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A. F. LUNDEBERG.

METHOD OF PRINTING OR COLORING FLOOR COVERINGS, &c., AND ARTICLES THUS PRODUCED.

APPLICATION FILED JUNE 7, 1902.

NO MODEL.

Fig. 1.

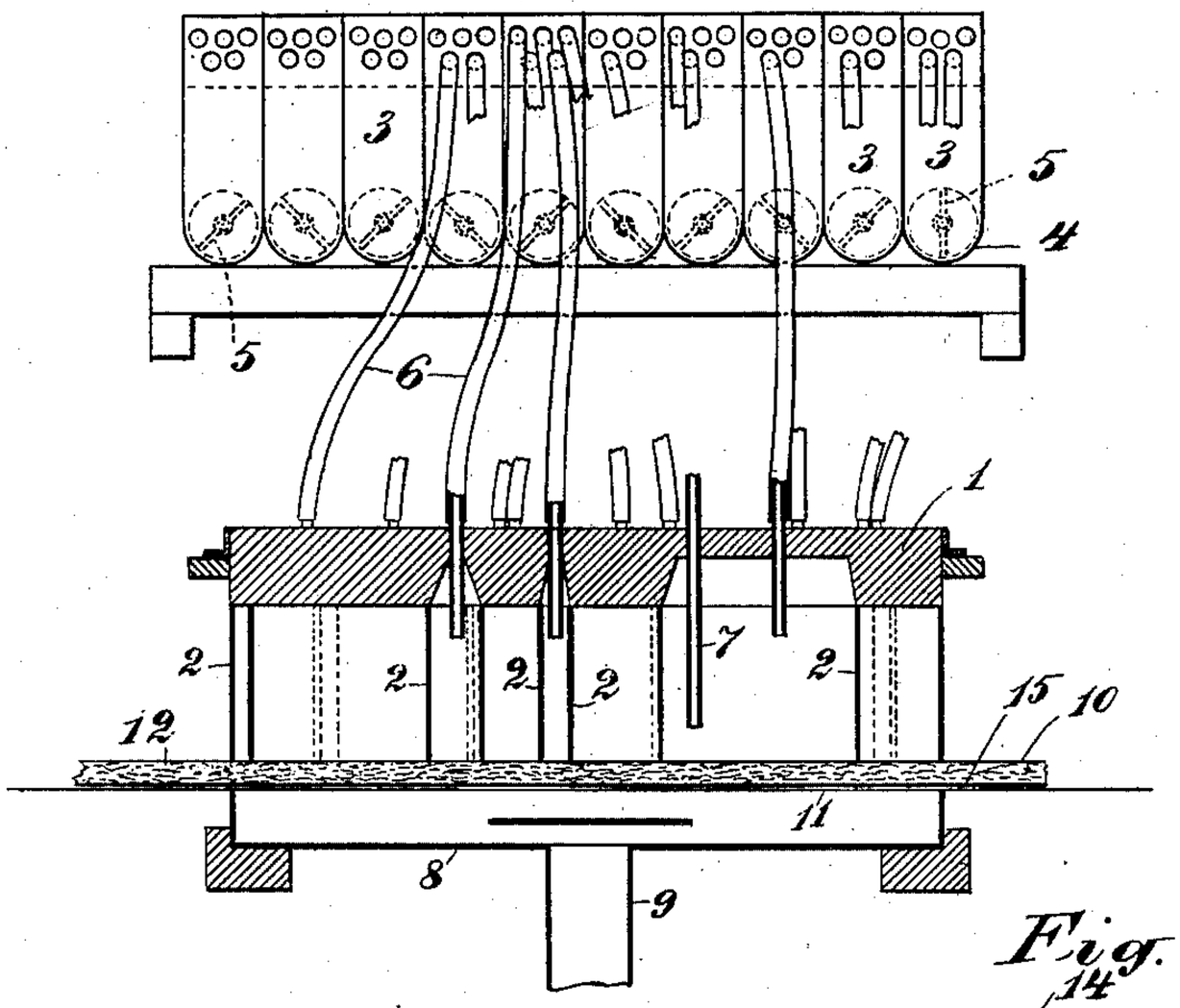


Fig. 3.

