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APPARATUS FOR STRIPING FABRICS

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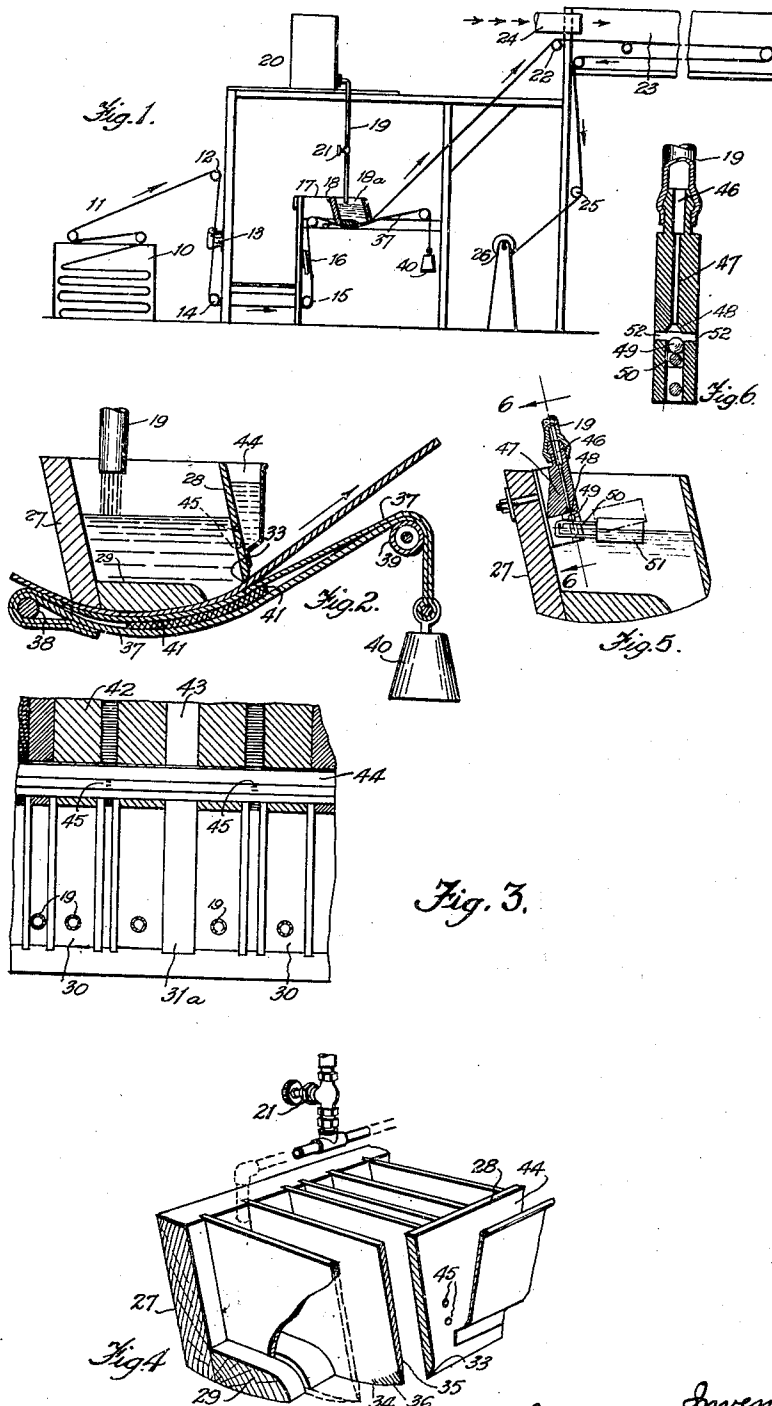


Fig. 3.

Fig. 4

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APPARATUS FOR STRIPING FABRICS

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This invention relates to the colouring of canvas and other textile fabrics, and refers especially to apparatus for applying stripes of different colours to canvas and other fabrics.

