

Oct. 17, 1939.

E. W. HAMANT

2,176,765

SURFACE DECORATING APPARATUS

Filed June 24, 1938

4 Sheets-Sheet 1

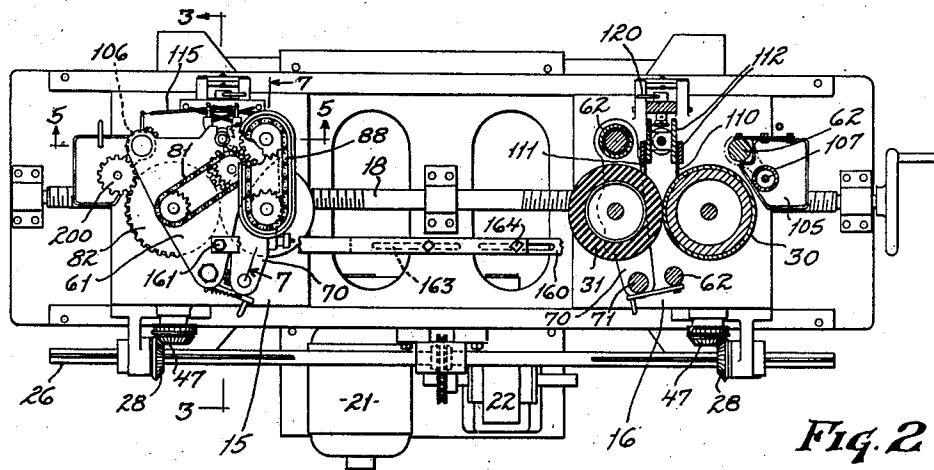


Fig. 2

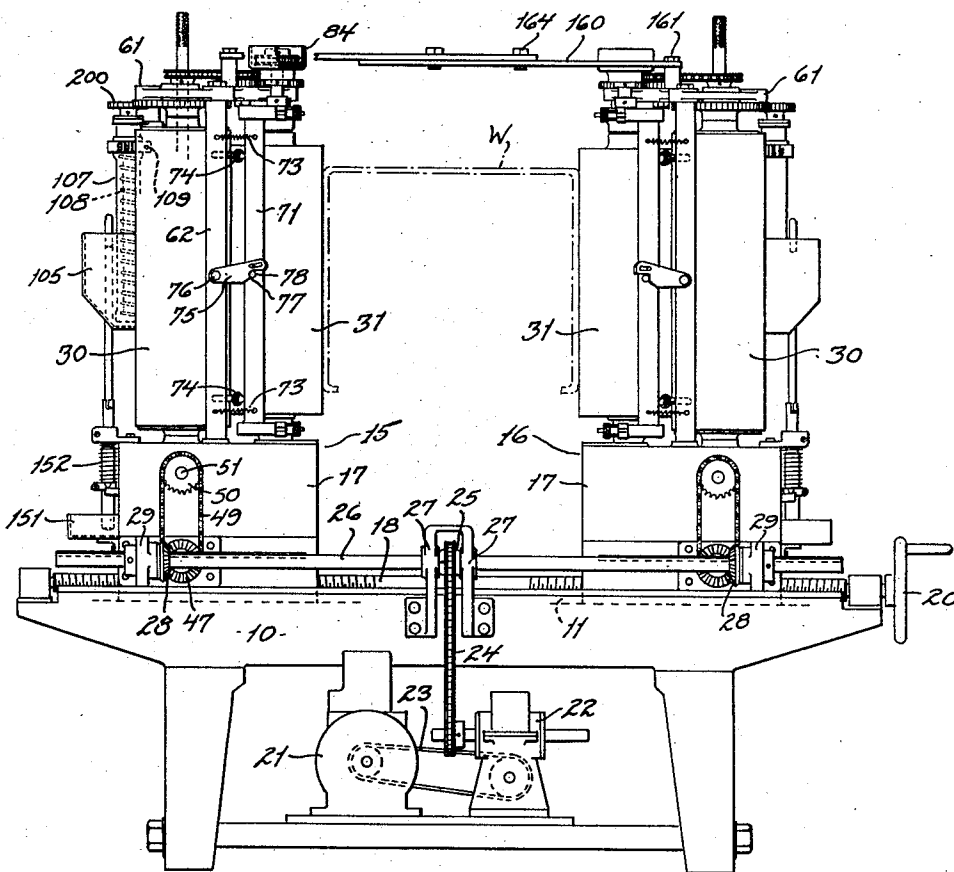