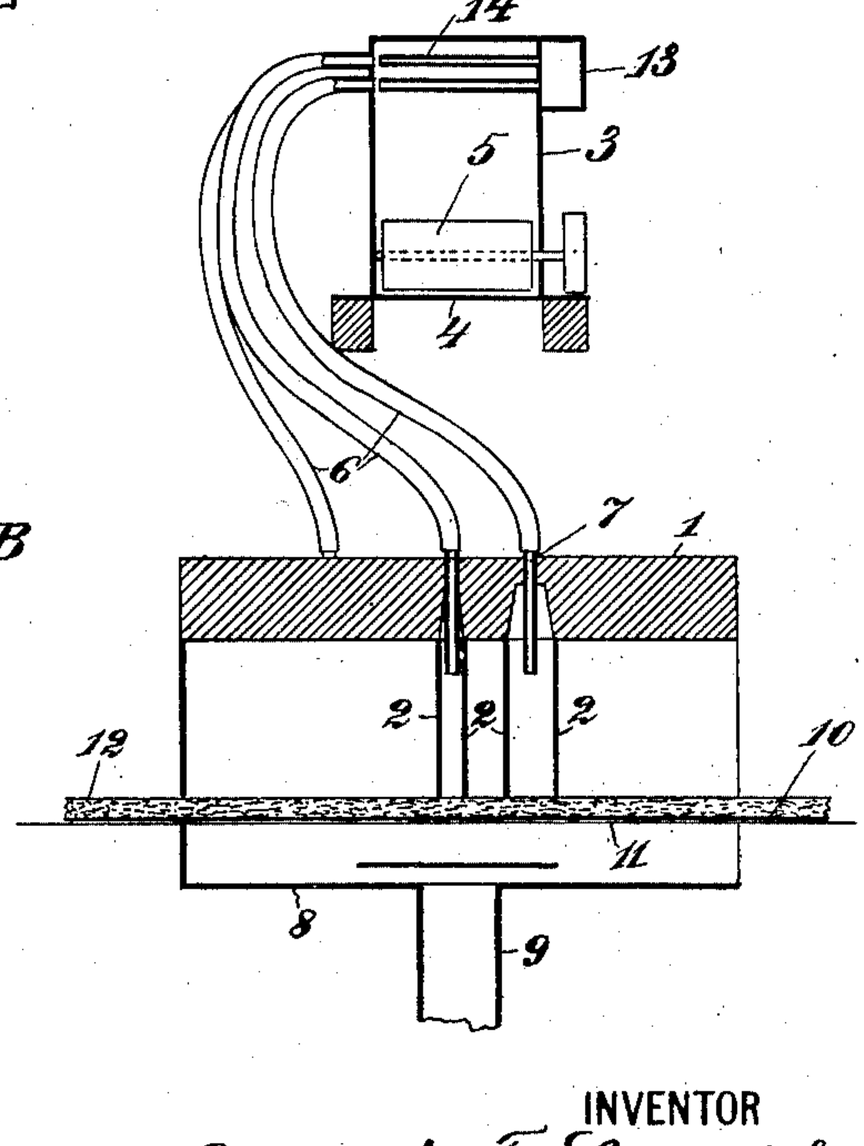
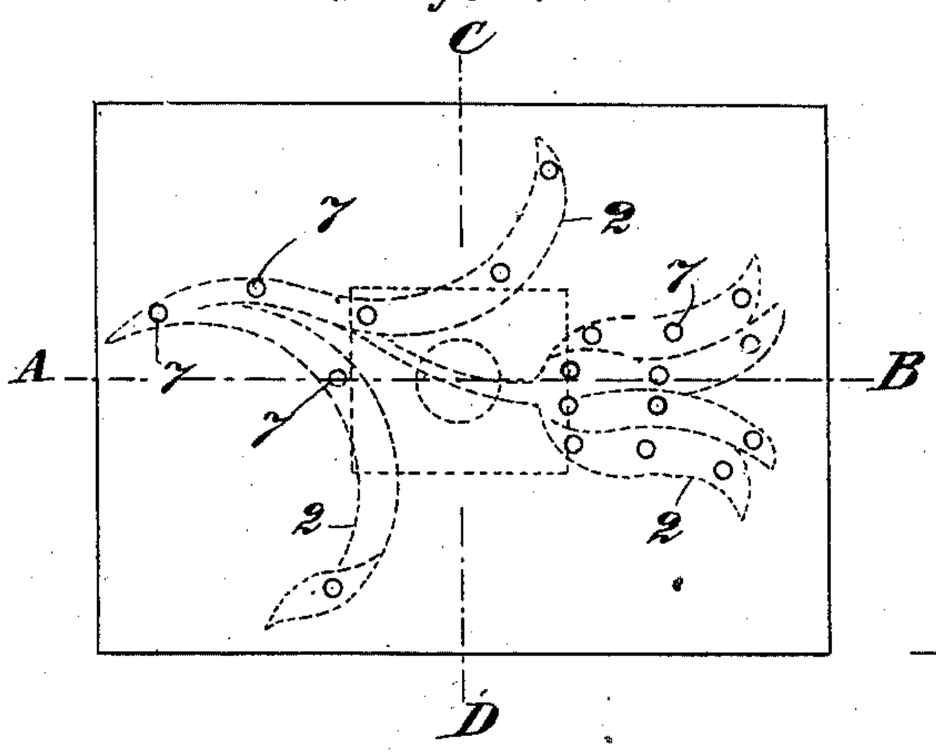


