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METHOD AND APPARATUS FOR DECORATING UNEVEN SURFACES

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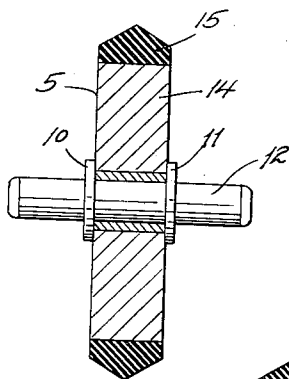


Fig. 1

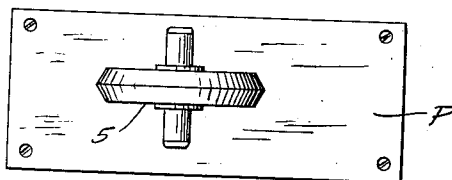


Fig. 2

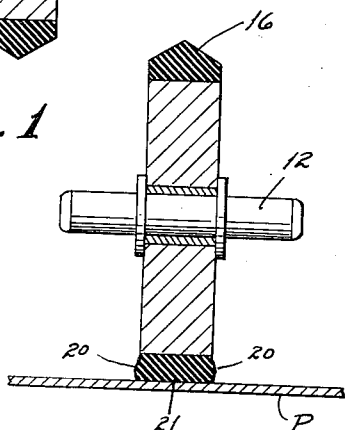


Fig. 3

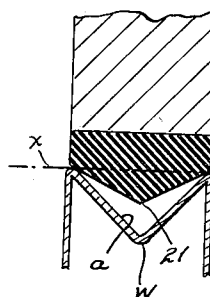


Fig. 4

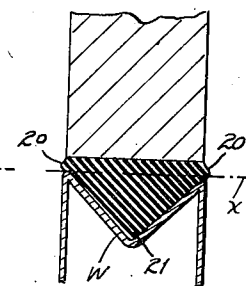


Fig. 5

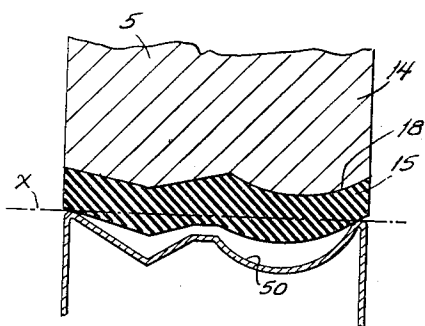


Fig. 6

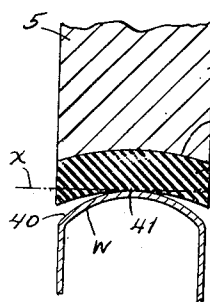


Fig. 7

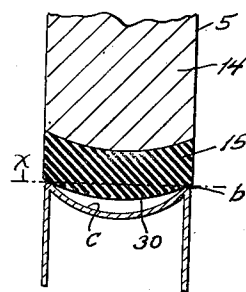


Fig. 8

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METHOD AND APPARATUS FOR DECORATING UNEVEN SURFACES

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11 Claims. (Cl. 101—35)

This invention relates to a method of and apparatus for decorating surfaces, and especially for decorating corners of moldings and other surfaces which, while regular in longitudinal contour, are nevertheless irregular in transverse contour. This, therefore, is the general object of the present invention.

At the present time, many objects are being decorated with designs simulating natural or other objects. Furniture, metal trim for building construction, frames and panels for automotive bodies, and many other objects are frequently grained, that is impressed, with a design simulating natural wood and other appearances. Many of these articles frequently have surfaces which are difficult to reach with ordinary graining or decorating methods and apparatuses. Such articles frequently have relatively raised and lowered surfaces. Such surfaces have, in the past, been decorated with difficulty and with impairment of the reproduced design.

Designs simulating natural and other objects have been reproduced on flat or comparatively flat surfaces, with increasing accuracy, both in detail of the design and the tonal reproduction thereof. A demand therefore has been created for the same quality of reproduction in adjacent surfaces having uneven contour. Various types of special mechanisms have been tried, but the quality of the reproduction has frequently been poor and the expense of such reproduction was often excessive, due to the manual labor involved in retouching.

An object of this invention is to provide a method and apparatus for decorating or graining such uneven surfaces at a minimum amount of expense and with a minimum amount of special equipment, and at the same time reproduce the design and its tonal values with substantially the same high degree of reproduction as is attained on flat surfaces.

Other objects of the invention will be brought out in the following description, reference being had to the accompanying drawing which illustrates the invention. The essential features of the invention will be summarized in the claims.

