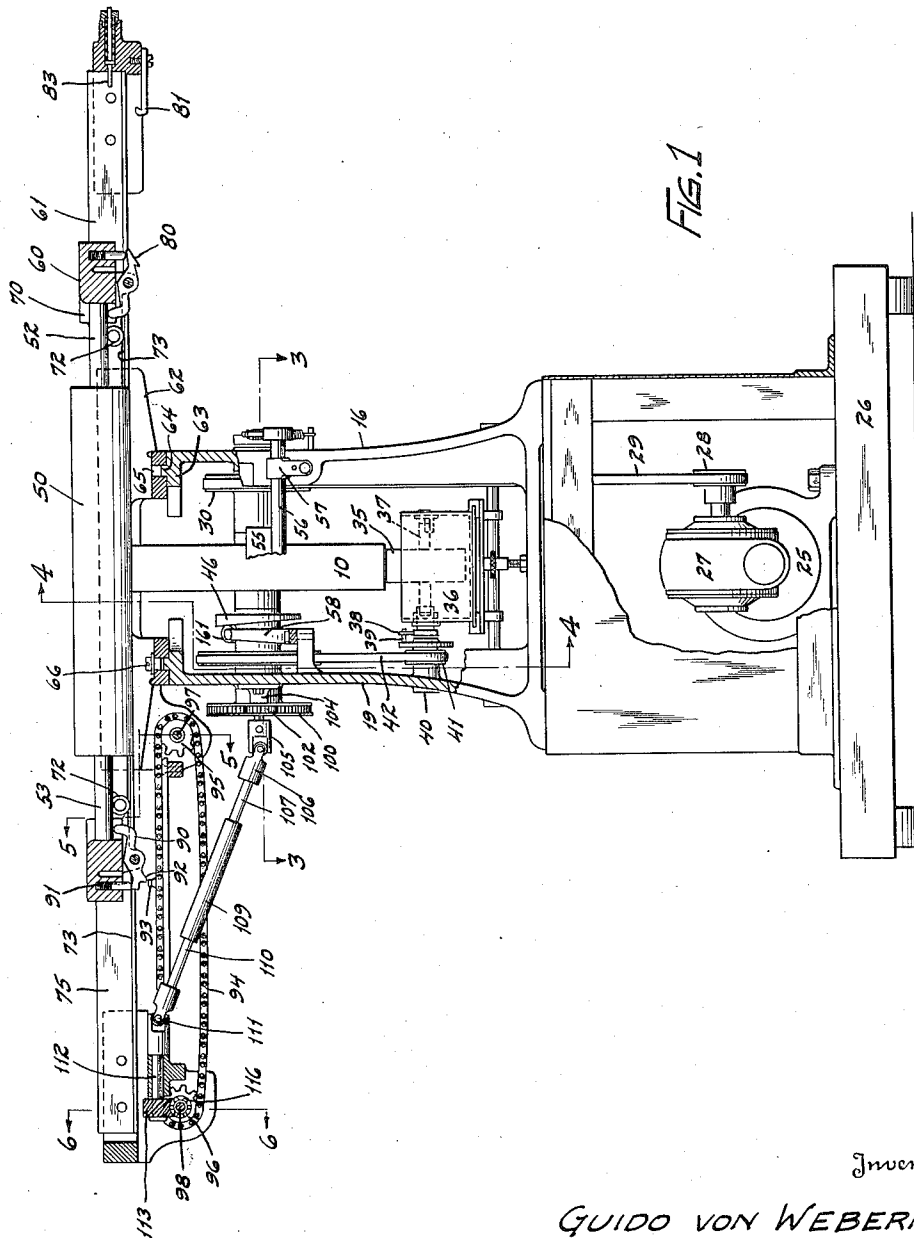


July 14, 1936.

