No. 656,084. Patented Aug. 14, 1900.

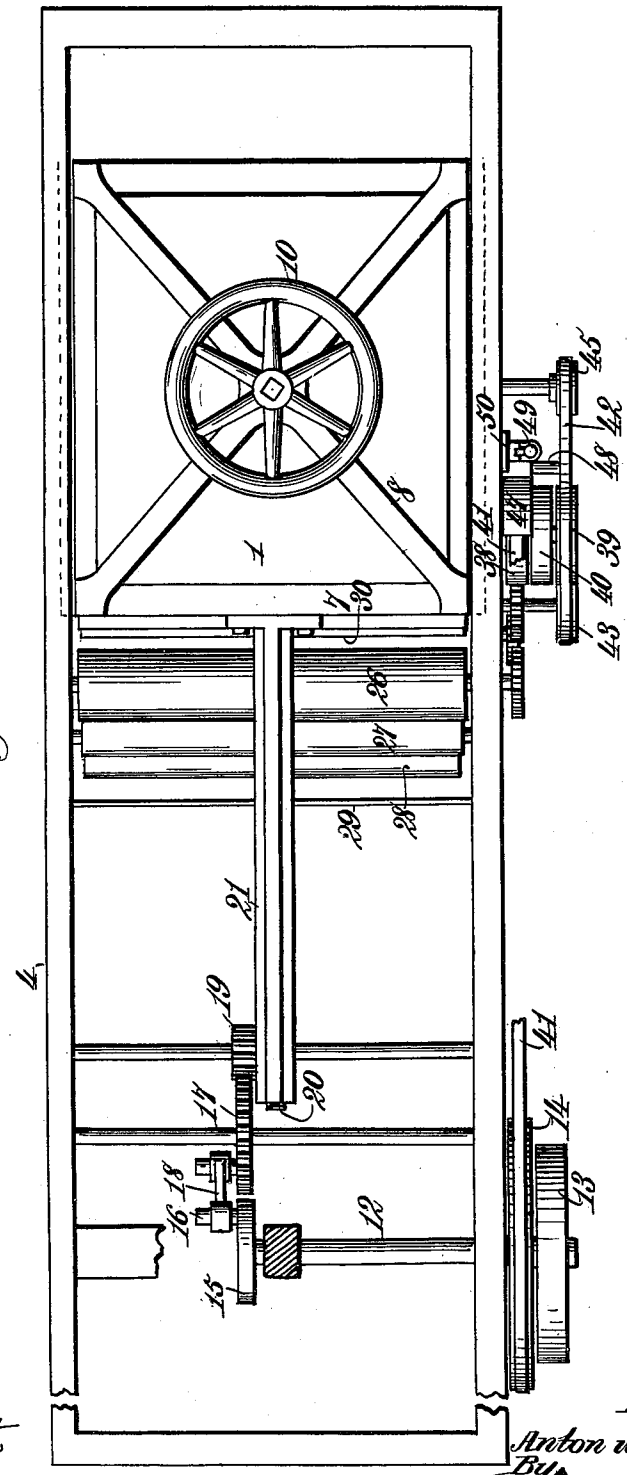
A. VON BEUST.

MEANS FOR REPRODUCING MULTICOLOR DESIGNS.