Fig. 1

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4 Sheets-Sheet 2

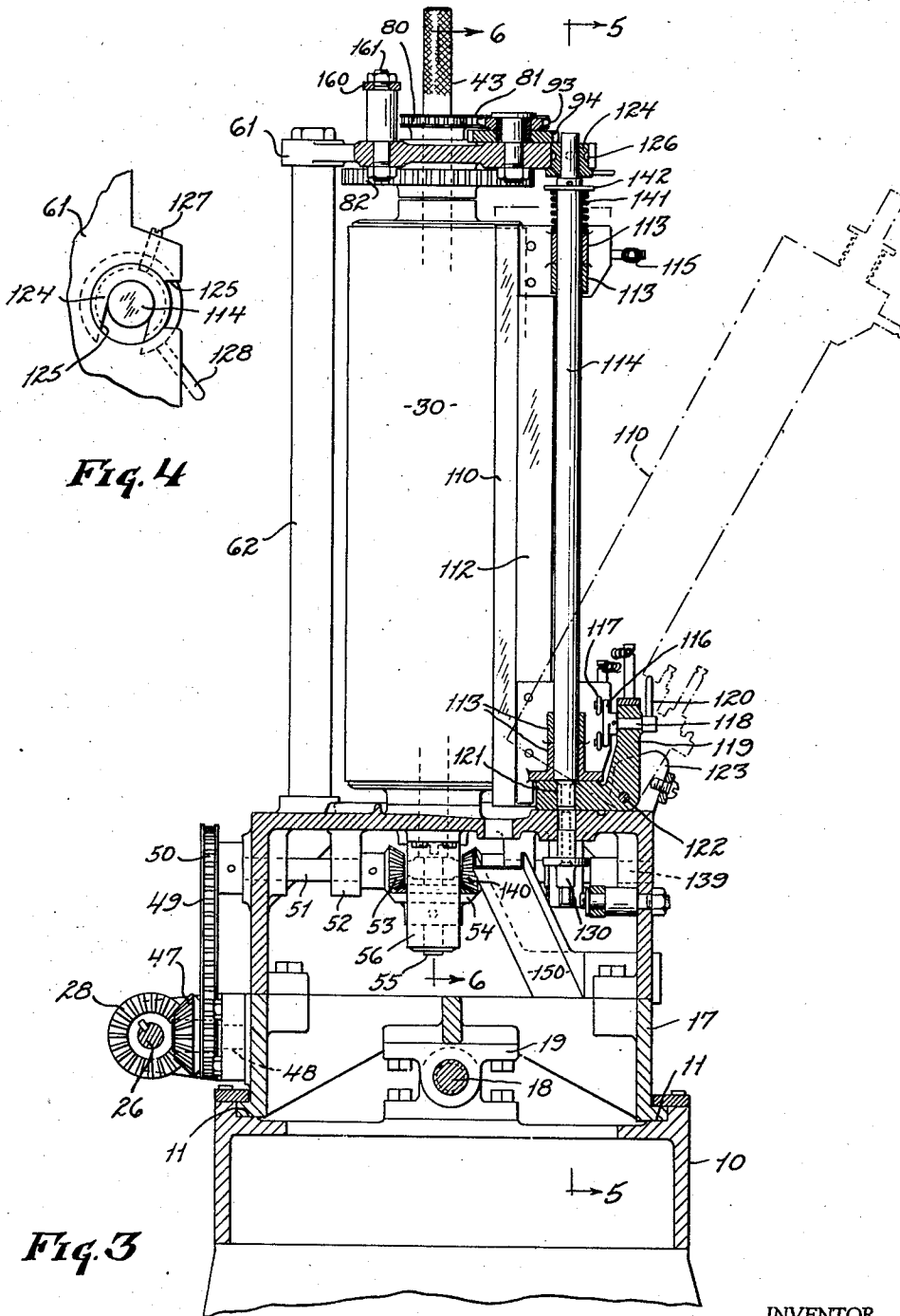


Fig. 4

Fig. 3

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4 Sheets-Sheet 3