G. VON WEBERN
METHOD OF AND APPARATUS FOR DECORATING ARTICLES
OF MANUFACTURE HAVING ELONGATED SURFACES
Filed June 8, 1935

2,047,718

3 Sheets-Sheet 1



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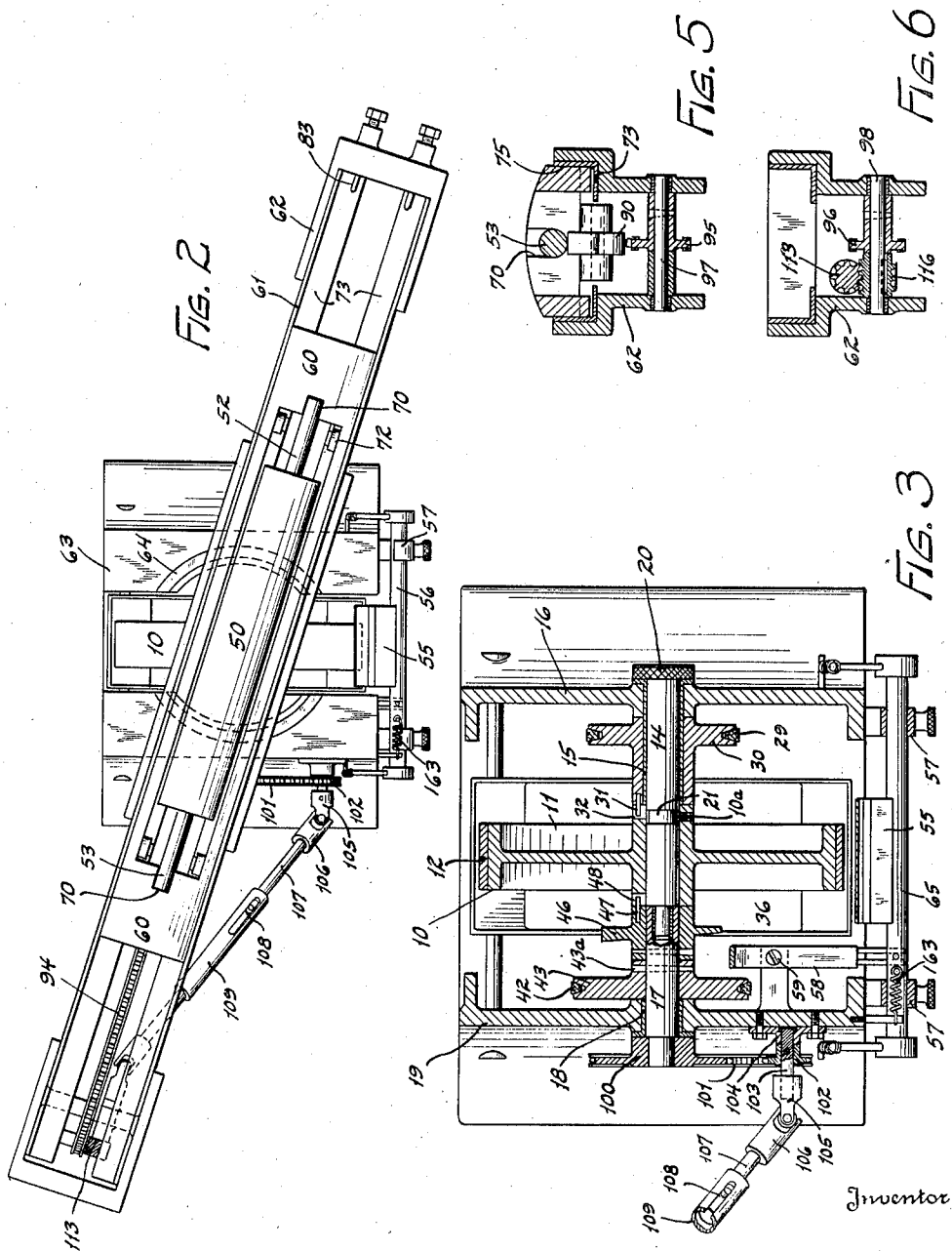
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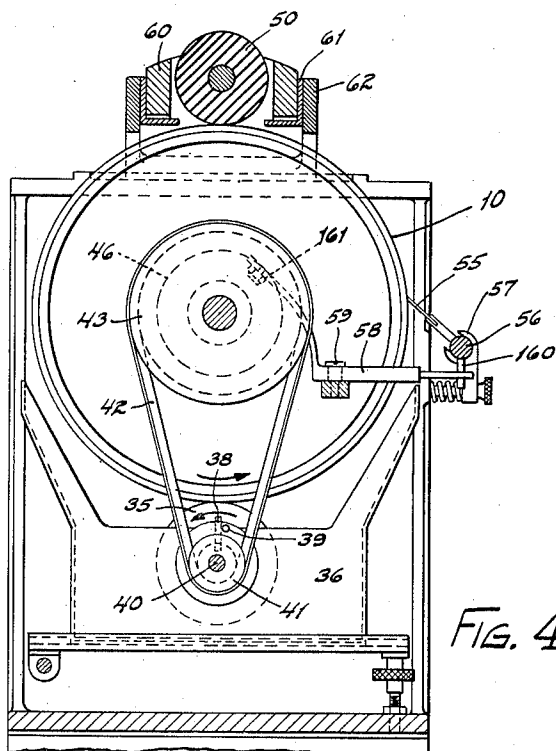


