the coiler mechanism or mechanisms B. To produce such movement the mechanism or mechanisms are carried by a carriage G which is mounted on transverse rails *g* and a reciprocating movement is imparted to the carriage such as by a crank g^1 (FIG. 1) or an eccentric g^2 (FIG. 3).

In the embodiment shown in FIG. 4 the coils C after being laid on the conveyor A are brought into contact with a second conveyor A² the upper run of which is parallel to the lower run of the conveyor A and the stripes of colour are applied by transverse rows of rollers d^6 and d^7 the lower rollers d^7 of each row rotating in baths d^8 to which the required colour is applied, the rollers of each row being staggered in relation to those of the other rows.

The conveyor band A may be formed of any suitable material such as a woven glass fibre fabric with an open weave to allow passage of excess of colour therethrough.

After the colour has been applied to the coils C on the conveyor A the yarn is wound or otherwise formed into a yarn package for further treatment such as in an autoclave or steamer to fix the dye.

By using the arrangement of printing the colours illustrated in FIG. 4 absolute random in the colouring of the final yarn can be obtained provided the number of coils per running unit of length is not divisible by the width of each colour band. This is illustrated in FIG. 5 which shows the coils C of yarn *c* in relation to three stripes 1, 2 and 3.

Alternatively if it is desired to make the process continuous the yarn may pass through the autoclave or steamers after leaving the conveyor band, washed and dried before being wound into the finished yarn package.

The hereinbefore described method and apparatus have not only the advantage of producing a yarn in which the colour bands occur at random or only repeat at long intervals, but also allow the conveyor band to travel at a very much slower speed than that at which the yarn is supplied to and withdrawn from the band, the relation of the two speeds being a function of the delivery speed of the coiler mechanism and of the diameter of the coils laid thereby.

The invention is applicable to yarns of natural or man-made fibres and in the latter case to yarns of stapled fibres or to continuous filament yarns.

What I claim is:

1. Apparatus for color printing a continuous length of yarn comprising a conveyor movable along a path, means for coiling said yarn, means for reciprocating said coiling means for depositing the coiled yarn upon said conveyor in a generally sinuous relation to said path, and means for applying colors to the yarn comprising a plural-

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ity of spaced color applying devices disposed transversely across the moving coiled yarn portion, said devices being arranged to apply alternate longitudinally adjacent different color bands along said moving yarn.

2. The apparatus defined in claim 1, wherein said conveyor moves in a substantially linear path, and said means for coiling the yarn is periodically reciprocated transversely of said path to deposit said coiled yarn in said sinuous relation along the conveyor.

3. Apparatus as in claim 1 wherein the colours are supplied to the coils by jets or nozzles.

4. Apparatus as in claim 1 wherein the colours are supplied to the coils by printing rollers.

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