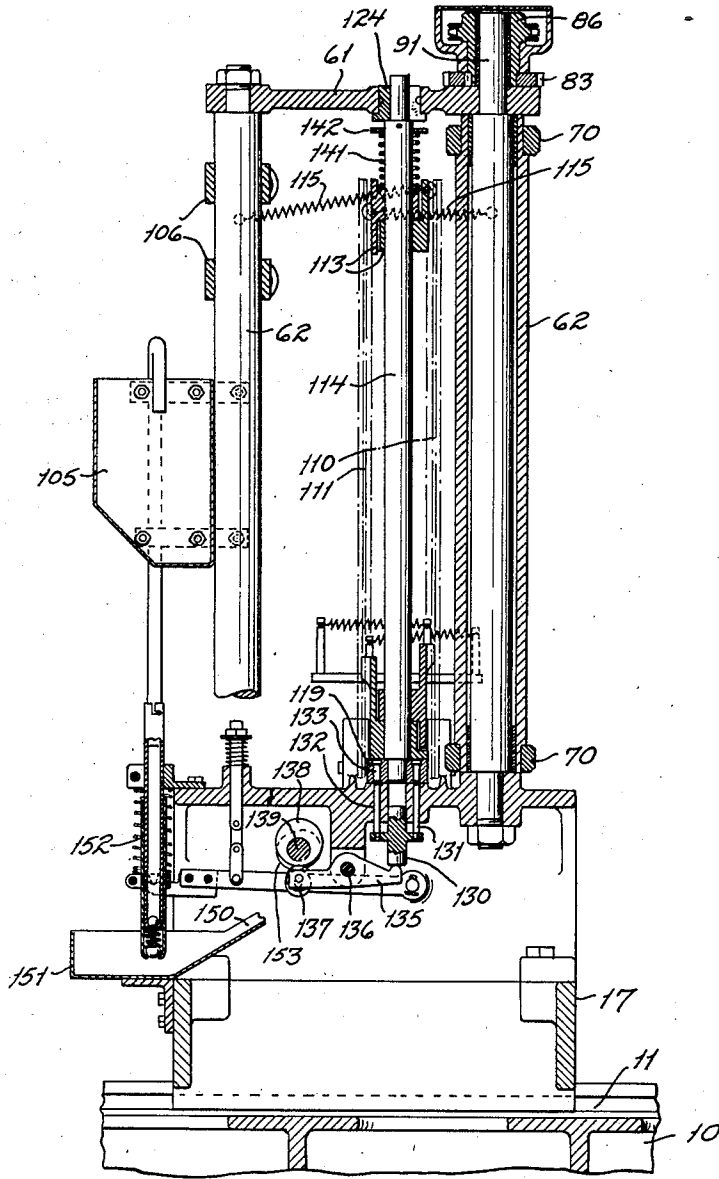


Fig. 5

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4 Sheets-Sheet 4

Fig. 8

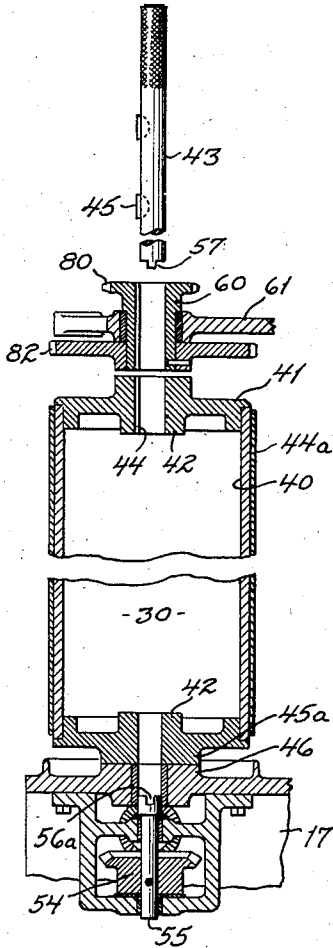
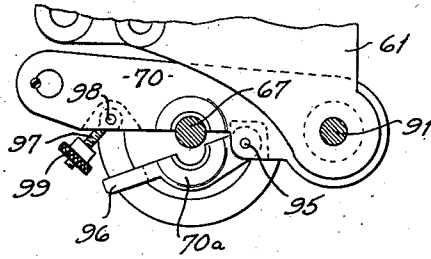