FIG. 4

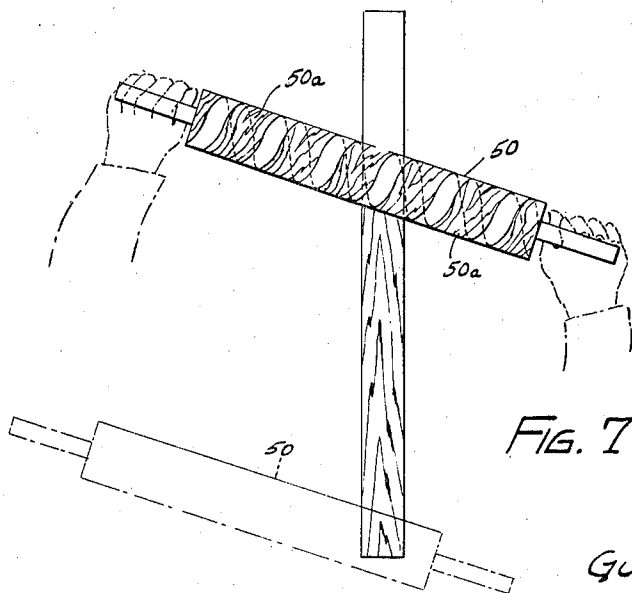


FIG. 7

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UNITED STATES PATENT OFFICE

2,047,718

METHOD OF AND APPARATUS FOR DECORATING ARTICLES OF MANUFACTURE HAVING ELONGATED SURFACES

Guido von Webern, Dayton, Ohio, assignor to Oxford Varnish Corporation, Detroit, Mich., a corporation of Michigan

Application June 8, 1935, Serial No. 25,644

14 Claims. (Cl. 101—154)

This invention relates to a method of and apparatus for decorating materials and more particularly to a method and apparatus for decorating surfaces wherein an offset impression process is used to apply a decorative transfer to an article of manufacture.

A further object of my invention is the provision of an apparatus which will be effective to apply to an offset transfer roll, a repeating decorative design carried by a printing cylinder, whereby several repeats of the designs on the cylinder can be applied to the transfer roll in a continuous manner. A specific application of the method and apparatus to a particular industrial use is set forth herein as being adapted to the decoration of surfaces of articles of manufacture which are comparatively long relative to the width thereof, and upon which surfaces the decorative design is applied.

The particular apparatus herein disclosed is adapted to the art of effecting wood grain finishes on moldings, frames and beadings when bent to final form, and also when the same exist in a semi-manufactured condition, namely, as elongated strips.

In the art of decorating articles of manufacture, formed, for instance, of sheet steel, a design may be reproduced on a pattern cylinder by a photomechanical process, and such a cylinder usually has the design etched intaglio. Color, such as an ink or paste of the proper consistency is then applied to the pattern, and any excess color is removed by a suitable scraper or doctor blade. A soft or resilient transfer roll is then brought into rolling contact with the pattern roll, thereby transferring the design in color to the transfer roll, which is thereafter brought into rolling contact with the surface of the work, to apply the design in color thereto. Such processes, as well as variations of such processes, are generally well known and are in use at the present time.

