Aug. 6, 1940. P. VAN DER REIS 2,210,633

MULTICOLOR FABRIC PRINTING

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Fig. 1.

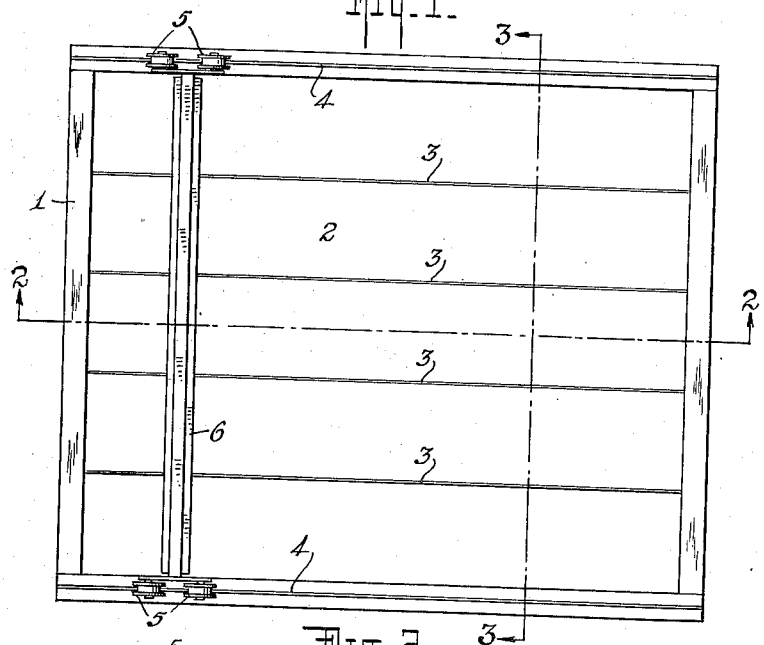


Fig. 2.

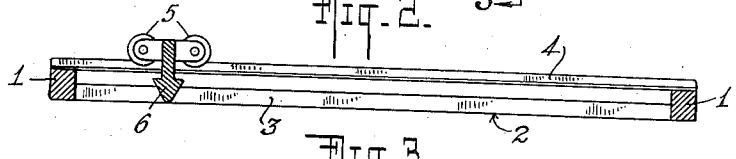


Fig. 3.

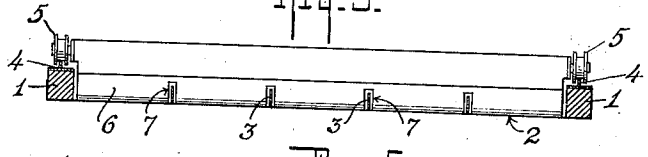


Fig. 4.

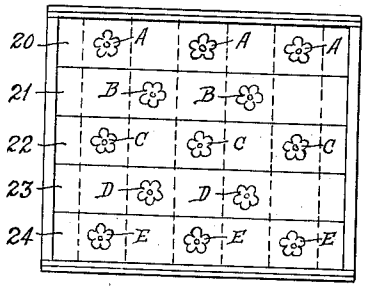


Fig. 5.

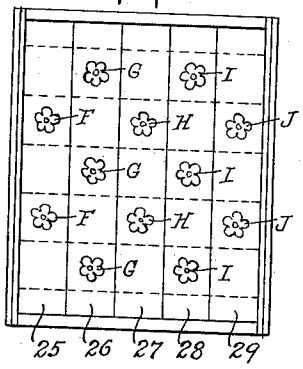
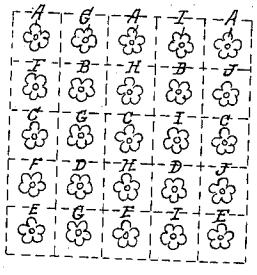


Fig. 6.



WITNESS

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Fig. 8.

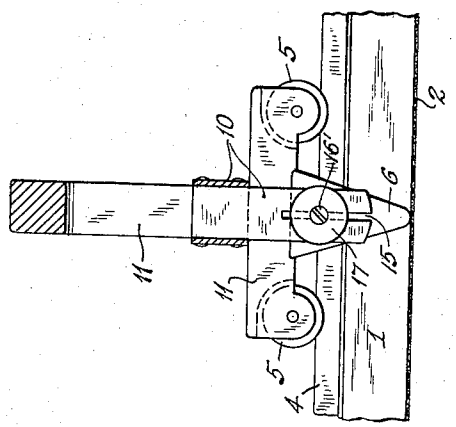


Fig. 10.