Fig. 6

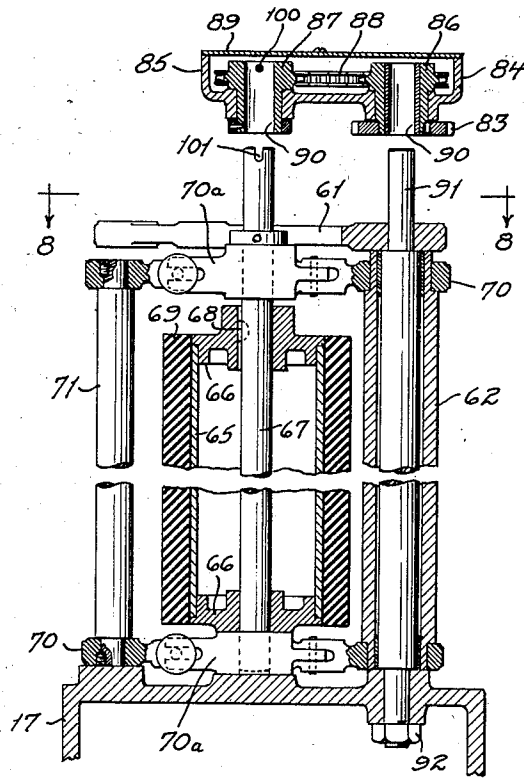


Fig. 7

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# UNITED STATES PATENT OFFICE

2,176,765

## SURFACE DECORATING APPARATUS

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Application June 24, 1938, Serial No. 215,658

12 Claims. (Cl. 101—154)

This invention relates to improvements in surface decorating machines and to an improved surface decorating machine which will decorate a plurality of surfaces simultaneously. These, therefore, are the general objects of the present invention.

A more specific object of this invention is to provide an improved surface decorating mechanism of the vertical roll type, in which the various rolls may be quickly removed for replacement or storage purposes.

Another object of this invention is to provide an efficient driving mechanism for a surface decorating machine, which mechanism will facilitate the removal of the decorating rolls.

A further object of the present invention is to provide an improved surface decorating mechanism with a roll scraping mechanism which may be readily moved to position the scraper blade for honing without affecting the adjustment of the scrapers or the driving connection which reciprocates such scrapers.

Other objects and features of this invention will become more apparent from the following description, which relates to a preferred embodiment of the invention, as illustrated in the accompanying drawings. The essential features of the invention will be summarized in the claims.

In the drawings,

Fig. 1 is a front elevation of my improved decorating mechanism; Fig. 2 is a plan view of the machine, certain parts being broken away to more clearly illustrate the internal construction; Fig. 3 is a vertical section, as indicated by the line 3—3 on Fig. 2; Fig. 4 is a fragmentary detail illustrating the mechanism for retaining the scraper unit in an active position; Figs. 5 and 6 are vertical sections, the planes of which are indicated by the correspondingly numbered lines on Fig. 3; Fig. 7 is a sectional detail, the plane of the section being indicated by the line 7—7 on Fig. 2; Fig. 8 is a fragmentary transverse sectional detail, the plane of the section being indicated by the line 8—8 on Fig. 7.

Referring again to the drawings, and especially to Fig. 1, the machine shown is especially arranged for decorating a plurality of vertical or nearly vertical surfaces. In general, the machine comprises a support 10, provided with longitudinally extending guideways 11. Slidably mounted in this guideway are a pair of spaced decorating units 15 and 16.

Each decorating unit comprises a base 17, which slidably coacts with the guideway 11 and which carries a pattern transfer or decorating mechanism, hereinafter to be more fully described.

Extending longitudinally of and journaled in the support 10 is a shaft 18, the ends of which are threaded with right and left-hand threads, respectively, and which engage internally threaded members 19, secured to the base of corresponding decorating units 15, 16, as shown in Fig. 3. At one end of the shaft 18 there is provided a hand wheel 20, the rotation of which causes the decorating units to be moved toward or away from each other, thus enabling the decoration of the opposite faces of articles having different widths.

The various mechanisms of the decorating unit, hereinafter to be described, are driven by a motor 21, mounted in the support 10. This motor is connected with a speed reducing unit 22 by a driving belt or chain 23. The speed reducing unit is drivably connected by a chain 24, with a sprocket 25, which is secured to a drive shaft 26, journaled in bearings 27, carried by the support 10. The sprocket 25 is embraced by the bearing 27, thus preventing axial movement of the shaft 26. This shaft has a splined connection with a pair of gears 28 which are rotatably mounted in respective bearing brackets 29, secured to respective decorating units. Thus the power is transmitted to both decorating units, regardless of their position relative to the support 10.

Inasmuch as the decorating units are substantially identical, only one will be described, and corresponding parts of other units are indicated in the drawings by identical reference characters. The only material difference between the two units is that one is a right-hand unit and the other a left-hand unit. Thus the work-engaging members of the respective units face each other, so that the opposite faces of a workpiece may be decorated by passing the work between the two units.

