June 21, 1932. G. VON WEBERN ET AL 1,863,816

WORK SUPPORTING AND DECORATING METHOD AND APPARATUS

Filed May 28, 1930

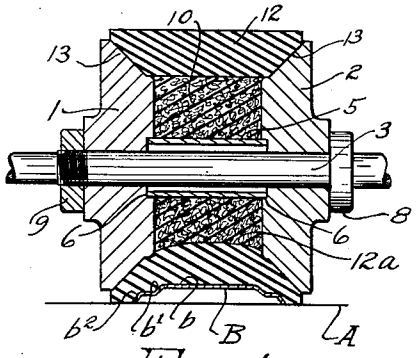


FIG. 1

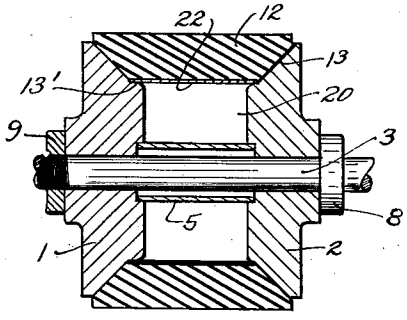


FIG. 2

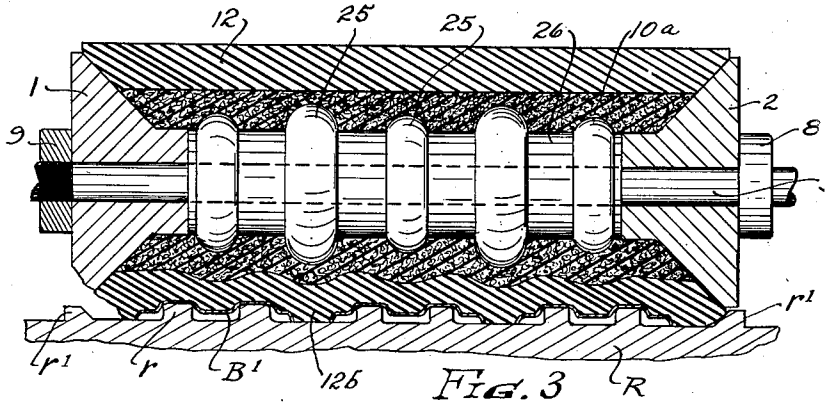


FIG. 3

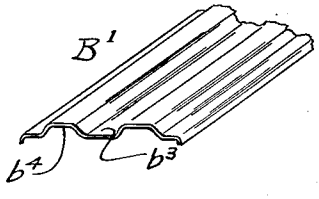


FIG. 4

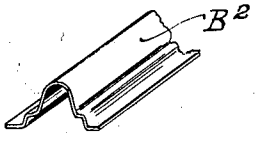


FIG. 5

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UNITED STATES PATENT OFFICE

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WORK SUPPORTING AND DECORATING METHOD AND APPARATUS

Application filed May 28, 1930. Serial No. 456,336.

This invention relates to a method and apparatus for effectively decorating shapes, such as sheet metal mouldings, frame parts and the like having relief and indented effects, by the use of a resilient transfer roll or like impression member. The invention contemplates the use of a resilient medium forming the exterior surfaces of a printing roll, in association with suitable pigment applying mechanism in a graining machine or the like to transfer a pigment pattern to work in such machine. An example of suitable mechanism is shown in the application of Lloyd V. Casto and George E. Lang, Serial No. 134,807, filed September 11, 1926.

An object of the invention is to provide a novel method of using a transfer roll or member having a yielding surface portion to grain or decorate blanks having indented and relief effects, to secure suitable design or pattern transfers thereon, notwithstanding the deviations of the various surfaces to be decorated, and without danger of damage to the work or transfer member.

A further object of the invention is to provide a graining or surface decorating method and apparatus, including the use of a resilient roll or member having a body and surface adapted to transfer a pigment pattern from a generally smooth plate or cylinder bearing the desired pattern in relief or intaglio and which transfer member, notwithstanding the surface limitations imposed by the plate or cylinder, will effectively grain or decorate objects having raised and receding surfaces; in other words, deviating surfaces, all in one operation.

Another object is to provide a core device for a transfer roll having a yielding surface portion, which core device will be so arranged that deep recesses in the blanks or between adjacent blanks of a series will be effectively decorated in the operation of the machine.

Further objects and features of the invention will become apparent from the following description relating to the accompanying drawing, showing the preferred forms of the apparatus and the method of using the same. The essential characteristics will be summarized in the claims.

In the drawing, Fig. 1 is a central longitudinal cross sectional view through one form of roll; Fig. 2 is a similar sectional view of another form; Fig. 3 is a similar cross sectional view of a longer roll and showing further modifications, and Figs. 4 and 5 are perspective illustrations of exemplary blanks to be decorated.