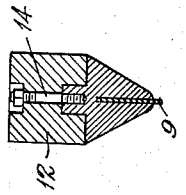


Fig. 7.

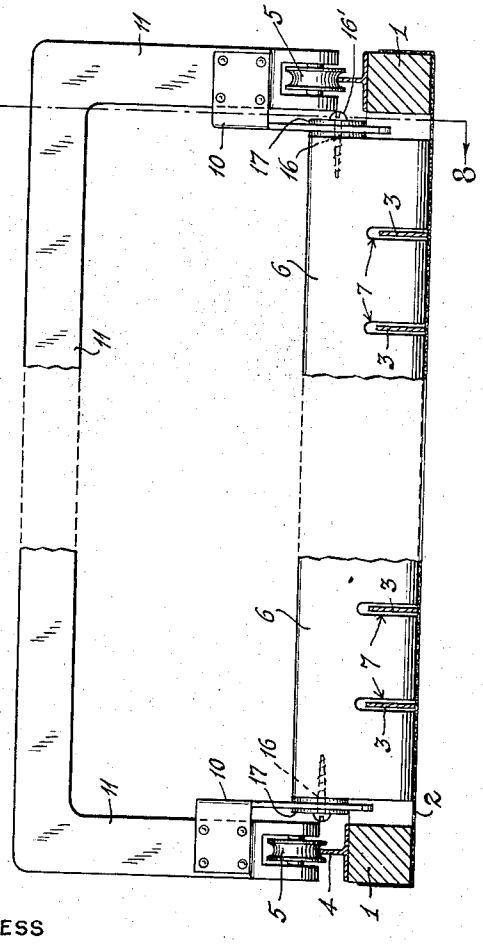
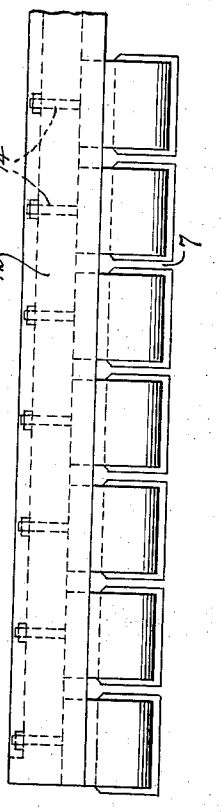


Fig. 9.



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2,210,633

MULTICOLOR FABRIC PRINTING

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Application January 3, 1939, Serial No. 248,969
In Brazil December 14, 1937

6 Claims. (Cl. 101—115)

The invention relates to the application of designs including variously colored portions to fabrics such as silk or other woven or like material and has for its object the improvement of existing methods and the effecting of economies in a number of directions.

The conventional present practice with respect to what is known as the screen-printing process is to prepare separate frames, one for each color to be applied. Upon these frames silk or metal screens are stretched. By methods well understood by those skilled in this art these screens are rendered impervious to the passage therethrough of coloring material except at the portions where the design calls for the presence of the color with respect to which the screen is made, leaving the remaining portions of the screen, i. e., where the color is to pass through, porous. The silk or fabric to be printed upon is generally stretched over a long table. One of the screen frames is then placed upon a section of the fabric and color is then poured upon one side of the screen, the color being then distributed over the whole of the screen surface by a scraper or spreader which forces the color to pass through the porous portions of the screen and causes the color to be transferred through those porous portions to the fabric to produce the figure or figure portions possessing the color for which the screen is adapted. The operator, stationed at one of the longer sides of the table upon which the fabric to be printed on rests, passes the scraper from one side of the frame to the opposite side until by one or more passages of the scraper over the screen its entire surface is covered with color and the amount required to color the underlying fabric to be printed has passed through the pervious portions of the screen. The screen frame is then moved to an adjacent section and the described procedure is repeated until the entire length of fabric to be printed upon has been printed at the predetermined points with figures or parts of figures of the same color. For the completion of a design which requires the presence of say a ten-color flower pattern, the described procedure must be repeated with each color in sequence, each color requiring a new and separate screen frame.

The improvements devised by me make it possible to proceed with fewer screen frames than the number represented by the number of colors to be printed and at the same time allows more colors to be printed thereby, saving a corresponding number of step and repeat operations, each of which may be regarded as an individual work unit. The total number of such work units is greatly reduced by the present invention.