An object of the invention is to provide improved apparatus of the kind described whereby the fabric may be simultaneously coloured in stripes of different colours on one side of the fabric in a continuous operation. The fabric may be coloured on its other side, either uniformly or in stripes, by a subsequent operation.

A more specific object is to provide means whereby the fabric may be colored in stripes of different colors in such a manner that a sharp clean dividing line is produced between adjacent stripes and that uncolored areas or bands are not formed between adjacent stripes.

A further object is to provide means for producing an even coating of coloring material of suitable thickness on the fabric, while a still further object is to provide means for drying the coating produced.

Apparatus for colouring fabrics according to the invention comprises means for moving a length of fabric longitudinally, a trough disposed transversely of and above the fabric, front and rear walls on the trough, partitions extending between the front and rear walls of the trough and parallel to the direction of travel of the fabric, a series of open-bottomed cells formed in the trough by the partitions and which are adapted to contain liquid coloring materials, the lower edges of the partitions being curved longitudinally so that the highest portions of the curve are adjacent to the front and rear walls, the front portions of the lower edges of the partitions being tapered towards the front wall to form sharp apices at said front wall, and the lower portion of the front wall being tapered downwardly towards its lower edge to form a sharp lower edge meeting the sharp apices of the lower edges of the partitions, a flexible band extending beneath the fabric as it passes beneath the trough, means for tensioning the flexible band in order to maintain the fabric in pressure contact with the lower edges of the front and rear walls and with the curved lower edges of the partitions, and means for supplying liquid colouring materials to the cells.

An important feature of the invention resides in tapering the front portions of the lower edges of the partitions to form apices at the front wall of the trough. By means of this construction, I have found it possible to eliminate undesirable

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uncolored areas between adjacent colored stripes, and to produce a clean sharp junction line between said stripes without blurring or merging of the colors.

According to another feature of the invention the bottom edge of each partition is curved longitudinally with the highest portions of the curve at the entrance and exit ends of the cells. This insures that the pressure contact between the fabric and the lower edges of the partitions, which is maintained as hereinafter described, is substantially uniform, a condition which is essential for satisfactory operation.

According to still another feature the fabric is held closely against and in pressure contact with the lower edges of the partitions and walls by an underlying band of fabric which passes over a pair of rollers, one on the entrance side and the other on the exit side of the cells, this underlying band being held taut by weighting one of its ends and securing the other end in position.

A cloth reservoir is provided from which the cloth or fabric is fed to the machine. The cloth is fed to the cloth reservoir intermittently and at a greater speed than that at which it is withdrawn. This provides time at the completion of the unrolling of a roll of fabric for the end of a roll to be sewn to the end of a subsequent roll, so that the length of cloth passing through the machine is continuous.

After the cloth leaves the cloth reservoir it passes over various idler rollers and through an automatic guider, and it then passes under the colour cells abovementioned. The colour cells are fed with colour gravitationally, an automatic cut-off of the feed of each colour being provided.

After the fabric has been coloured by passing it beneath the colour cells, it is drawn through a suitable hot air drier. The conditions in the drier and the duration of the drying treatment are such that when the fabric leaves the drier the colours are completely dry. The reverse side of the fabric may be coloured uniformly, or striped by passing the fabric again through the machine.

Reference will now be made to the preferred form of the invention illustrated in the accompanying drawings. In these drawings—

Figure 1 is a diagrammatic view in side elevation showing apparatus for colouring fabric according to this invention.

Figure 2 is a view in sectional end elevation of a colour cell showing the fabric passing thereunder.

Figure 3 is a plan view of the colour cells and fabric passing thereunder,

Figure 4 is a perspective view, partly in section, of the colour cells,

Figure 5 is a view in sectional elevation of a colour cell showing mechanism for regulating the supply of colouring material to the cell, and

Figure 6 is a view in section taken on the line 6-6 of Figure 5.