(Application filed Mar. 17, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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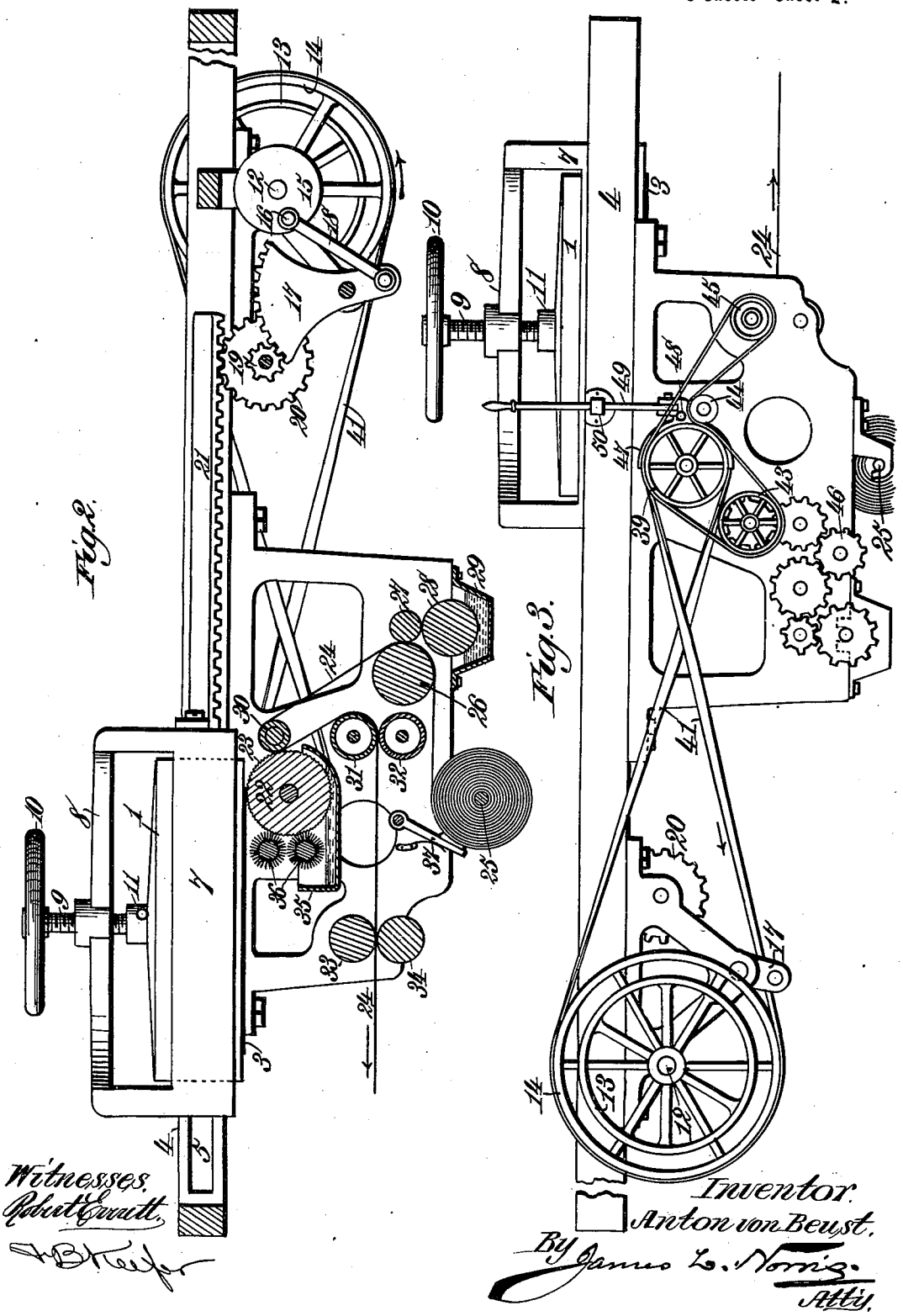

Fig. 2.

Fig. 3.

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Fig. 4.

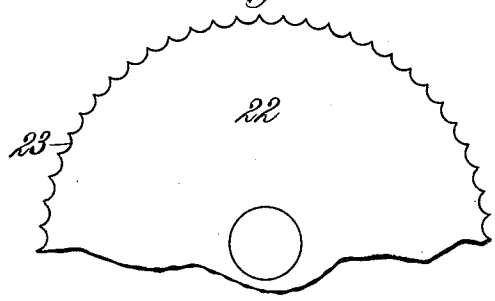


Fig. 5.

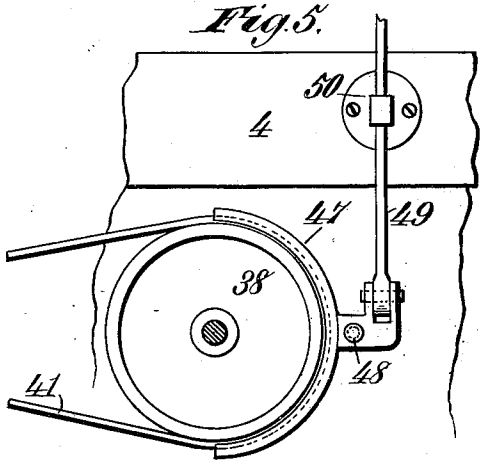


Fig. 6.