When moldings, framings and other articles which present elongated surfaces, are to be decorated, it is desirable to so decorate them that the pattern or design, when being repeated on the same strip, will not be optically obvious. Generally this has been accomplished by providing pattern and transfer rolls having a circumference greater than the length of the strip to be decorated. However, as the length of the strip increases, this becomes exceedingly difficult. For instance, to increase the circumference of the rolls, the diameters thereof and the rolls become unwieldy. This is especially disadvantageous

when the offset or transfer roll is manually applied to the work. Such transfer rolls are made usually of a gum or glue and glycerine composition, and therefore are quite resilient. As the diameter of such rolls increases, the tendency of the roll to become distorted is likewise increased. This makes it difficult to obtain an accurate reproduction of the design. Likewise, such rolls, due to their large diameter and weight, are difficult to handle, and to have the design applied thereto from the pattern roll.

In the decoration of the internal surfaces of frames and especially frames having curvilinear internal corner surfaces, such as automotive window frames, the diameter of the offset roll is limited both by the narrow dimension of the frame and by the radius of the curves at the corners thereof. In such instances the roll obviously cannot be of such a diameter as would permit its circumference to be greater than the internal perimeter of the frame, as the diameter of such a roll would be too great to permit its entrance into the frame, or too large to imprint the rounded internal surfaces of small radii. Obviously, this would materially hamper the application of a continuous design having a non-repeating pattern to the internal surface of a frame.

Hence, an additional object of the present invention is to provide a method and apparatus to facilitate the graining of elongated surfaces, such as window moldings and frames for automobile bodies by an offset printing process and a further object is to provide a method and apparatus which will permit a design to be transferred to the elongated surfaces of such articles by manually rolling an offset roll along the surfaces thereof without necessitating the use of cumbersome and unwieldy offset rolls.

A further object is the provision of a method of graining which may be readily used to grain the internal surfaces of frames and the like in such a manner as will provide the frame with a substantially continuous decorative pattern.

It is also an object of the present invention to provide a graining mechanism in which a transfer roll may be positioned, and such positioning act to initiate the operation of the mechanism to transfer a design from a suitable pattern to such transfer roll, and to further arrange the apparatus so that consequent upon the removal of such transfer roll, the mechanism will be automatically reset to receive another transfer roll.

A further object of the invention is to provide

an improved transfer machine which will transfer a design from a pattern to an offset printing roll with rapidity and to so arrange such mechanism that the design may be applied to the offset roll in the form of spiral convolutions, the direction and pitch of such spiral being changeable at the will of the operator.

Other objects of the invention will become more apparent from the following description, reference being had to the accompanying drawings. The essential features of the invention will be brought out in the claims.

Referring now to the drawings, wherein I illustrate a preferred form of mechanism for carrying out my invention, Fig. 1 is a front elevation of an apparatus for transferring a design from a pattern roll to a transfer roll, certain parts being broken away to more clearly illustrate the internal construction of the mechanism; Fig. 2 is a plan view of the apparatus illustrated in Fig. 1; Fig. 3 is a horizontal section through the pattern roll as indicated by the line 3—3 on Fig. 1; Figs. 4, 5 and 6 are vertical sections as indicated by the correspondingly numbered lines on Fig. 1; Fig. 7 is a diagrammatic view illustrating a manner of transferring the design from the transfer or offset rolls to the work.

My improved method comprises in general the provision of a pattern, the length of which is greater than the length of the strip to be grained. This pattern may be in the form of a cylinder, the circumference of which is longer than the strip to be decorated. The design may be applied to the pattern in any well known manner, such as photomechanically. However, I preferably apply the design to form a continuous pattern on the roll, as explained and claimed in Patent No. 1,944,200, issued to Guido von Webern, January 23, 1934, and assigned to my assignee. Ink or color is applied to the cylinder, and any excess color is removed by a doctor blade in the usual manner. An offset roll having a diameter considerably less than the diameter of the pattern roll, but having a greater surface width than the pattern, is then brought into rolling contact with the pattern and rolled thereacross. When the work is in strip form, the offset roll is rolled therealong in a path at an angle to the long dimension of the work.