Referring to the drawings, wherein the same reference numerals are employed to designate like or corresponding parts, the reference numeral 10 indicates a fabric reservoir to which canvas or other fabric 11 is supplied by means not shown and from which the fabric 11 may be withdrawn continuously. The fabric 11 passes over an idler roller 12, through an automatic guider or aligning mechanism 13, over idler rollers 14, 15, over a brush 16, over an idler roller 17, and then beneath a colouring trough 18. The brush 16 smooths out the fabric and removes loose threads and other pieces of foreign material.

Paint, lacquer or other colouring material 18a is supplied gravitationally to the cells of the trough 18 through pipes 19 from containers 20. Valves 21 are provided in the pipes 19 to regulate the quantity of colouring material supplied.

After passing beneath the trough 18, the fabric 11 passes upwards and over an idler roller 22 and then passes horizontally through a drier 23. Air at a suitable temperature enters the drier 23 through inlet pipe 24 and is passed through the drier in contact with the fabric. The temperature and rate of flow of the air, and the duration of treatment of the fabric in the drier, are such that the colours on the fabrics are completely dry when the fabric leaves the drier. The fabric then passes over an idler roller 25 and is wound on roller 26.

The colouring trough 18 comprises a rear wall 27 and a front wall 28 extending the full length of the trough and sloping downwardly and forwardly in the direction of travel of the fabric 11. A bottom member 29 is secured to the lower edge of the rear wall 27 and covers the rear portion of the bottom of the trough.

The trough 18 is divided into colour cells 30 by partitions 31 which fit into recesses in the rear wall 27 and bottom member 29 and are secured to the rear face of the front wall 28. The number, arrangement and widths of the colour cells 30 are such as to provide on the fabric 11 the required pattern of stripes.

In each cell or compartment 30 a space 32 is formed between the front edge of the bottom member 29 and the lower edge of the front wall 28. The lower or bottom edge of the front wall 28 is tapered or shaped to a sharp edge 33. The lower edge 34 and the front edge 35 of each partition 31 are tapered at their forward and lower ends, respectively, to form a sharp point or apex 36 at the forward or exit end of the cells 30, which point or apex 36 meets the sharp lower edge 33 of the front wall 28.

The lower edges 34 of the partitions 31 and the lower surface of the bottom member 29 are curved longitudinally, that is, in the direction of travel of the fabric 11, and the highest portions of the curve are at the front and rear ends of the said lower edges 34.

The fabric 11 is passed beneath the trough 18 as shown in Figure 2 in the direction of the arrow shown in this figure and is maintained in pressure contact with the undersurface of the bottom member 29 and with the lower edges of the

partitions 31 and front wall 28 by a band 37 of fabric or other flexible material lying beneath the fabric 11. One end of the band 37 is secured to a rod or bar 38 and the other end passes over a roller 39 and is attached to a weight or weights 40. A strip or pad 41 of sponge rubber or like resilient material may be inserted between the upper and lower layers of the band 37 beneath the trough 18.

The weighted flexible band 37 holds the fabric 11 firmly against the lower edges of the walls 27, 28 and the lower edges 34 of the partitions 31, irrespective of any slight variations or inequalities in the fabric.

The paint, lacquer or other colouring material 18a is applied to the upper surface of the fabric 11 as it passes beneath the open lower ends of the cells 30. The fabric 11 engages the lower edge 33 of the front wall 28 with such pressure that the required quantity of colouring material is left on the fabric leaving the trough 18.

The tapering of the lower edge 34 of each partition 31 towards the exit ends of the cells 30 ensures that the fabric 11 is coloured in stripes 42 with exactitude, so that the differently coloured stripes do not smear at their junctions and do not leave any appreciable gaps of uncoloured material in those positions. The exactitude of the meeting of the adjacent stripes without gaps and without overlapping depends mainly on the accuracy of construction of the partitions.

The colouring material 18a is supplied to the cells 30 through the pipes 19 as previously stated, and these pipes may be arranged as shown in Figure 4 to supply the same colouring material to a series of cells. A feed trough 44 containing colouring material may be provided on the front of the trough 18, and holes 45 are formed in the front wall 28 between the trough 44 and certain of the cells 30. This arrangement is particularly suitable for supplying colouring material to narrow cells 30, which are otherwise difficult to supply.