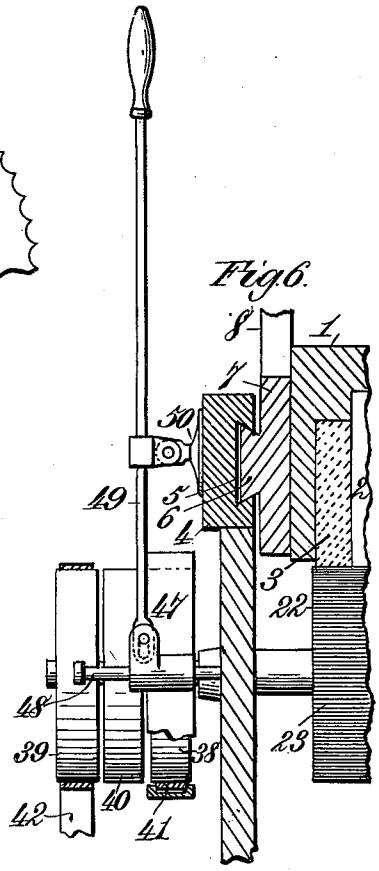


Fig. 7.

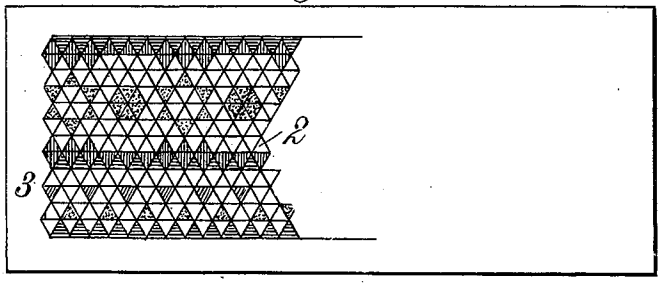


Fig. 8.

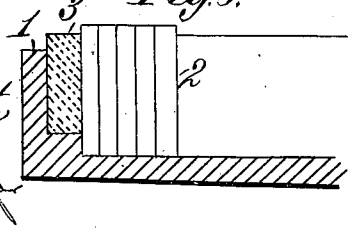
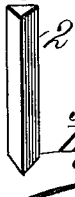


Fig. 9.



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UNITED STATES PATENT OFFICE.

ANTON VON BEUST, OF ORANGE, NEW JERSEY.

MEANS FOR REPRODUCING MULTICOLOR DESIGNS.

SPECIFICATION forming part of Letters Patent No. 656,084, dated August 14, 1900.

Application filed March 17, 1900. Serial No. 9,101. (No model.)

To all whom it may concern:

Be it known that I, ANTON VON BEUST, a citizen of the United States, residing at Orange, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Means for Reproducing Multicolor Designs, of which the following is a specification.

This invention relates to means for printing multicolor designs on paper and other fabrics at a single operation, and has for its object, first, to provide an improved color-printing surface on which the design to be reproduced is formed in all its distinctive colors and from which a large number of reproductions may be transferred to the paper or fabric to be printed; second, to provide improved transferring means arranged to take successive reproductions of the colored design from the block or surface, and, third, to provide improved means for imprinting said colored reproductions on the paper or fabric to be printed.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a plan view of my improved apparatus. Fig. 2 is a vertical longitudinal sectional view. Fig. 3 is a view in side elevation. Fig. 4 is a partial end view of the corrugated or grooved roller for planing off the stipple-stick block. Fig. 5 is a detail view of the belt-shifting mechanism. Fig. 6 is a detail sectional view of the same, also illustrating the means for guiding the stipple-stick block in its reciprocating movement. Fig. 7 is a plan view of a portion of the stipple-stick block. Fig. 8 is a vertical sectional view of the same, and Fig. 9 is a detail perspective view of one of the stipple-sticks.

Before describing the machine I will first explain the manner of making the color block or plate. I first take a hollow rectangular frame 1 and arrange within convenient reach a number of what I term "stipple-sticks," said stipple-sticks consisting of slender pencils or crayons 2, formed of any suitable solid coloring substance, the sticks being of any desired or suitable shape in cross-section and of any required length. The stipple-sticks are made in many assorted shades of color, and there must be at least a number of stipple-sticks for each distinctive color-shade in the design to be copied or reproduced. Having the design to be copied in front of me, I select the stipple-sticks of the proper shade one at a time and place them on end in close contact with each other in the frame in the proper order to accurately reproduce the design and in the correct colors, much in the same manner as printers set up type, a faithful reproduction of the design in both form and color being thus made in numerous minute dots or stipple, resembling mosaic work. When the entire picture has been thus set up in the frame 1, the stipple-sticks are firmly and securely fixed in the frame by casting any suitable plastic substance, as plaster-of-paris, for example, about the stipple-sticks and between the latter and the frame, as indicated at 3, thus completing the stipple-stick block or plate in readiness for use.