When a pattern roll is used, as illustrated in the apparatus shown in the drawings, the axis of the offset roll is positioned at an acute angle to the axis of the pattern roll and the offset roll is progressed along its own axis simultaneously with its rotary movement. The pattern roll is simply rotated about its axis and constrained from any axial displacement relative to the transfer roll, other than the predetermined amount above stated. This effectively transfers the design from the pattern roll to the offset roll and, partially due to the surface characteristics inherent in offset printing rolls used in this type of work, there is substantially no blurring of the design during this transfer. The relative axial travel of the offset roll is preferably controlled by its frictional contact with the pattern roll. The offset roll is then removed from the transfer apparatus and is rolled across the work as indicated in Fig. 7. The axis of the roll being maintained at all times at an angle to the strip to cause the spiral pattern to be transferred to such strip with the grain lines or pattern thereof substantially parallel with the edges of the strip. Obviously, this angle is determined by the angle maintained between the offset roll and the pattern roll, at the time the

pattern was applied to the offset roll. Such a method permits the use of an offset roll having a diameter comparatively small in relation to the diameter of the pattern roll and hence is handled readily by the operator and as the transfer roll is manually rolled across the work. Likewise, since the roll is small in diameter, there is less tendency of the roll to become lopsided or flattened, as the periphery thereof is closer to the axis of the roll. This smallness of transfer roll diameter facilitates the graining of the internal surfaces of frames and the like.

The apparatus shown in the drawings comprises a motor-driven mechanism for applying a design in ink or suitable printing fluid to a pattern roll 10 and for thereafter transferring the ink pattern in the form of a continuous spiral to a composition offset roll 50. The mechanism is arranged to be adjusted to transfer the pattern to the offset roll in the form of either a left-hand or right-hand spiral, as desired. Likewise, the pitch of the spiral may be varied to accommodate patterns of various widths, to the best advantage possible with the particular offset roll being used.

As shown in the drawings, and especially in Figs. 1 and 3, the pattern roll 10 comprises a drum 11 having about its periphery a pattern plate 12, which carries a suitable design. Such design may be sunk into the periphery of the plate by any well-known photogravure process. The pattern roll is rotatably journaled on a shaft 14, one end of which is mounted in a bushing 15, carried by an upright frame member 16, the other end of which is journaled in a stub-shaft 17, rotatably mounted in bushings 18 carried by another upright frame member 19.

The mechanism is arranged for quick removal and replacement of the pattern roll 10. Accordingly, the shaft 14 is provided with a knurled head 20, arranged to be grasped by the operator, and withdrawn, thereby releasing the pattern roll 10, to enable the replacement of the pattern with another bearing a different design. A suitable set screw 10a carried by the hub of the pattern roll engages the annular recess 21 in the shaft and normally acts to retain the shaft and pattern roll in position.

The pattern roll is continuously rotated by a suitable motor 25. As illustrated in Figs. 1 and 3, the motor 25 is supported by an adjustable base member 26, and is placed below the pattern roll and drivingly connected with a gear reduction unit generally indicated at 27. The driving shaft of the gear reduction unit carries a pulley 28, which by means of a suitable belt 29, drives a pulley 30. The latter pulley is rotatably journaled on the bushing heretofore mentioned and is drivingly connected with the pattern roll 10 by a pin 31, carried by the hub of the pulley; the pin engaging a slot 32 in the hub of the pattern roll.

Pigment is supplied to the pattern roll by an applicator roll 35, mounted therebeneath and having its lower reach in a reservoir or ink supply tray 36, which is supported between the frame members 16 and 19 in any suitable manner. The applicator roll is rigidly carried by the shaft 37, and is journaled in suitable bearings carried by the walls of the reservoir 36. This shaft extends outwardly from the reservoir and is provided with an extending pin 38 which establishes the driving connection between the applicator roll shaft 37 and an axially aligned sub-shaft 40. The sub-shaft 40 is carried by the frame member 19 and contact between the pin 38 and an abutment 39 75

carried by a pulley 41 effects the driving connection. The pulley 41 is rotatably journaled on the sub-shaft 40, and is driven through a belt 42 from a pulley 43, the latter being secured to the subshaft 17, heretofore mentioned. The shaft 17 is driven from the pattern roll 10.

As shown in Fig. 3, the pulley 43 is rigidly secured to the shaft 17 by a suitable pin 43a, and a cam member 46 is also secured to the same shaft and carries a pin 47, arranged to engage a recess or slot 48 in the left-hand face of the hub of the pattern roll 10, thereby providing a driving connection between the pattern roll, the motor and the ink-applicator roll.