Referring again to the drawing and first to Fig. 1, it will be noted that the roll may be made up of end plates 1 and 2 through which a suitable driving or supporting shaft 3 extends. The end plates may be suitably spaced by a tube of material, such as metal indicated at 5, arranged to enter concentric recesses 6 in the respective end plates. The plates may be further held in fixed position by reason of a shoulder 8 on the shaft adjacent one of the plates and a threaded clamping nut 9 on the shaft adjacent the other plate.

Suitably seated between the plates and supported as by the tube 5 is a highly resilient and compressible body of material 10, such as sponge rubber. A similar arrangement may be found in the patent to Lloyd V. Casto, No. 1,691,336, owned by the assignee hereof, but which does not show the special provision for decorating peculiar shaped blanks with which this application is concerned.

The sponge rubber layer may be formed in place by moulding as a separate operation, with the roll parts previously described assembled as shown or in any other suitable manner.

Embracing the body of sponge rubber or the like is a layer of resilient material, such as congealed glue and glycerine or any known type of material having similar operating characteristics. This layer, indicated at 12, is preferably continuous but may, of course, comprise sections or segments, as will be obvious.

The end plates 1 and 2 of the roll have surfaces inclining outwardly as shown at 13. As shown, these surfaces are conical but may be varied greatly in accordance with the general shape of the work to be decorated. With this arrangement of elements, a piece

of work supported as on a conveyer surface A and of the form shown at B in Fig. 1, may be effectively grained on all its upwardly facing surfaces, recesses, and the sides. For illustration, the blank B has a top surface *b*, an inclined or side surface *b*1 and still another inclined surface *b*2.

When a roll of the type shown in Fig. 1 is pressed into contact with a piece such as shown, the sponge rubber at 10 will yield inwardly to allow the transfer material 12 to recede toward the middle of the roll, the deformation of the resilient material 12 being indicated at 12*a*; meanwhile, the conical surfaces 13 come into action to press the resilient material closely against the inclined surfaces *b*1 and *b*2 and the connecting portions of the blank, thereby effectively graining all the desired surfaces of the blank in a uniform manner and with a natural design depending on that presented by the roll.

The form of the roll shown in Fig. 2 is mainly adapted for operation on blanks having portions with surfaces which rise upwardly a considerable distance from other portions. For example, the form of blank shown in Fig. 5 may be very effectively grained on such a roll. This roll is different from that shown in Fig. 1, mainly in that the sponge rubber is partly or entirely omitted and a fluid space provided instead. The fluid space is indicated at 20 and may contain air or, if desired, a suitable liquid, such as oil. Fluid in the space 20 may be maintained at slightly greater than atmospheric pressure, as by the use of an inflatable air bag or tube, with suitable valve arrangements for greater cushioning effect. This is not illustrated.

To maintain an air space while moulding the material 12, as in the usual mould or gun, I may provide a layer or tube of material, such as paper, shown at 22, which paper layer may be supported on shoulders 13′ adjacent the conical portions of the end plates. This layer may be formed by wrapping as many turns of paper as desired about the shouldered portions of the end plates to get the necessary strength for holding back the molten gum during the moulding operation.

After the roll has been completely formed and the gum congealed, the use of the roll on a blank, such as shown in Fig. 5, to grain the generally convex surfaces thereof, shown, will cause the paper to break through and allow the material 12 to press upwardly a considerable distance toward the center of the roll as compared to what will take place in the case of using a sponge rubber base for the gum. Nevertheless, the essential principle is the same as before and in connection with the modification of Fig. 2, the inclined or conical surfaced end plates may be modified as to shape as required by the shape of the work to be decorated, as will be obvious.

In the form shown in Fig. 3, the sponge rubber or like base 10*a* for the gum material may be used, or omitted, depending largely on the character of the blanks to be decorated. For example, an air space may be provided in accordance with Fig. 2. The essential difference between Fig. 3 and the previously described figures is the provision of special internal pressure members 25 of any suitable material, for example, hard rubber, wood or metal. These may be variously shaped and located along a tube or core 26 for the roll, suitably supported within it, as previously described, and if desired the members 25 may be adapted for adjustment along the roll axially thereof in any suitable manner, (not shown).

The essential result of using these internal pressure members is illustrated in connection with Fig. 3. Here there are a number of blanks B1 of the general nature shown in Fig. 4 having central recesses at *b*3, and otherwise conforming substantially to the shape shown in Fig. 1 at B. Such blanks may be supported on a conveyer, pressure roll or tray represented diagrammatically by the member R in Fig. 3. The member R has raised effects at *r* for engaging the deeper recesses of the blanks, namely those at *b*4 to effectively support the blanks and prevent deforming the same. If the blank is solid, such as a wooden moulding or is hollow but self-sustaining, then the raised effects would be omitted. The member R may also have projections at *r*1 to confine the roll material 12 and prevent its spreading out at the outer edges of the roll during the printing operation.

It will be seen that the members 25 may be of different size, as determined by the distance which it is desired to squeeze or distort the gum material from the center. For example, those of the members 25 which are disposed in line with the recesses *b*3 on the blanks are of less radial extent than those which are disposed between the blanks, since there is less pressure required to urge the material 12 snugly into one set of recesses than into another.