The numeral 4 indicates the frame of the machine, having formed in its opposite sides horizontal dovetailed grooves 5, in which are adapted to freely slide correspondingly-shaped lugs 6, formed on the sides of a reciprocating casing 7, provided on its upper side with a spider 8, in which is arranged a vertical screw 9, having fixed thereon a hand-wheel 10. The lower end of the screw 9 is swiveled in a bearing 11 in the upper side of the frame 1, said frame being freely movable in the casing 7, whereby by turning the hand-wheel 10 the frame 1, carrying the stipple-stick block, may be fed downward at will for the purpose hereinafter explained.

The numeral 12 indicates a driven shaft, on which is fixed a fly-wheel 13, a pulley 14, and a wheel 15, carrying a wrist-pin 16. Mounted on a suitable journal is an oscillating segmental gear 17, to one end of which is pivotally connected one end of a pitman 18, the other end of the pitman being connected to the wrist-pin 16. The segmental gear 17 gears with a pinion 19, which is arranged to rotate with a gear-wheel 20, and said gear-wheel in turn gears with a rack 21, attached to the sliding casing 7. The shaft 12 is constantly rotated in a single direction

by any suitable power, and through the medium of the wheel 15 and pitman 18 imparts to the segmental gear 17 an oscillating movement, and the latter, through the medium of the pinion 19, gear-wheel 20, and rack 21, reciprocates the casing 7 and with it the stipple-stick block back and forth in the frame 4.

Journaled in suitable bearings transversely beneath the sides of the frame 4 is a roller 22, of hardened steel or other suitable material, and the periphery of said roller is provided with numerous minute shallow parallel grooves or corrugations 23, thus forming numerous sharp longitudinal knife-edges. In order to obtain the best results, the groove or corrugations 23 should be formed quite close together—about one hundred to the inch, for example. In practice the bottom or under side of the stipple-stick block travels in contact with the corrugated periphery of the roller 22 as said block is moved in one direction, and the roller cuts or planes off and removes from said block a thin layer forming a reproduction of the colored design formed by the stipple-sticks. The roller 22 is caused to rotate in the direction of the arrow by the means hereinafter explained, and as the stipple-stick block is moved forward in a direction opposite to the direction in which the roller rotates the latter planes or cuts off the thin layer therefrom in the manner described. When the stipple-stick block is moved backward in the reverse direction, however, the roller is unable to contact therewith, owing to its under surface having been removed. Before the stipple-stick block again moves forward, however, it is fed downward by giving a partial turn to the hand-wheel 10 to bring its under surface again into operative engagement with the corrugated roller.

The numeral 24 indicates the web of paper or other fabric designed to be printed, said web being wound upon a roller 25, and from the roller the fabric passes about a roller 26 and between the latter and a corresponding roller 27. The latter roller rotates in contact with a roller 28, arranged to rotate in a tank 29, containing a supply of adhesive or sticky substance—such as wax-varnish, glue, or other liquid or semiliquid adhesive which will dry quickly—and said rollers 27 and 28 operate to transfer to the fabric a thin coating of the adhesive substance. From the rolls 26 and 27 the fabric passes to and about a roll 30, formed of or covered with a yielding material, such as rubber or leather, and by said yielding roll the coated surface of the fabric is pressed into close and intimate contact with the grooved periphery of the roller 22. From the latter roll the fabric passes between two burnishing-rolls 31 and 32, which operate to flatten and fasten the color to the fabric and dry the surface, and said rolls may or may not be heated, according to the nature of the material employed for coating the fabric. From the burnishing-rolls the printed fabric passes out of the machine between two delivery-rolls 33 and 34.

The roller 22 is arranged to rotate in a tank 35, containing a cleansing fluid, such as turpentine or benzene, by which the roller is thoroughly cleansed, and before it again comes in contact with the stipple-stick block is effectually dried by rotating in contact with squeegee or brush rollers 36. A friction-brake 37 of any suitable or preferred construction is employed for preventing the fabric from unwinding from the roll 25 too rapidly.