Each decorating unit is provided with a pattern roll 30 and a transfer roll 31. These rolls are supported by the base, with their axes substantially vertical. Each roll is so supported that it is readily removable from the machine, and special attention has been directed toward the provision of a roll driving mechanism to facilitate such removal. The latter is an important feature of the machine, inasmuch as it is often desirable to change the pattern and thus the design which is to be transferred to the work. It is likewise desirable to remove the offset roll when the machine is shut down so that the roll may be stored in such a position that the transfer material or roll coating will not bulge at one end of the roll. This may

be accomplished by storing the transfer roller, when not in use, in inverted position.

The pattern roller and its mounting is best illustrated in Figs. 3 and 6. As there shown, the pattern roller 30 comprises a cylinder 40, supported by end plates 41, having hub formations 42 through which a shaft 43 extends. One of these hub formations, for instance the upper formation, is provided with a key-way 44, arranged to receive a key 45 carried by the shaft, and thus drivingly connecting the shaft to the roll. The pattern 44a generally comprises an intaglio printing plate and is carried by the cylinder 40 in the usual manner. It is to be noted that the boss 42 at the lower end of the pattern roll is slightly enlarged, as indicated at 45a, and normally rests on a boss 46 formed on the base of the unit. The arrangement is such that the roll shaft 43 can be removed by drawing it upwardly from the roll, whereupon the roll will rest in a vertical position on the boss 46 until removed from the mechanism by the operator.

The pattern roll is driven from the power shaft 26. As illustrated in Fig. 1, the bevelled pinion 28, heretofore described, as being driven by the power shaft 26, meshes with a similar bevelled pinion 47, journalled on a stub shaft 48, carried by the base 17 of the decorating unit. Drivingly connected to this gear 47, by a drive chain 49, is a sprocket wheel 50. This sprocket wheel is secured to a shaft 51, which is journalled in suitable bearings 52 depending from the base 17. The inner end of the shaft 52 is provided with a bevel pinion 53, which meshes with a bevelled gear 54, carried on the vertically extending shaft 55, journalled in a bearing bracket 56 secured to the base 17 immediately below the axis of the pattern roll. The upper end of the shaft 55 extends partially into the top of the base of the decorating unit, as shown on Fig. 6, and is provided with a transversely extending slot 56a arranged to be engaged by a tongue 57 formed on the lower end of the pattern roll shaft 43, thus establishing a driving connection between the power shaft 26 and the pattern roll. The shaft 43 is mounted at its upper end in a combined gear unit 60 which in turn is journalled in an upper frame member 61, supported by vertically extending frame members 62 (Figs. 3 and 5).

The transfer roll comprises a cylinder 65, having a pair of end plates 66, through which a shaft 67 extends. This shaft is drivingly secured to one of the end plates by a key 68. The cylinder 65 is provided with a covering of transfer material 69, preferably a glue and glycerin or similar compound which will remove ink from a pattern and transfer it to a workpiece with a high degree of accuracy.

The transfer roll is mounted so that it may be swung toward or away from the pattern roll. To this end the shaft 67 is journalled at its upper and lower ends in respective bracket members 70, which are pivotally mounted at one end on one of the vertical frame members 62 as shown in Fig. 7. At their other ends the bearing members 70 are tied together by a bar 71.

The transfer roll is resiliently maintained in contact with the pattern roll by a pair of springs, shown in Fig. 1 at 73. The springs are connected between a vertical frame member 62 and the tie bar 71. The pressure between the pattern and transfer rolls is limited by a pair of adjusting screws 74 which threadingly engage one of the vertical frame members 62 and about the tie bar 71 of the transfer roll support.

To enable the transfer roll to be moved out

of contact with the pattern when the machine is not in use, without disturbing the adjustment between the two rolls, I provide a cam 75 which is pivoted at 76 with the vertical frame member 62, and may be swung into the position shown in Fig. 1, with the surface 77 thereof, abutting a pin 78, carried by the tie bar 71, and thus maintain the transfer roll spaced from the pattern roll.

As heretofore mentioned, the upper end of the pattern roll shaft is journalled in a combined sprocket unit 60. As shown in Fig. 6, this unit comprises a sprocket 80, which extends through and is journalled in the upper frame member 61, secured to the hub of the sprocket beneath the frame member 61 is a gear 82, which meshes with a pinion 200 on the ink pump hereinafter described. The sprocket 80 is drivingly connected by a chain 81 to an idler sprocket 93 secured to a gear 94. The gear 94 meshes with a pinion 83, carried by a gear unit 84. The gear unit 84 is best illustrated in Fig. 7, and, as there shown, comprises a housing 85 in which is journalled a sprocket 86. This sprocket extends through the housing and has secured to it, beneath the housing the gear 83. Also journalled in the gear housing 84 is a second sprocket 87, which is connected by a driving chain 88, with the sprocket 86. Both sprockets 86 and 87, as well as the driving chain, lie within the housing 85, which is provided with a cover plate 89, to retain a suitable lubricant. Both sprockets 86 and 87 are provided with openings 90, to receive a shaft-like extension 91 which is secured to the base of the decorating unit, as at 92 (Fig. 7), and the shaft 67 of the transfer roll respectively.