The invention is illustrated in the accompanying drawings in which Fig. 1 is a top plan view of one form of a color-distributing frame and scraper. Fig. 2 is a longitudinal section taken on line 2—2 of Fig. 1. Fig. 3 is a cross-section on line 3—3 of Fig. 1. Fig. 4 is illustrative of the production of a particular design in five colors upon a section of the fabric to be printed. Fig. 5 is a similar view to Fig. 4 illustrating the application of five additional colors to the same fabric section. Fig. 6 is a view of the complete fabric section as printed in accordance with Figs. 4 and 5. Fig. 7 is an enlarged fragmentary cross-sectional detail of a modified form of certain parts of the device. Fig. 8 is a section on line 8—8 of Fig. 7. Fig. 9 illustrates another form of a modification, and Fig. 10 is a detail of one of the scraper elements.

In the drawings 1 is the screen frame with which is associated the stretched screen 2 divided into independent strip sections by the parallel partition walls 3. Each of the strip sections 2 is porous only at those portions which are adapted to transfer the color for which the strip is adapted, so that one strip section 2 may be prepared to supply the red portion of the design, while the adjacent strip is adapted to transfer the green portions of the design, and the next strip the blue portions, and so forth. The partitions 3 rest upon the screen 2 and prevent the spread of one color to the adjacent compartment or screen section. The frame 1 is provided at two opposite sides with rails 4 extending parallel to the partition walls 3, and on these rails run the rollers 5 which are attached to the ends of the scraper or spreader 6 so that the scraper can be passed smoothly over the entire set of screen strips 2. The individual portions of the scraper 6 which run over the several strips 2 are spaced from each other as at 7 sufficiently to accommodate the walls or partitions 3. The scraping edge portion of the scraper units may be supplied with elastic or rubber inserts such as shown at 9 in Fig. 10 to assist in the distribution of color over the screen and to assure proper action within the confines of two partitions. As indicated in Figs. 7 and 8 the scraper may be fastened to the roller carriage in such a manner that the scraper is movable upwardly or downwardly and is also adjustable in a rotary direction on its longitudinal axis. The rails 4 and preferably also the portions of the frame 1 on which the rails 4 are supported, ex-

tend beyond the main portion of the frame in order to permit the scraper to function up to the outermost inner wall of the screen frame where the screen is exposed.

The screen frame as thus far described is laid upon a section of the fabric to be printed in such a manner that the screen sections come to rest upon the fabric in the direction of the length of the latter. Coloring matter A, B, C, D, and E, which may all be different from each other according to the character of the design to be printed, is poured upon one end of the several screen sections 2, whereupon the scraper is manipulated for the distribution of the color. If the porous portions of the several screens 2 do not all lie in alignment, there will remain zigzag or irregularly disposed intermediate unprinted portions which, if the design calls for it, may subsequently be printed upon with other or further colors. When the color transference by the use of the described frame has been completed, the frame is stepped or moved to the adjacent position and the procedure repeated until the entire length of the fabric to be printed upon (generally about 80 to 100 yards) has been treated. If the design is a five-color design, with a color arrangement which will be satisfied by the application of colors through a single screen frame of the type described, the foregoing operations complete the printing of the multicolored design and produce, for example, the color arrangement shown in Fig. 4 in which the strip sections are indicated as 20, 21, 22, 23, and 24, while the colors are indicated by A, B, C, D, and E. But if the design calls for additional colors, a second frame is used corresponding in all substantial respects to the first, but preferably arranged to have the individual screen sections 2, partition walls 3, and rails 4 run transversely of the fabric to be printed. In other words, whereas the scraper used in connection with the first frame was passed over the fabric in the direction of its length, it will in the second frame travel in the direction of the width of the fabric whereby printing is done in two different directions, crosswise of each other. If, in connection with the second frame, five screen sections are used as indicated at 25, 26, 27, 28, and 29 in Fig. 5, and colors F, G, H, I, and J are used for the several screen sections, the printed result of the use of this screen will be that shown in Fig. 5. But if the fabric has previously been printed with the design transferred through the first frame, then the combined design as printed by the use of the two frames in ten colors will be as shown in Fig. 6 and will show a color distribution, looked at lengthwise of the printed fabric, of the following order:

A	G	A	I	A
F	B	H	B	J
C	G	C	I	C
F	D	H	D	J
E	G	E	I	E

By merely varying the color distribution and nothing else, the same pattern but with totally different color distributions in its individual parts, can be produced as instanced by the following examples:

H	E	H	D	H	C	H	C	E	C
C	J	A	J	B	B	F	G	F	D
F	E	F	D	F	A	H	A	E	A
C	I	A	I	B	B	J	G	J	D
C	E	G	D	G	I	H	I	E	I

It is apparent that the foregoing procedure supplies almost unlimited scope with respect both to the number of colors which may be used and the distribution of the colors in various and fanciful arrangements. The color distribution, of course, depends upon the skill of the designer of the patterns but his scope is greatly enhanced by the possibilities afforded by the present invention and he can freely draw on a larger number of colors without being restricted or deterred by the necessity of the present-day practice of being obliged to prepare a separate screen for each added color and with that separate screen individually apply the color over the entire length of the long piece of fabric to which the design is to be applied. Thus it is apparent that whereas in the present standard procedure it is necessary to use ten frames for a ten-color printing with ten repetitions of going over the whole piece of fabric to be printed, once with each frame, it now requires a very much lesser number of frames and then only a single going over the fabric to be printed by each frame. The number of frames and the number of screen sections carried by each frame is subject to variations. Thus, in dealing with multicolored printing, two, three, four, or at most five frames will ordinarily be used. By the use of five frames for a ten-color printing there is such a manifold possibility with respect to color variation and color distribution that practically every possible pattern is capable of being printed.

The screen 2, with respect to its several sections, can be readily treated in a single operation for rendering all those parts of the several sections impervious where that condition is required. It is also possible to make the screen sections as separate strips.

The rollers 5 preferably come in pairs but each roller carriage may also be equipped with a double pair of rollers, these being details which are within the choice of the constructor of the mechanism.

The scraper or squeegee element may consist of a continuous piece provided with appropriately spaced recesses 7 for the partitions 3. It also may be constituted of independent scraper elements as indicated in Figs. 9 and 10. In this latter case each individual scraper element is individually attached to a support 12 as by nuts 14, these individual elements being spaced apart to provide the recesses 7. As shown in Fig. 7, a fixture 10 will be associated with the member 11, which connects the two opposite rollers. This fixture is provided with a slot 15 along which the position of the scraper bar may be adjusted vertically. The scraper bar can also be moved or adjusted on the pivot 16 in a rotary direction, the adjusted positions being maintained by the screw head 16' and the washer 17.

By the provision of a frame as described it becomes possible to fasten color containers at the upper end of the frame for each division or section of the screen, said color containers containing sufficient color for printing the entire fabric length of eighty to one hundred yards without the necessity of requiring replenishment.

The use of scraper mechanism such as indicated in Fig. 7 possesses the advantage that the entire assembly can be used in connection with any screen frame so that by standardizing the screen divisions for different designs or by maintaining a plurality of such assemblies for a plurality of standardized varying screen divisions, one of the assemblies will always be available for use with any particular screen division which may be called for a connection with the reproduction of any desired design.

It will be apparent that many modifications of

structure may be made use of without departing from the scope of the present invention.

I claim:

1. Apparatus for use in multicolor fabric printing comprising in combination, a frame enclosing an area substantially smaller than the area of the fabric to be colored and movable at will in a stepwise fashion along the length of the fabric, a screen attached to said frame and being porous only at those portions through which color material is to be transferred to the fabric, a plurality of partitions extending within the confines of the frame to form a plurality of open troughs bottomed by the screen for the reception of a plurality of differently colored color materials, a pair of rails secured to the two side edges of said frame which extend alongside said partitions, and a manually movable carriage mounted on said rails and including a pair of rollers engaging each rail, means supporting the rollers of each pair in spaced relation, a rigid member connected to said roller supporting means and extending across said partitions, said member being adapted to serve as a handle for manual movement of the carriage along said rails and spreading means comprising a plurality of spaced sections each of which extends into an open trough so as to simultaneously exude the color materials through the porous portions of the screen in the several troughs as the carriage is manually moved along the rails of said frame, each of said sections being composed in major part at least of rigid material and having an overall length greater than the height of its associated partitions so that the portions of the carriage intermediate said sections override the upper edges of said partitions in spaced relation and do not come into engagement with such edges during the movements of the carriage the lower end portion of each of said sections being substantially triangular in cross-section and tapering in thickness towards the lower terminal end thereof.