It will be noted from Figs. 1 and 4, that the ink-applicator roll 35 does not actually contact with the pattern roll, but is spaced a slight distance from it. This distance is greatly exaggerated in Fig. 1. Actually, the distance is only sufficient to avoid positive contact between the two rolls, thereby preventing the ink-applicator from wearing away or defacing the pattern. The printing fluid used is of such a consistency as to effectively bridge the gap between the two rolls, and supply ink or printing fluid evenly to the pattern, despite the slight separation between the two. The application of the ink is assisted, due to the rotation of the two rolls. It will be noted from Fig. 4 that the surface of the ink applicator roll is moved in a direction opposite to the direction of movement of the pattern roll surface. This tends to cause a more even flow of ink from the reservoir to the pattern roll.

The excess ink is removed from the pattern roll by a suitable doctor blade 55. As shown in Figs. 2 and 4, the doctor blade comprises a thin, metallic plate member 55, somewhat longer than the width of the pattern roll and is rigidly secured to a bar or shaft 56. The doctor roll shaft 56 is mounted for reciprocation in suitable bearings 57, carried by the machine frame, and moved axially by a lever 58 pivoted at 59 to a suitable frame bracket. One end of the lever 58 engages a pin 160, carried by the doctor blade shaft 56, while the other end of the lever 58 has mounted thereon a roller 161, arranged to engage the cam 46, heretofore mentioned. A suitable spring, such as the spring 163, shown in Fig. 3, is interposed between the frame and the doctor roll shaft and serves to maintain the roller 161 in engagement with the cam 46.

As heretofore mentioned, the particular mechanism here described is adaptable for use in a graining process wherein the offset roll is manually rolled across the work. In such instances, the mechanism is arranged to have the roll deposited therein by the operator and consequent upon the deposit of the roll in the mechanism to automatically transfer a design pattern from the pattern roll 10 to such offset rolls, and consequent upon the removal of the offset roll from the mechanism to reset the mechanism to receive another offset roll.

The mechanism comprising a carriage for the offset roll also is operable intermittently, depending upon the positioning of an offset roll thereupon. As shown in Figs. 1 and 2, the offset roll 50 is manually positioned in a carriage 60, which is reciprocally mounted in an elongated guideway 61 formed in the slide frame construction 62, the latter being carried by the frame members 16 and 19. As shown, the guideway 61 is mounted on the slide frame 62, which bridges the frame members 16 and 19 at their upper portions. The connection between the slide

frame 62 and the table-like portion of the frame is that of a turn-table. As shown, the turn-table 63 is provided with an annular rib or ribs 64, arranged to engage recesses 65 in the slide frame 62. Suitable bolts, such as are indicated at 66, may be provided to clamp the slide frame in any desired angular position relative to the frame and so controlled as to determine the relative angular positions of the pattern roll 10 and the offset roll 50, thereby controlling the degree of pitch of the spiral effected by the design during the transfer of the design from the pattern roll to the offset roll.

The carriage 60 comprises a rectangular frame having at its opposite ends pockets 70 arranged to receive the offset roll pin 52, of the offset roll shaft 50, in such a manner that the offset roll may rest by gravity on the pattern roll.

The carriage 60 is mounted for longitudinal movement in the guideway 61. As shown in Fig. 20 1, the carriage is provided with a plurality of rolls or rollers 72, arranged to engage the bottom wall 73 of the guideway, while the edges of the carriage are arranged to engage the side walls 75 of the guideway so as to maintain the direction of movement of the carriage constant.

Fig. 1 illustrates an offset roll 50 during the transfer of the grain design from the pattern roll to the offset roll. However, when the roll is placed in the machine the carriage is in its extreme right-hand position, in which position a pivoted latch 80, mounted on the carriage, is in engagement with a coacting latch member or catch 81, carried by the right-hand end of the frame 62. However, consequent upon the deposing in the carriage, by the operator, of an offset roll, the shaft of such roll engages the latch as shown in Fig. 1, rocking the latch in a counter-clockwise direction, thereby freeing it from the catch 81, whereupon a suitable spring-pressed plunger 83 acts to overcome the inertia of the offset roll and to aid or permit the pattern roll to both rotate the offset roll and propel it axially along the guideway of the frame 62. As the offset roll rests entirely by gravity on the pattern roll, any slight variations are readily compensated for, and a driving frictional contact between the two rolls is insured.