As heretofore mentioned, the transfer roll is arranged to be readily removed. For this purpose, the bearings 70 are split, as shown in Fig. 8. One member 70a of each of these bearings is pivotally mounted to the main member 70, as indicated at 95, and is provided with a bifurcated end 96 arranged to be fixed to a swinging stud 97, pivoted to the main bearing member as at 98, and provided with a knurled clamping nut 99. Thus, when it is desired to remove the transfer roll, the gear unit 84 is lifted bodily from the shafts 67 and 91, as indicated in Fig. 7, and the bearing member 70a released, whereupon the roll and the shaft may be readily removed from the decorating mechanism as a unit. The driving connection between the shaft 67 and the sprocket 87 comprises a pin 100, carried by the sprocket 87, and arranged to seat in a transversely extending slot 101 in the transfer roll shaft.

The pattern is inked by any suitable mechanism. However, I prefer to utilize a reservoir 105, such as is shown in Fig. 1 at 105. This reservoir is secured to one of the vertical frame members 62, by suitable bracket. Also secured to the frame member 62, as by brackets 106, is a cylinder 107, the lower end of which is contained within the reservoir. Rotatably mounted in the cylinder is a lift screw 108, which raises the material out of the reservoir and moves it toward the upper end of the cylinder 107, where it is ejected through an orifice or jet 109, onto the pattern roll. The ink then flows freely downwardly along the pattern and is distributed thereover by a scraper mechanism, hereinafter to be described.

The lift screw 108 has a gear 200 at its upper end which meshes with the gear 82 heretofore described, thus driving the lift screw from the pattern roll.

The scraper mechanism not only distributes 75

the ink on the pattern but also excess ink from the pattern. A similar scraper removes from the transfer roll such ink as remains thereon after the impression has been made. This scraper mechanism is best illustrated in Figs. 1, 3 and 5. As there shown, the scraper comprises a pair of blades 110 and 111, each of which is supported between a pair of vertically extending plates 112, which are provided with suitable bracket formations 113 to enable the scraper blade to be pivotally mounted on a vertically extending rod 114 carried by a pivotally mounted bracket 119. Suitable springs 115 which are interposed between the scraper blade mounting member and vertical frame member 62, serve to resiliently draw the scraper blades into contact with the pattern and transfer rolls, respectively.

When the machine is not in operation the scraper blades are moved away from their respective rolls. As indicated in Figs. 2 and 3, a cam 116 which carries a pair of rollers 117 may be moved into engagement with the scraper supporting plates 112 to separate the scrapers from their respective rolls. The cam 116 is mounted on a shaft 118 journaled in the bracket 119, hereinafter to be more fully described and is provided with a handle 120 to facilitate manual operation of the cam.

To facilitate honing of the scraper blades and thereby eliminate any roughening of the blades as may have resulted from the scraping action, both scraper blades and their supporting bracket are mounted to move as a unit about a horizontal pivot, thus enabling them to be tilted on the dotted line position indicated in Fig. 3. As heretofore mentioned, the scraper blades are mounted on a supporting rod 114. The lower end of this rod is of a reduced diameter, as indicated at 121, and is mounted in the bracket 119, heretofore mentioned. This bracket is pivotally mounted on a transversely extending pin 122 carried by upstanding lug formations 123 of the base 17.

The upper end of the rod 114 which supports the decorating unit is journaled in a bushing 124, which is rotatably mounted in the upper frame member 61, heretofore described. Both the frame members and the bushing are slotted, as indicated at 125 in Fig. 4, so that when the bushing is rotated to move the slots out of registration, as indicated in that figure, the rod 114 will be locked in a vertical position. To retain the bushing 124 in the frame member 61, the bushing is provided with an annular groove 126, arranged to be engaged by a set screw 127 carried by the frame member. A handle 128 is provided by means of which the bushing may be readily rotated. Thus, when it is desired to hone the scraper blades the bushing 124 is rotated until the slots 125 come into registration, each with the other, whereupon the entire assembly may be moved to the position shown in dotted lines in Fig. 3. If an excessive amount of honing is required the blades and the rod 114 may be lifted out of the tilted bracket and a new unit installed.