Fig. 2.



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No. 737,945. Patented September 1, 1903.

UNITED STATES PATENT OFFICE.

AUGUST FREDRIK LUNDEBERG, OF STOCKHOLM, SWEDEN.

METHOD OF PRINTING OR COLORING FLOOR-COVERINGS, &c., AND ARTICLES THUS PRODUCED.

SPECIFICATION forming part of Letters Patent No. 737,945, dated September 1, 1903.

Application filed June 7, 1902. Serial No. 110,566. (No model.)

To all whom it may concern:

Be it known that I, AUGUST FREDRIK LUNDEBERG, engineer, a subject of the King of Sweden, and a resident of Observatoriegatan 16, Stockholm, in the Kingdom of Sweden, have invented certain new and useful Improvements in Methods of Printing or Coloring Floor-Coverings, Wall-Papers, and other Fabrics, and Articles thus Produced, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of the present invention is a method of printing, dyeing, or coloring floor-coverings similar to the so-called "linoleum carpets," wall-papers, and other fabrics, the distinctive feature being that the coloring-matter is applied to the material in a dry and pulverized state. The invention also covers the articles produced by the method indicated.

In the liquid impregnation process—such as is described in previous patents for partially or fully dyeing fabrics made of cork-meal, pine-needle dust, or similar material—colors are used which are dissolved in a liquid or made up with the aid of linseed-oil or the like. However, this way of coloring is open to various objections. In the first place it is difficult to effect at all points between the various channels, spaces, or cells of the die or pattern block a complete tightening, so as to prevent one liquid color from passing into another, thereby producing ragged or blurred edges of the pattern. A further drawback, apart from the necessity of the use of a larger quantity of liquid color than is actually required for producing the coloring, consists in the tendency of the color to adhere to and dry upon the walls of the cells, &c., thereby necessitating frequent cleaning of the narrow channels and corners of the cells, &c., which operation is connected with great difficulty. It is particularly troublesome and difficult to effect the cleaning of the cells and conduits when the color is to be changed for the printing, since all old colors must be entirely removed from the tubes, channels, cells, &c. Besides a great waste of color and solvents takes place, and, further, the precipitation of the colors from their solutions and the difficulty of preventing the colors during the printing from running into and mingling with each other must be considered.

By using colors in the form of dry fine powder according to the present invention the above drawbacks are avoided or reduced to a minimum. Moreover, the present method allows of floor or other coverings or fabrics to be produced with such color-patterns that the latter not only fully or partially penetrate the carpet, but also enable a larger number of color-shades and more delicate details than hitherto to be produced. In other words, the method according to the present invention enables patterns of richer variety and a more artistic taste to be produced than has hitherto been possible. For instance, a long red leaf can be provided in various places with several different shades of red, and besides the outlines or contours of these shadings can produce a delicate reshading or merging of one shade into the other which gives to the fabric a refined appearance. This method also allows considerably thinner and consequently cheaper fabrics to be made than has hitherto been possible, without, however, affecting the quality of the same.