Referring now to the drawing, Fig. 1 is a cross-sectional axial view of an impression or offset roll, especially adapted for carrying out my invention; Fig. 2 is a plan, illustrating the use of my improved roll on a pattern plate; Fig. 3 is a section similar to Fig. 1, but illustrating the roll coacting with a flat pattern plate; Fig. 4 is a fragmentary section on an enlarged scale of the roll, and the article to be decorated, and illustrates

the normal shape of the roll relative to the article to be decorated; Fig. 5 is a view similar to Fig. 4, with the roll in printing contact with the article to transfer the pattern thereto; Figs. 6, 7 and 8 illustrate the manner of graining various shaped articles in accordance with the present invention.

In the past, many attempts have been made to provide rolls for graining irregular sections. Generally such rolls have had a flat contacting surface so that they may coact with a flat pattern plate and on which the design was applied by any well-known photogravure or other method. The practice has been to prepare the plate by photomechanical methods, coat the pattern plate with ink, and remove the excess ink, and thereafter bring into rolling contact with the plate a roll which was provided with a covering of a composition material, such as rubber, or glycerine and glue, and which removed the ink or pigment from the pattern. This offset or impression roll was then brought into rolling contact with the article to be decorated. It is obvious that where the articles had uneven surfaces, such as those shown at W in the drawing, there was considerable distortion of the roll, with a resulting impairment of the design during its transfer from the offset or pressure roll to the article to be decorated. My invention overcomes this difficulty and yet permits the use of the flat pattern plate, which is obviously the most economical to produce.

As shown in the drawing, my invention contemplates the use of an offset roll of such a cross-sectional shape that portions of it will be compressed when the roll is brought into contact with the pattern plate and other portions will be compressed when the roll is brought into rolling contact with the work to be grained, thereby eliminating to a great extent, distortion of the pattern and materially decreasing the distortion of the roll itself.

As shown in Fig. 1, it will be noted that the roll may be made up of suitable end plates 10 and 11, through which a suitable driving or supporting shaft 12 extends. The end plates may be spaced by a suitable material, such as a metal or wood core 14, upon the periphery of which is a layer of composition material. The composition preferably comprises a resilient composition, such as rubber, or a glue and glycerine compound and is indicated at 15. Such a composition material is comparatively resilient, somewhat tacky and has the usual operating characteristics required in offset or impression rolls for printing processes.

In carrying out my improved method, the roll 10 is first brought into rolling contact with a

suitable flat or comparatively flat surface or pattern which is shown as a flat plate P in the drawing. The pattern may, however, be a flat surfaced cylinder. The annular surface 16 of the roll, due to pressure exerted upon the supporting shaft 12, is brought into rolling contact with the graining surface of the pattern face. The roll, as shown in Figs. 1, 2 and 3, has been especially formed for graining articles having an angular recess, as shown in Figs. 4 and 5 at W. The composition material is shaped, as shown in Fig. 4, to enter only partially the recess or angle A in work W. I find it advantageous to have the roll enter approximately half way into the recess, giving the roll a V-shaped surface. Hence, when the roll is brought into rolling contact with the surface of the work, it will be distorted, as shown in Fig. 5, and the portions 20 of the roll adjacent the sides thereof will be in compression. When, however, this roll is brought into contact with a pattern plate, the center portion 21 will be compressed. This makes each operation take part of the distortion of the roll. That is, when the grain or design is taken from the plate, slightly more pressure is used than would have to be used where the periphery of the roll is flat, and the central portion of the roll is brought into compression. When, however, the roll is applied to the object to be decorated, less pressure is required than would be required if the roll were flat, and the outer edges of the roll are brought into compression. In this way it is possible to apply the decoration to depressed or otherwise distorted surfaces, which distortions would be so great as to render it practically impossible to either take a proper impression from a flat surface with a roll shaped to conform to the article, or would render it practically impossible to reach a grooved or low portion in the article with a flat surfaced roll, made to conform with the pattern plate.

Figs. 7 and 8 illustrate roll formations for different forms of work. In some instances, the base 18 of the resilient material is joined to a substantially regular cylindrical surface while in other instances the base 18 is provided with protruding ridges opposite the hollow formation of the work. However, in each instance the other periphery of the resilient material normally extends midway into the depressions in the object to be decorated.

From the foregoing description, it will be seen that my method for decorating blanks having surfaces deviating from a common plane, contemplates the use of a transfer roller or member having a surface which deviates from a common plane substantially half as much as does the surface of the article to be decorated. Considering the general invention as a method, it includes applying unequal pressure to the transfer material of a roll or like printing element, as that element is applied to a pattern or printing surface. Certain portions of the roll are compressed to a greater degree than other contacting portions of the roll. The application of the roll to the work to be decorated, brings about a greater compression of those portions of the roll which were only slightly compressed when the impression was being taken from the printing surface or pattern. That is to say, the parts of the roll which were subjected to the least pressure, when being applied to the printing plate or cylinder, are subjected to the greatest pressure when the roll is subsequently applied to the uneven surfaces of the work to be decorated.