2. Apparatus for use in multicolor fabric printing comprising in combination, a frame enclosing an area substantially smaller than the area of the fabric to be colored and movable at will in a stepwise fashion along the length of the fabric, a screen attached to said frame and being porous only at those portions through which color material is to be transferred to the fabric, a plurality of partitions extending within the confines of the frame to form a plurality of open troughs bottomed by the screen for the reception of a plurality of differently colored color materials, a pair of rails secured to the two side edges of said frame which extend alongside said partitions, and a manually movable carriage mounted on said rails and including a pair of rollers engaging each rail, means supporting the rollers of each pair in spaced relation, a rigid member fixedly attached to said roller supporting means and spanning the space therebetween, said member being adapted to serve as a handle for manual movement of the carriage along said rails, a spreader disposed intermediate said roller supporting means and including a plurality of spaced sections each of which extends into an open trough and serves as a spreading instrumentality, the portions of said spreader intermediate said sections overriding the upper edges of said partitions and being spaced therefrom so as not to come into engagement with such edges during the movements of the carriage, and means for adjustably connecting the ends of said spreader to said roller supporting means.

3. Apparatus such as is defined in claim 2 in which said rigid handle is U-shaped and the connecting means for said spreader comprises a pair of brackets attached to and depending from the arms of said rigid handle, and means carried by the ends of said spreader and interengaging with said brackets to support said spreader, said last mentioned means being adjustable relative to said brackets to vary the position of said spreader.

4. Apparatus such as defined in claim 2 in which the connecting means for said spreader comprises a pair of depending brackets affixed to said rigid handle and each having a vertically disposed slot, fastening members carried on the ends of said spreader and extending through said slots, said fastening members being adjustable to vary the spreader in vertical and rotary directions with relation to said brackets and adapted to secure said spreader to said brackets in the adjusted position.

5. Apparatus for use in multicolor fabric printing comprising in combination, a frame enclosing an area substantially smaller than the area of the fabric to be colored and movable at will in a stepwise fashion along the length of the fabric, a screen attached to said frame and being porous only at those portions through which color material is to be transferred to the fabric, a plurality of partitions extending within the confines of the frame to form a plurality of open troughs bottomed by the screen for the reception of a plurality of differently colored color materials, a pair of rails secured to the two side edges of said frame which extend alongside said partitions, and a manually movable carriage mounted on said rails and including a pair of rollers engaging each rail, means supporting the rollers of each pair in spaced relation and a spreader connected to said roller supporting means and extending across said partitions, said spreader consisting of a single piece of material slotted to provide a plurality of spaced sections, each of which extends into an open trough so as to simultaneously exude the color materials through the porous portions of the screen in the several troughs as the carriage is manually moved along the rails of said frame, the lower end portion of each of said sections being substantially triangular in cross-section and tapering in thickness towards the lower terminal end thereof and the portions of said spreader intermediate said sections overriding the upper edges of said partitions and being spaced therefrom so as not to come into engagement with said edges during the movements of the carriage.

6. Apparatus for use in multicolor fabric printing comprising in combination, a frame enclosing an area substantially smaller than the area of the fabric to be colored and movable at will in a stepwise fashion along the length of the fabric, a screen attached to said frame and being porous only at those portions through which color material is to be transferred to the fabric, a plurality of partitions extending within the confines of the frame to form a plurality of open troughs bottomed by the screen for the reception of a plurality of differently colored color materials, a pair of rails secured to the two side edges of said frame which extend alongside said partitions, and a manually movable carriage mounted on said rails and including a pair of rollers engaging each rail, means supporting the rollers of each pair in spaced relation and a spreader connected to said roller supporting means and ex-

tending across said partitions, said spreader comprising a plurality of spaced sections each of which extends into an open trough so as to simultaneously exude the color materials through the porous portions of the screen in the several troughs as the carriage is manually moved along the rails of said frame, the lower end portion of each of said sections being substantially triangular in cross-section and tapering in thickness towards the lower terminal end thereof and including a rubber insert which is positioned in a recess extending the width of said section and projects beyond the outer edges of said recess into engagement with surface portions of the trough into which said section depends and serves as a spreading instrument, and the portions of said spreader intermediate said sections overriding the upper edges of said partitions and being spaced therefrom so as not to come into engagement with said edges during the movements of the carriage.

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