Motion is communicated to the various rollers in the following manner: Mounted on one end of the shaft of the roller 22 are two fast pulleys 38 and 39 and a loose pulley 40, and a crossed belt 41 connects the pulley 38 with the pulley 14 on the driven shaft of the machine and operates to drive the roller 22 in the direction indicated by the arrow. A belt 42 passes about the pulley 39 and about pulleys 43, 44, and 45, fixed on the ends of the shafts of the rollers 31, 36, and 33, respectively, driving said rollers in the directions indicated by the arrows. The delivery-roller 33 is geared to the other delivery-roller 34, and the burnishing-roll 31 is in like manner geared to the other burnishing-roll 32. The roll 32 is also geared to an idler gear-wheel 46, which in turn is geared to the roller 26, which latter is geared to the roller 27, and the rollers 27 and 28 are geared together. Arranged to embrace the edges of the belt 41 as it travels about the fast pulley 38 or the loose pulley 40 is a segment-shaped cap 47, which is adapted to slide from off one of said pulleys on to the other on a fixed pin or guide 48, and attached to said cap is a belt-shifting lever 49, fulcrumed intermediate its ends to a bracket-arm 50, fixed on one side of the frame of the machine. By oscillating said lever the belt 41 may be shifted from the fast pulley 38 onto the loose pulley 40, and vice versa, in an obvious manner. The roller 22 is driven by the belt 41 from the main driving-shaft 12, and the belt 42 drives the cleansing-roller 36, the burnisher-rolls 31 and 32, and the delivery-rollers 33 and 34, and the roller 32 drives the roller 26 and composition rollers 27 and 28 by means of the gearing before described.

The operation of the machine is as follows: As the drive-shaft 12 is rotated the stipple-stick block is first moved forward in the direction of the arrow over the grooved roller 22. The roller 22 rotates in a direction opposite to the direction in which the stipple-stick is traveling, as shown, and operates to cut, shave, or plane off a thin layer from the under side of said block, each groove or corrugation of the roller holding the colors it has planed off or removed from the block until in its rotation it comes in contact with the coated surface of the fabric as the latter is drawn by the burnishing and delivery rollers about the yielding roller 30 when it deposits its colors thereon. The printed fabric then

passes between the burnishing-rollers, which operate to flatten and fasten the colors on the coated fabric and dry the coating thereon, and from the burnishing-rollers the printed fabric passes out between the delivery-rollers. As the stipple-stick block commences its return movement in the direction opposite to that indicated by the arrow the belt-shifter should be operated to shift the belt from the fast pulley 38 to the loose pulley 40, thus throwing all the rollers out of action, so that as the stipple-stick block is being retracted the paper or fabric remains stationary. At the end of the return movement of the stipple-stick block the hand-wheel 10 should be given a partial turn to feed down the stipple-stick block, and the belt-shifter should be again operated to shift the belt onto the fast pulley and again place the rollers into operation. Then as the stipple-stick block once more moves over the grooved roller the latter shaves or planes off another thin layer from the under side of said block and transfers it to the fabric. This operation may be repeatedly effected until the desired number of reproductions have been printed on the fabric or until the stipple-stick block has been entirely consumed.

By the improved means above described I am enabled to reproduce multicolor designs in solid colors with great accuracy and faithfulness at a single operation and from a single block or plate, the number of such reproductions being only limited by the thickness of the block, or, in other words, by the length of the stipple-sticks.

Having described my invention, what I claim is—

1. In an apparatus for reproducing multicolored designs, the combination with a block comprising a multiplicity of stipple-sticks or crayons set up on end and side by side to form the colored design to be reproduced and suitably bound together, a cutting-tool for cutting off successive thin layers from the surface of said block, and means for transferring said layers to and fixing them on the surfaces designed for the reception of the reproductions, substantially as described.

2. In an apparatus for reproducing multicolor designs, the combination with a block comprising a multiplicity of stipple-sticks or crayons set up on end and side by side to form the colored design to be reproduced and suitably bound together, means for shaving off successive thin layers from the surface of said block, and means for transferring said layers to and fixing them on the surface designed for the reception of the reproductions, substantially as described.