I claim:

1. A method of decorating blanks having surfaces deviating from a contact plane by the use of a transfer method, comprising bringing a transfer roll having an uneven peripheral surface deviating from a common plane to a less degree than does the work into peripheral contact with a comparatively flat pattern by exerting pressure on the roller to remove color therefrom, and subsequently bringing such roll into peripheral contact with the work by applying printing pressure on the roll.

2. A method of decorating blanks having surfaces deviating from a contact plane by the use of a transfer method comprising applying a design in color to an element having an uneven peripheral surface deviating from a contact plane to a less degree than does the work and subsequently bringing said element into contact with the work by exerting printing pressure on the element, thereby exerting unequal pressure on the transfer material on the element opposite the printing point or line, the pressure being least where the surfaces to be decorated reach away from the point of application of this unequal pressure.

3. A method of decorating a blank having surfaces deviating from a common line, bringing into contact with such blank a roll having an uneven peripheral surface deviating from a straight line a less amount than does the surface to be decorated, such surface having a design in color applied thereto and transferring such pattern by a rolling action between the blank and the roll while exerting pressure on the roll toward the blank, such pressure being unequal at different points on the periphery of the roll and being the greatest at those points which first contact with the work to be decorated.

4. A method of decorating blanks having surfaces deviating from a straight line, comprising bringing into contact with a flat inked pattern surface a roll having a peripheral surface deviating from a straight line a less amount than does the surface to be decorated, transferring such pattern by a rolling action between the pattern and the roll and while exerting pressure on the roll, such pressure being unequal at different points in the roll surface and being the least at those points in the roll which will, when brought into contact with the surfaces of the work, contact with the highest surface of the work and thereafter bringing the roll into rolling engagement with the work while applying pressure to the roll, whereby said roll will be in compression when in contact with the work.

5. A method of decorating surfaces of articles having relatively raised and recessed surfaces, which comprises using a substantially cylindrical resilient transfer roll having recessed portions and raised portions to coact with the raised or recessed portions of the surfaces of the work respectively, which portions neither rise nor recede as much as the corresponding portions of the work, pressing such roll into rolling contact with a flat inked pattern and subsequently pressing said roll into rolling contact with the article.

6. A printing roll for the printing of blanks having surfaces deviating from a flat plane, such roll comprising a core, a layer of resilient material adapted to effect an offset impression of the blank, said material embracing the core and having an uneven peripheral surface, such surface deviating from the common plane a less amount than does the work to be decorated.

7. A printing roll for the printing of blanks having surfaces deviating from a flat plane, such roll comprising a core, a layer of resilient material adapted to effect an offset impression on the surfaces of the blank, said material embracing the core and having an uneven peripheral surface deviating from a flat plane a less amount than does the work to be decorated, and the degree of resiliency being such that the roll, when carrying a transfer, can be compressed to meet all the surfaces of the blank without destroying the design of the transfer being carried thereby.

8. A method of decorating surfaces which deviate in surface contour from the surface contour of the pattern from which the surfaces are to be decorated, comprising applying color to the pattern, transferring the color from the pattern by a resilient transfer member, the contacting surface of which deviates from the surfaces of both the pattern and the work.

9. A method of decorating surfaces which deviate in surface contour from the surface contour of the pattern from which the surface is to be decorated, comprising applying color to the pattern, removing the color from the pattern by a resilient transfer member, the contacting surface of which deviates from the surfaces of both the pattern and the work, such deviation being less than the

deviation between the surface contour of the pattern and the surface contour of the work, and subsequently transferring the pattern from such member to the work by the application of pressure to the member.

10. A method of decorating surfaces which deviate in surface contour from the surface contour of a pattern, comprising applying color to the pattern, bringing into contact, first with the colored pattern and then with the work, a transfer member, the contacting surface of which deviates from the contacting surface of both the pattern and the work, such deviation being substantially half of the total deviation between corresponding points of the pattern surface and the surface to be decorated.

11. A printing member for the printing of blanks having a non-planular contact surface, such member comprising a base, a layer of resilient material carried by the base and adapted to transfer a design from a pattern differing in contour form the contact surface of the blank, the contacting surface of the roll differing in shape from the contact surface of the work and the pattern, such difference being substantially half the difference between the contour of the pattern and the work.

GUIDO VON WEBERN.