In Figures 5 and 6 a device for automatically regulating the supply of colouring material 18a to the cells 30 is illustrated. The supply pipe 19 is attached to a nipple 46 formed on the upper end of a valve body 47 which is bolted to the rear wall 27 of the trough 18. A delivery passage is formed in the valve body 47 and terminates in a valve seat 48. A ball valve 49 is adapted to be moved upwardly against the valve seat 48 by an arm or lever 50 pivoted to the valve body 47 and having a float 51 connected to its free end.

Outlet passages 52 for the colouring material are provided in each side of the valve body 47. By means of this float controlled valve a substantially uniform quantity of colouring material may be maintained in the cell 30.

This machine is remarkably efficient, not only in the accuracy with which the stripes of different colours are marked upon the fabric, but also on account of its remarkable speed. With one of these machines several thousand yards of fabric may be coloured in a day.

I claim:

1. Apparatus for coloring fabrics which comprises means for moving a length of fabric longitudinally, a trough disposed transversely of and above the fabric, front and rear walls on the trough, partitions extending between the front and rear walls of the trough and parallel to the direction of travel of the fabric, a series of open-bottomed cells formed in the trough by the partitions and which are adapted to contain liquid

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coloring materials, the lower edges of the partitions being curved longitudinally so that the highest portions of the curve are adjacent to the front and rear walls, the front portions of the lower edges of the partitions being tapered towards the front wall to form sharp apices at said front wall, and the lower portion of the front wall being tapered downwardly towards its lower edge to form a sharp lower edge meeting the sharp apices of the lower edges of the partitions, a flexible band extending beneath the fabric as it passes beneath the trough, means for tensioning the flexible band in order to maintain the fabric in pressure contact with the lower edges of the front and rear walls and with the curved lower edges of the partitions, and means for supplying liquid coloring materials to the cells.

2. Apparatus according to claim 1 and having a bottom member which closes the rear portion of the bottom of each cell, an opening being formed between the front edge of the bottom member and the front wall of the trough.

3. Apparatus according to claim 1 and having a feed trough secured to the front wall of the trough, said feed trough being adapted to hold a supply of liquid coloring material, said front wall being provided with holes through which the coloring material is admitted to certain of the cells.

4. Apparatus according to claim 1 and having pipes through which the coloring materials are supplied to the cells, valves connected to said pipes for regulating the admission of coloring materials to the cells, and floats mounted in the cells and connected to the valves so as to automatically maintain uniform quantities of coloring materials in the cells.

5. Apparatus for coloring fabrics which comprises means for moving a length of fabric longitudinally, a trough disposed transversely of and above the fabric, front and rear walls on the trough, partitions extending between the front and rear walls of the trough and parallel to the

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direction of travel of the fabric, a series of open-bottomed cells formed in the trough by partitions and which are adapted to contain liquid coloring materials, the lower edges of the partitions being

5 curved longitudinally so that the highest portions of the curve are adjacent to the front and rear walls, the front portions of the lower edges of the partitions being tapered towards the front wall to form sharp apices at said front wall and the lower portions of the front edges of the partitions being tapered downwardly to said apices and the lower portion of the front wall being tapered downwardly towards its lower edge to form a sharp lower edge meeting the sharp apices of the lower edges of the partitions, a flexible band extending beneath the fabric as it passes beneath the trough, means for tensioning the flexible band in order to maintain the fabric in pressure contact with the lower edges of the front and rear walls and of the partitions, means for supplying liquid coloring materials to the cells, a drier, means for passing hot air through the drier and in contact with fabric passing there-through, and means for passing the fabric continuously beneath the trough and then through the drier.

6. Apparatus according to claim 1 wherein the flexible band is secured at one end and is weighted at the other end.

7. Apparatus according to claim 1 wherein a resilient pad is incorporated in the flexible band beneath the trough.

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