The pattern roll progresses the transfer roll 50 along its guideway until the entire roll has been covered with the pattern, as indicated by the shaded portions of the roll 50a in Fig. 7, at which time the right-hand end of the offset roll has progressed a slight distance beyond the edge of the pattern roll and the driving connection therebetween is thus broken. The carriage remains in this position unaffected by the mechanism until the offset roll is removed therefrom by the operator.

Consequent upon the removal of the offset roll from the carriage by the operator, the left-hand portion 53 of the offset roll shaft is removed from contact with a spring-pressed pawl 90 disposed at the right-hand end of the carriage, whereupon a spring 91 rocks the pawl in a counter-clockwise position. This rocking causes a lip 92 thereof to be swung into a position to be engaged by suitable lugs 93, carried by a continuous belt or chain 94, which is driven in the direction of the arrow in Fig. 1. This positive drive serves to return the carriage 60 to its extreme right-hand position and to cause the latch to reengage the catch 81. The spring-pressed plunger 83 absorbs the shock and maintains the catch 80 in engagement with the catch 81.

The chain 94 is carried by a pair of sprocket members 95 and 96, mounted on respective shafts 97 and 98, journaled in the guideway frame 62. This chain is constantly driven from the sub-shaft 17, heretofore described. As shown in Figs. 1, 3 and 6 a suitable sprocket 100 is drivingly secured to the sub-shaft 17 and through the medium of a sprocket chain 101 drives a sprocket 102 which is secured to a suitable sub-shaft 103 journaled in a bearing member 104 secured to the frame plate 19, in any suitable manner.

The sub-shaft 103 has secured to its outer end, one member 105 of a universal joint mechanism, the other member 106 of which carries a shaft 107 having a splined connection 108, with a tube or sleeve 109. The sleeve 109 is rigidly secured to a shaft 110, which, in turn, through a universal joint 111, is drivingly connected to a shaft 112, journaled in the guide frame 60. A suitable spiral gear 113 is drivingly connected to the shaft 112 and meshes with another spiral gear 116 drivingly secured to the sprocket shaft 98, serves to drive the chain 94 to return the carriage.

From the foregoing description it will be seen that I have provided a method of decorating articles in which long surfaces, such as elongated strips or the interior surfaces of frames, may be readily grained by the use of an offset roll having a comparatively small diameter. It will likewise be seen that I have provided an apparatus for transferring a design to a pattern roll in a simple and efficient manner, and in which the transfer roll may be placed manually, by the operator, and the mechanism thereafter functions to automatically transfer the design from a pattern roll to an offset roll and consequent upon the removal of such offset roll the mechanism will automatically reset itself so as to receive another offset roll. It is obvious also, that the depositing and removing of the offset roll automatically initiates the action of the mechanism to transfer the grain to the offset roll and to restore the mechanism to receive another offset roll.

I claim:

1. The method of effecting the decorating of an elongated surface, comprising applying a design to a pattern, obtaining a transfer therefrom on an offset roll by rolling such roll along the pattern and at the same time moving the roll relative to the pattern in the direction of its axis, and subsequently transferring the design from the offset roll to the article to be decorated.

2. The method of effecting the decorating of an elongated surface comprising applying a design to a pattern, obtaining a transfer therefrom on an offset roll by effecting a rolling contact between the pattern and the roll while moving the roll in a direction at an angle to the pattern, and subsequently transferring the design from the offset roll to the surface to be decorated by effecting a rolling contact between the roll and the work while moving the roll in a direction at an angle to the work.

3. The method of effecting the decorating of an elongated surface by the use of a pattern roll, comprising obtaining a transfer from the pattern roll to the surface of an offset roll by rolling the transfer roll along the pattern roll and at the same time moving the transfer roll relative to the pattern roll in the direction of the transfer roll axis, and subsequently transferring the design from the offset roll to the article to be decorated.

4. The method of effecting the decorating of the surface of an article of manufacture, com-

prising applying a design to a pattern roll, obtaining of a transfer therefrom to the surface of an offset roll by effecting a rolling contact between the pattern roll and the transfer roll while also effecting a relative axial movement between said rolls, and subsequently transferring the design from the offset roll to the surface to be decorated by effecting a rolling contact between the roll and the work while moving the roll in a direction at an angle to the work.