The material preferably used for floor-covering or linoleum carpets, for instance, in this manufacture consists of a mixture of a powdery substance—such as cork-dust, wood-meal, pine-needle dust, and the like—or of mixtures of various ground materials of this nature with linseed-oil, preferably oxidized, or other binding agents. The mass produced from this mixture is ground in the usual manner as finely as possible and spread out upon a convenient backing, usually jute, and of a thickness corresponding to the thickness of the product to be manufactured. The jute forms, as usually, the foundation of the carpet. In this condition while the mass rests upon the backing in the form of a thin not hardened or rolled layer the whole is brought under the dyeing apparatus. The latter consists of a plate of wood, iron, or the like, upon the undersides of which is formed the pattern from thin sheet-metal pieces with projecting edges forming shallow cells, each in communication with its respective color box or receptacle. Beneath this pattern-plate is a suction-box, and between the lat-

ter and the pattern-plate is placed the prepared fabric. The dyeing operation is effected in such a manner that air saturated or intimately mixed with color-dust is drawn by the suction device through the pattern-plate to the carpet or other fabric to be colored. The air flows on into the suction-box, while the color is retained in the carpet, through which it penetrates, owing to the fine and still loose consistency of the mass upon the backing penetrating almost or right up to the latter. Thereafter the fabric is subjected to further treatment, so as to give it a firm even surface, &c.

In the accompanying drawings, Figure 1 shows the apparatus in side elevation and partial section on line A B of Fig. 2. Fig 2 is a plan view of the pattern-block. Fig. 3 is an end view, partially in section, on line C D of Fig. 2.

The pattern-block 1 is provided with sheet-metal edges 2 on its under side, forming the pattern-cells desired. These edges 2 are high enough to cause the color-dust introduced to be equally distributed or distributed in a manner hereinafter described. The color containers or receptacles 3 are preferably provided with bottoms 4 of semicircular cross-section, agitating devices 5 being arranged therein and set in rotation or actuated in a convenient manner, thereby stirring up the color-dust and keeping it suspended in the receptacles. Flexible or other tubes 6 connect these receptacles with the respective cells in the pattern-block. For example, three tubes may lead into the cell which corresponds to one portion of the design, and the corresponding tubes can lead from one and the same receptacle containing the color-dust desired for that particular part, or they can be connected with different receptacles charged with different colors. Thus a shading effect can be obtained. These tubes are slipped over or connected to tubular sockets 7, passing through the pattern-block into the cells. These sockets can have either different lengths preliminarily adjusted in the cells, or their lengths can be varied by adjustment of the pattern-block. The suction-box 8 has a tube 9 connecting it with the suction apparatus. The suction-box can be provided with a grating or similar support for the fabric to be treated.

The carpet or other fabric 10 is placed between the raised pattern-block and over the suction-box. In order to facilitate this, the carpet can rest upon a fine wire-netting 11 or the like. The carpet being in the proper position, the pattern-plate is moved downward until the sheet-metal edges 2 of the cells enter a certain distance into the composition layer 12, after which the suction apparatus (pump, blower, or the like) is set in action. This suction device sucks the air from the receptacles, provided with convenient ports, into the tubes and thence into the cells of the pattern-block and through the carpet composition into the suction-box. The color-dust carried with the air from the receptacles penetrates into the composition and is retained by and adheres to the latter. As soon as a sufficient quantity of color is sucked in the suction device is stopped and the pattern-block raised high enough to be out of contact with the fabric, after which the latter is drawn forward, so as to submit a fresh portion to the same operation, and so on. After the coloring operation is finished the fabric is subjected in the usual manner to the necessary heating, pressing, and drying operations.

The preparation of the color-dust is preferably effected with the aid of oil, resin, or the like, so as to be prevented from absorbing any binding means contained in the carpet material and, further, to facilitate the after treatment. The color-dust can also be mixed with cork-dust, wood-meal, or the like, whereby a less heavy material is obtained that can be more easily divided in a powdered or approximately powdered state, or the color-dust might be mixed with the substances above mentioned, together with cork-dust, wood-meal, or the like. Upon stopping the suction action before advancing the fabric a slight suction or air action can be produced in the opposite direction in the color-receptacle in order to prevent any color-dust from falling out on raising the pattern-block, or two suctions can be effected for each section of material treated with a slight suction in the opposite direction between the two color-applying suctions in order to increase the penetrating effect of the suction actions. If the mass used to form the layer is ground at a low temperature, the mass can be finely ground and the distribution facilitated, whereby the coloring operation is essentially assisted. The suction action can also be stopped and the penetrating of the color into the fabric be accomplished by a slight air action in the color-box. To this end an air-box 13 is provided, said air-box being placed at the side of the color boxes or cells and connected with the latter by tubes 14. These tubes extend in the direction toward and nearly to the mouths of the flexible tubes. When air is led into the box 13, it passes through the tubes 14 and through the flexible tubes into the color-box, producing therein a slight air-pressure.