As heretofore mentioned, the scraper blades are reciprocated axially relative to the transfer and the pattern rolls. A plunger 130 is mounted in the base of the decorating unit in axial alignment with the rod 114. Secured to this plunger are a pair of pins 131, which extends upwardly through suitable openings 132 in the top of the base and are in alignment with a corresponding pair of pins 133, which are slidably mounted in the scraper mounting bracket 119. The plunger 130, and therefore both pair of pins, are reciprocated by a lever 135. This lever is pivoted as at 136 to the base 17 and is provided with a roller 137, which is engaged by a cam 138, carried by a shaft 139, journaled in the frame and driven by a bevelled pinion 140, which meshes with the bevelled pinion 54, heretofore described. It will be noted that the operation of the scraper blade in one direction, namely, the upper direction, is effected by the cam 138. A spring 141 embracing the upper end of the scraper roll shaft and retained in position thereon by a washer 142 serves to maintain the scraper blades normally in their lowermost position and the roller 137 against the cam. By reason of the two part pins 131-133, the scraper unit may be tilted, as shown in Fig. 3, without interference with the operation of the mechanism which reciprocates the blades.

The material removed from the rolls by the scraper falls to the top of the base 17 and through a conduit 150 into a reservoir 151. A pump 152, operated by a cam 153 on the cam shaft 139, returns the ink to the reservoir 105 heretofore described.

The two decorating units 15 and 16 are joined at their upper ends by an adjustable spacing bar to maintain the distance between the units fixed, once the bar has been adjusted. This bar is best illustrated in Figs. 1 and 2 and comprises two members 160 which are secured to respective units as at 161. One of the bars is provided with a pair of slots 163 to enable the bars to be clamped together in an adjusted position by the clamping bolts 164 carried by the other.

I claim:

1. In a surface decorating machine, a pair of spaced frame members, a shaft supported by one of said frame members, means to rotate said shaft, a second shaft rotatably journaled on said frame members and in axial alignment with said first named shaft, a decorating roll carried by and splined to said second named shaft intermediate said frame members, said second named shaft being removable from said frame members and said roll by an axial movement, and separable means to effect a driven connection between said shafts when the second named shaft is in position in said roll and frame members.

2. In a surface decorating machine, a pair of spaced frame members, a gear journaled in one of said frame members, a shaft extending through said gear and having a splined connection therewith, said shaft being journaled in the other of said frame members and removable from said frame members and said gear by an axial movement, a pattern intermediate said frame members and having a splined connection with said shaft, a transfer roll journaled between said frame members, a power-operated driving means, a separable connection between said means and said shaft, and a removable driving connection between said gear and said transfer roll.

3. In a surface decorating machine, a substantially vertically extending pattern roll, a substantially vertically extending transfer roll, a common base for said rolls, driving mechanism carried by said base including a drive shaft in alignment with the axis of the pattern roll, a top frame member disposed above said rolls and secured to the base by a vertically extending frame member, a roll shaft having its opposite ends journaled in the base and top frame member respectively, said roll shaft passing through and being splined to said pattern roll, and a separable driving connection between the driving and roll shafts; said roll shaft being withdrawable

by axial movement from said base and pattern roll to permit removal of said pattern roll.

4. In a surface decorating machine, a substantially vertically decorating roll, a base for said roll, a top frame member disposed above said roll and secured to the base by a vertically extending frame member, a roll shaft having its opposite ends journaled in the base and top frame member respectively, said roll shaft passing through and being splined to said pattern roll, driving means mounted on said base, a separable driving connection between the driving means and roll shaft, said roll shaft being separable from said driving means and withdrawable from said base and said pattern roll by an axial movement of said shaft, and means to support said pattern roll in a substantially vertical position when the roll shaft is withdrawn.

5. In a surface decorating machine, upper and lower spaced frame members, a substantially vertically extending pattern roll and a substantially vertically extending transfer roll mounted between said frame members, power operated means mounted beneath said lower frame members, a shaft journaled in said frame members and extending axially through said pattern roll, a driving connection between said shaft and said power operated means, a driving connection between said shaft and said pattern roll, said transfer roll having a shaft extending upwardly above such roll and the upper frame member, a third shaft extending upwardly from said upper frame member, a gear in axial alignment with and driven by said pattern roll shaft, a supplemental frame, sprockets mounted on the supplemental frame, a drive chain connecting said sprockets, a gear secured to one of said sprockets and adapted and arranged to be driven by the first named gear, said sprockets being adapted and arranged to coact with the transfer roll shaft and the third shaft respectively, and a separable driving connection between the transfer roll shaft and the other sprocket.