3. In an apparatus for reproducing multicolor designs, the combination with a block comprising a multiplicity of stipple-sticks or crayons set up on end and side by side to form the colored design to be reproduced and suitably bound together, means for cutting off in numerous subjoining sections successive thin layers from the surface of said block, and means for transferring said layers to and fixing them on the surface designed for the reception of the reproductions, substantially as described.

4. In an apparatus for reproducing multicolor designs, the combination with a block formed of a plurality of solid colors arranged to form the design to be reproduced, a rotary roller provided on its periphery with numerous small longitudinal corrugations or grooves arranged to contact with the surface of the said block, means for guiding the block in a rectilinear direction transversely to the said roller, and means for rotating the roller in an opposite direction to the movement of the block, substantially as described.

5. In an apparatus for reproducing multicolor designs, the combination with a block formed of a plurality of solid colors arranged to form the design to be reproduced, a rotary roller provided on its periphery with numerous small longitudinal corrugations or grooves arranged to contact with the surface of the said block, means for guiding the block in a rectilinear direction transversely to the roller, means for rotating the roller in an opposite direction to the movement of the block, a yielding pressure-roller arranged in contact with the grooved roller, means for feeding a web of fabric between the pressure and grooved rollers, and means for coating the fabric with an adhesive substance before its passage between said rollers, substantially as described.

6. In an apparatus for reproducing multicolor designs, the combination with a block formed of a plurality of solid colors arranged to form the design to be reproduced, of a rotary roller provided on its periphery with numerous small longitudinal corrugations or grooves, means for moving the block in a rectilinear direction transversely to the said roller, means for feeding the said block toward the roller, and means for rotating the roller in an opposite direction to the movement of the block, substantially as described.

7. In an apparatus for reproducing multicolor designs, the combination with a block formed of a plurality of solid colors arranged to form the design to be reproduced, of a roller provided on its periphery with numerous small longitudinal corrugations or grooves, means for reciprocating the block transversely across the corrugated roller, means for intermittingly rotating the roller in an opposite direction to the movement of the block, and means for feeding the block toward the roller, substantially as described.

8. In an apparatus for reproducing multicolor designs, the combination with a block formed of a plurality of solid colors arranged to form the design to be reproduced, of a roller provided on its periphery with numerous small corrugations or grooves, means for reciprocating the block transversely across the corrugated roller, means for intermit-

tingly rotating the roller in an opposite direction to the movement of the block, a yielding pressure-roller disposed in contact with the corrugated roller and arranged to intermittingly rotate with the latter, means for feeding a web of fabric between the pressure and corrugated rollers, means for coating the fabric with an adhesive substance before its passage between said rollers, and means for feeding the block toward the corrugated roller, substantially as described.

9. In an apparatus for reproducing multicolor designs, the combination with a block formed of a plurality of solid colors arranged to form the design to be reproduced, of a roller provided on its periphery with numerous small corrugations or grooves, means for reciprocating the block transversely across the corrugated roller, means for intermittingly rotating the roller in one direction as the block is reciprocated in the opposite direction, means for coating a web of fabric with an adhesive substance and feeding it to the corrugated roller, burnishing-rolls between which the web passes after it leaves the corrugated roller, and means for feeding the block toward the said roller, substantially as described.

10. In an apparatus for reproducing multicolor designs, the combination with a block formed of a plurality of solid colors arranged to form the design to be reproduced, of a longitudinally corrugated or grooved roller, means for reciprocating the block transversely across the corrugated roller, means for intermittingly rotating the roller in an opposite direction to the movement of the block, a pressure-roller disposed in contact with the corrugated roller and arranged to intermittingly rotate with the latter, means for feeding a web of fabric between said rollers, and rotating brush-rollers arranged to rotate in contact with the corrugated roller and clean the latter, substantially as described.

11. In an apparatus for reproducing multicolor designs, the combination with a block formed of a plurality of solid colors arranged to form the design to be reproduced, of a longitudinally corrugated or grooved roller, means for reciprocating the block transversely across the corrugated roller, means for adjusting the block toward the roller, means for rotating the roller in one direction as the block is reciprocated in the opposite direction, means for throwing the roller out of operation when the block is retracted, and means for feeding a web of fabric into contact with said roller, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ANTON VON BEUST.

Witnesses:
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FRANCIS O. HUNT.