For thin carpets, wall-papers, or other fabrics either woven tissue 15 alone or porous paper or the like can be used without any added layer 12 of composition, the color being transmitted to the cloth, porous paper, &c., in the manner above described. The coloring means is then preferably prepared in a special manner, or it can consist of finely-ground linoleum-like material or mixed with the latter and then applied to the desired places of the fabric through the pattern-block in the manner described. The coloring means is thus applied to the fabric in the form of a thin layer and prepares the latter for further treatment in the manufacture of

a thin carpet, wall-paper, and the like. If such a ground-colored mass is used for coloring a composition layer in the manner above described, a carpet is obtained which is only colored on the surface if the said layer does not consist of too fine a material. At the same time as the color-dust is applied in the manner indicated a suitable covering mass can be applied to the other portions of the fabric in the same manner as is the color-dust. In order to effect a better adhesion of the coloring means, the surface of the woven fabric, paper, &c., can be made slightly sticky.

In order to produce shading of the same color or blending of various colors, several tubes for different shades or colors can communicate with the same cell. A further means consists in varying the length of the tubes extending through the pattern-block or in making them adjustable, since the effect of the color flowing through the tube is the stronger relatively to that of the color supplied through other tubes leading into the same cell the nearer the end of the tube is to the carpet. The supply of the color can be also regulated by more or less closing the tubes or by varying the width of the tubes, &c. The ends of the tubes can have the form of funnels and can be provided with a spraying device or the like. Instead of air any other suitable gas can be used.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Method of manufacturing pattern-colored floor-coverings, wall-papers and other similar fabrics consisting in sucking air or other gas saturated or mixed with colors in the form of fine powder through the fabric or material to be colored placed beneath and in contact with a pattern-block separating the different colors, to the carpet, wall-paper or other fabric while the mass of the fabric is still in a condition sufficiently loose and incoherent to allow the air and the color-dust mixed therewith to penetrate into the same, and then treating the material in the usual manner by heating, rolling, pressing or the like.

2. Method of manufacturing pattern-colored floor-coverings, wall-papers and other similar fabrics consisting in sucking air or other gas saturated or mixed with colors in the form of dry fine powder through the fabric or material to be colored placed beneath and in contact with a pattern-block separating the different colors, to the carpet, wall-paper or other fabric, the colors being mixed with matters such as oil, resin or the like allowing the colors to be finely divided or also with cork-dust, wood-meal or the like, either alone or in mixture with the aforesaid matters, thus obtaining a less heavy material that can more easily be divided into an approximately powdered state.

3. Method of manufacturing pattern-colored floor-coverings, wall-papers and other similar fabrics consisting in sucking air or other gas saturated or mixed with colors in the form of dry fine powder through the fabric or material to be colored placed beneath and in contact with a pattern-block separating the different colors, laying the colors directly, upon the cloth not covered with any mass and eventually applying mass upon the other portions of the cloth in the same manner as the colors are applied.

4. Method of manufacturing pattern-colored floor-coverings, wall-papers and other similar fabrics consisting in sucking air or other gas saturated or mixed with colors in the form of dry fine powder through the fabric or material to be colored placed beneath and in contact with a pattern-block separating the different colors, to the carpet, wall-paper or other fabric and at the same time as a suction action is produced at one side of the fabric producing an air action upon the other side, thus facilitating the penetrating of the color into the mass.

5. Pattern-colored covering fabrics having the colors which produce the pattern details integral with the fabric and formed of interblending particles of color in powder, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

AUGUST FREDRIK LUNDEBERG.

Witnesses:
ERNST SVANGVIST,
A. F. LUNDBORG.