6. In a decorating machine, a base, a driving member carried by said base, a vertically extending shaft journaled in said base, a pattern roll mounted on said shaft, a driving connection between said member and said shaft, means to apply ink to said pattern, a second vertically extending shaft rotatably mounted on said base, a transfer roller mounted on said shaft, a driving connection between said second named shaft and transfer roller, a gear at the upper end of the pattern roll shaft and driven thereby, a vertically extending post supported by said base, a gear on said post and drivingly connected with the first named gear, a sprocket drivingly secured to second named gear, a sprocket mounted on said transfer roll shaft, a separable driving connection between said last mentioned sprocket and said transfer roll shaft, a driving connection between said sprockets, a common bearing member interconnecting said sprockets, whereby said sprockets and the gear carried thereby may be removed as a unit to facilitate removal of the transfer roll with its shaft.

7. In a decorating machine, a base having a horizontal guideway thereon, a pair of decorating units movably mounted on said guideway, means to move said units toward and away from each other, each unit including a lower frame member engaging said guideway and an upper frame member spaced therefrom, and a substantially vertically extending decorating roll disposed between and supported by said guideway,

there being an adjustable member extending between the upper frame members of said units, and means to lock said members in an adjusted position thereby to maintain said decorating rolls a predetermined position apart.

8. In a decorating machine, a frame, a decorating roll carried thereby, means to supply fluid coloring material to said roll, a scraper to remove excess color from one end of said roll, said scraper being pivotally connected to said frame, the axis of said pivot extending in a direction substantially normal to the direction of the axis of the roll, and the other end of said scraper being releasably connected to said frame whereby said scraper may be rocked about its pivot to move the scraper out of alignment and out of contact with the roll.

9. In a decorating machine, a frame, a decorating roll carried thereby, means to supply fluid coloring material to said roll, a movable scraper to remove excess color from said roll, means to move the scraper out of contact with said roll, one end of said scraper being pivotally connected to said frame, the axis of said pivot extending in a direction substantially normal to the direction of the axis of the roll, and the other end of said scraper being releasably connected to said frame whereby said scraper may be rocked about its pivot to move the scraper out of alignment and out of contact with the roll independent of the operation of said means.

10. In a decorating machine, a frame, a pattern roll carried thereby, means to supply fluid coloring material to said pattern roll, a transfer roll in peripheral contact with said pattern roll and supported by said frame, a bracket having a pivotal connection with said base, the axis of the pivotal connection extending in a direction substantially normal to the axes of the rolls, a rod secured to the bracket with its axis parallel with the axes of said rolls, a scraper for one of the rolls, resilient means to maintain said scraper in contact with the roll it is adapted to scrape, and a releasable latch for the end of the rod remote from the bracket to enable the scraper to be moved away from the roll last mentioned.

11. In a decorating machine, a frame, a pattern roll carried thereby, means to supply fluid coloring material to said pattern roll, a transfer roll in peripheral contact with said pattern roll and supported by said frame, a bracket having a pivotal connection with said base, the axis of the pivotal connection extending in a direction substantially normal to the axes of the rolls, a rod carried by said bracket with its axis normally parallel with the axes of said rolls, a pair of scrapers pivotally and slidably mounted on said rod, resilient means to swing the scrapers on said rod and maintain said scrapers in contact with respective rolls, a spring carried by said rod and adapted to move said scrapers in one direction, a pair of pins reciprocally carried by said bracket and engaging respective scrapers, a second pair of pins reciprocally mounted in said frame, means to reciprocate said last named pins, and a releasable latch adapted and arranged to hold the bracket in a position such that the rod extends parallel with the axes of said rolls and the pins carried thereby are in axial alignment with the pins of the frame.

12. In a decorating machine, a frame, a pattern roll carried thereby, means to supply fluid coloring material to said pattern roll, a transfer roll in peripheral contact with said pattern roll and supported by said frame, a bracket having



5 a pivotal connection with the base, the axis of the pivotal connection extending in a direction substantially normal to the axes of the rolls, a rod secured to said supplemental frame with its axis normally parallel with the axes of said rolls, a scraper mounted for axial movement on said rod, resilient means to maintain said scrapers in

contact with the roll it is adapted to scrape, means to reciprocate the scraper on the rod, a releasable latch adapted and arranged to hold the rod in said normal position, said rod being removable from the bracket when swung out of its normal position. 5

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