It will be seen that the receding surfaces of the pieces of work B1 supported as shown on the element R, act to direct the transfer material 12 toward each other. For example, the material in Fig. 3 at the region 12*b* is squeezed by both adjacent blanks in such manner that the material will uniformly enter the recess formed between the two blanks. This much of the invention is entirely apart from the roll construction and is operative to greater or less extent without such devices as those shown at 25. The spacing of the pieces on the support depends largely on the height of the pieces and of course their shape. In a work arranging system, such as shown, the devices *r*1 cooperate with the blanks in substantially the same manner as the blanks

cooperate with each other to direct the transfer material 12 in the proper manner to secure uniform decorative effects.

It is to be understood that while the rolls shown in Figs. 1, 2 and 3 are adapted for cooperation with pattern rolls having pattern effects thereon produced as by etching a copper plate or roll through a suitable resist, it it within the scope of the invention to provide the pattern relief or intaglio effects directly on the pattern transfer material, such as at 12, in any known or suitable manner. The prior application above mentioned discloses one manner in which the necessary pigment is applied to the transfer roll, via a separate pattern roll.

Considering the general invention as a method, this consists in providing unequal pressure on the transfer material of a roll or like printing element as required by the indented and raised surface effects on the work to be decorated. The method is further amplified by the provision for exerting additional pressure on the transfer material, as by the devices shown at *r*1, Fig. 3, and by the blanks themselves, for squeezing the transfer material toward the work and protecting this material against damage.

We claim:

1. A method of decorating blanks having surfaces deviating from a common plane, by the use of a transfer member having a generally smooth surface, comprising forming a transferable pattern on such generally smooth surface and exerting printing pressure on the blank by applying the member thereto and meanwhile exerting unequal pressure on the transfer material of the member opposite the printing point or line, the pressure being greatest where the surfaces to be decorated recede farthest from the points of application of such unequal pressure, and least where the surfaces are closest to such points.

2. A method of decorating blanks having surfaces deviating from a common plane, by the use of a substantially cylindrical transfer roll having resilient transfer material, comprising forming a transferable pattern on the cylindrical surface of the roll and exerting printing pressure on the blank by applying the roll thereto and meanwhile exerting unequal pressure on the transfer material of the roll opposite the printing point or line, the pressure being greatest where the surface to be decorated recedes farthest from the axis of the roll, and least where the surfaces are closest to the roll axis.

3. The method of decorating surfaces of articles having relatively raised and receding surfaces, which comprises using a substantially cylindrical transfer roll, applying printing pressure to the article through the medium of a pattern on a resilient printing member on the roll, and meanwhile applying unequal pressure to the resilient printing member on the surface thereof opposite the point or line of contact between the article and roll.

4. A printing roll comprising a core and a layer of resilient material adapted to effect an offset impression on a blank, said material embracing the core, the core having raised portions to provide unequal radial pressure effects in different portions intermediate the ends thereof.

5. A transfer member adapted for impressing a pigment design on blanks having surfaces which deviate from a common plane, said member having a resilient transfer body and a base support therefor including spaced relatively compact and relatively yielding portions of the base corresponding respectively to the relatively recessed and relatively raised portions of the blank.

6. Transfer apparatus comprising, a support for blanks which have relatively raised and receding surfaces to be decorated, a transfer roll adapted for impressing a pigment design on the blanks, said roll comprising an outer layer of resilient, transfer material, and inner supporting means therefor of relatively yielding character in proximity to the raised surfaces of the blank on the support and of relatively non-yielding character in proximity to the receding surfaces, whereby the blanks may be effectively grained on both the raised and receding surfaces in one operation.

7. A pattern printing member for impressing a pigment design on blanks having surfaces which deviate from a common plane, comprising, a central body and a layer of yielding material adapted to effect a transfer of a pattern to a work blank, the body having substantially solid portions thereof directed to increase the pressure in certain zones transversely of the body and yielding portions to decrease the pressure in other zones, said solid portions and yielding portions being spaced to correspond to the contour of the blanks, whereby blanks having relieved and indented effects may be uniformly decorated by rolling contact pressure between the member and blank.

8. A printing roll, comprising a central body and an embracing layer of yielding material adapted to effect a transfer to a blank, the body being characterized in that it has intermediate of its ends, a non-yielding enlargement in concentric relation to the roll, whereby elongated blanks of deviating contour may be effectively decorated.

9. The method of arranging work having relatively raised and receding surfaces for decoration thereof in a graining or like printing machine, comprising supporting the work pieces in substantially closely spaced relation to each other, whereby the receding surfaces of two adjacent pieces of work will act to mutually direct yielding transfer ma-

terial on a transfer roll toward each other for uniform decoration of the receding surfaces or both pieces, simultaneously with the decoration of the raised surfaces of the pieces.

In testimony whereof we hereunto affix our signatures.

GUIDO VON WEBERN.
EDW. W. HAMANT.