5. The method of effecting the decoration of elongated surfaces through the use of a pattern roll having a design thereon extending in a true circumferential direction, comprising causing the transferring of the design from the pattern roll to an offset roll by effecting relative circumferential and axial movements between said rolls to form a spiraled pattern on the transfer roll and thereafter transferring the design to the work to be decorated to effect a lineally extending pattern.

6. In an apparatus of the class described, the combination with a pattern-forming medium and means to apply color to said pattern, of an offset printing roll, means to support said offset roll in peripheral contact with said pattern, means to rotate said roll while maintaining contact with said pattern to transfer color to said offset roll from said pattern, and means to cause the offset roll to move along its axis simultaneously with its rotary movement.

7. In an apparatus of the class described, the combination with a pattern roll having a substantially continuous circumferential pattern thereon, means to apply color to said pattern, a carriage supported for movement substantially in the direction of the axis of said pattern roll, and adapted to receive an offset printing roller and retain said roller in circumferential contact with said pattern roll, and means to rotate said roller and simultaneously move said carriage, whereby the pattern is transferred to said roller in a spiral formation thereon.

8. In a mechanism of the class described, the combination with a frame, a pattern roll mounted in said frame, a carriage movably mounted on said frame and adapted to removably retain an offset printing roller in peripheral contact with said pattern roll, a guide for said carriage whereby said carriage may move in a plane parallel to the axes of said rolls, and means to simultaneously rotate said roll and said roller and move said carriage.

9. In a transfer mechanism, the combination of a frame having a pattern roll rotatably mounted thereon, of means to supply pigment to said pattern roll, a carriage arranged to receive and hold an offset printing roller for rotation in peripheral contact with said pattern roll, a guideway for said carriage whereby said carriage may move in a direction at an acute angle to the axis of the pattern roll while maintaining peripheral contact between said roll and roller, and releasable means to restrain said carriage against movement, and means whereby said carriage is automatically released consequent upon the deposit of a roller therein.

10. In an apparatus of the class described, the combination with a pattern roll, and means to apply color to said pattern roll, of an offset printing roll, means to support said offset roll in peripheral contact with said pattern, means to rotatably support said offset roll while maintaining contact with said pattern roll to transfer color to said offset roll from said pattern roll, and

means to cause the offset roll to move along its axis simultaneously with its rotary movement.

11. In an apparatus of the class described, the combination with a pattern roll and means to
 5 apply color to said pattern roll, of an offset printing roll, means to rotatably support said offset roll and said pattern roll in peripheral contact with each other, means to rotate one of said rolls while maintaining said contact to effect
 10 transfer of color to said offset roll from said pattern roll, and means to effect a relative axial shifting of said rolls while in contact.

12. In an apparatus of the class described, the combination with a pattern roll having a sub-
 15 stantially continuous circumferential pattern thereon, means to apply color to said pattern roll, means adapted to receive and rotatably support an offset printing roller and retain said roller in circumferential contact with said pattern roll,
 20 and means to rotate said roller and roll and simultaneously effect a relative axial movement of said roll and roller.

13. In a mechanism of the class described the combination with a frame, a pattern roll rotat-
 25 ably supported by said frame, means mounted on

said frame for rotatably supporting an offset printing roller and adapted to removably retain an offset printing roller in peripheral contact with said pattern roll, angularly adjustable means disposed between the said means and the frame
 5 whereby the axes of said rolls may be adjusted to non-parallel positions, and means to rotate said roll and said roller while their axes are non-parallel.

14. In a transfer mechanism the combination
 10 with a frame of a pattern roll rotatably mounted thereon, of means to supply pigment to said pattern roll, a carriage arranged to receive and hold an offset printing roller for rotation in peripheral contact with said pattern roll, a guideway for
 15 said carriage whereby said carriage may move in a direction at an acute angle to the axis of the pattern roll while maintaining peripheral contact between said roll and roller, and means automatically effective when an offset roll is
 20 placed upon said carriage to cause the carriage to move said roll transversely of the circumferential face of the pattern roll.

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