

March 23, 1965

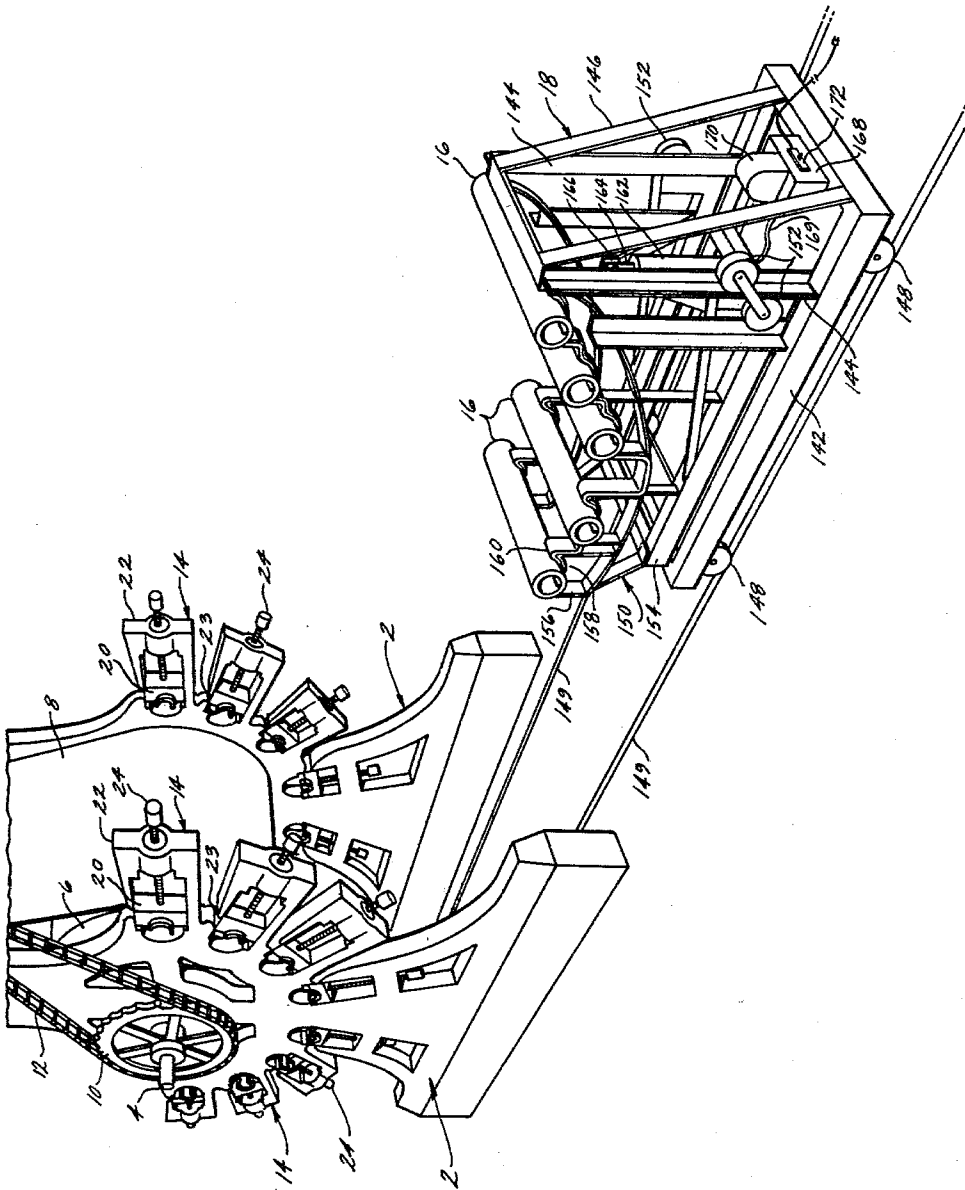
R. J. VERLIK

3,174,724

ROLL CARRIER AND ELEVATING DEVICE FOR PRINTING APPARATUS

Filed Aug. 10, 1962

5 Sheets-Sheet 1



INVENTOR.
ROBERT J. VERLIK

BY

Peter J. Costas

ATTORNEY

March 23, 1965

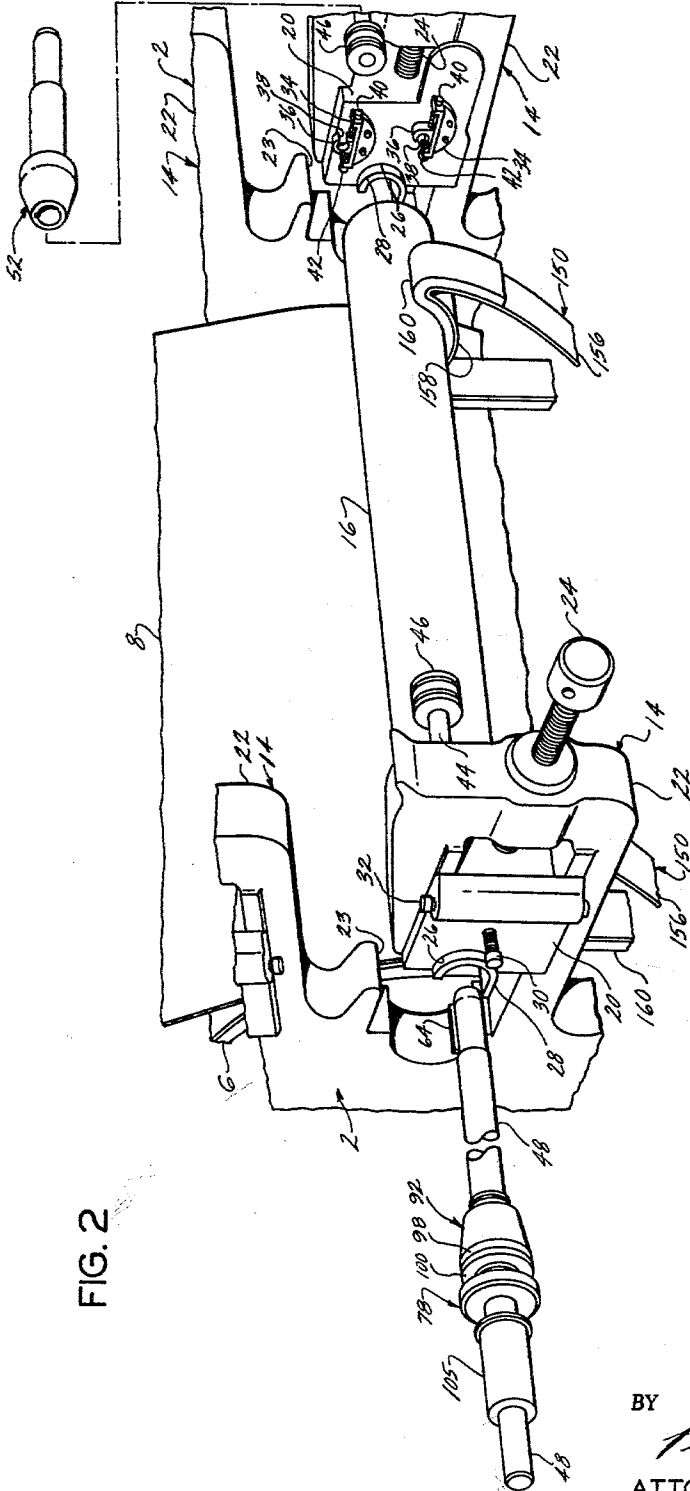
R. J. VERLIK

3,174,724

ROLL CARRIER AND ELEVATING DEVICE FOR PRINTING APPARATUS

Filed Aug. 10, 1962

5 Sheets-Sheet 2



INVENTOR
ROBERT J. VERLIK

BY

Peter J. Costello

ATTORNEY

March 23, 1965

R. J. VERLIK

3,174,724

ROLL CARRIER AND ELEVATING DEVICE FOR PRINTING APPARATUS

Filed Aug. 10, 1962

5 Sheets-Sheet 3

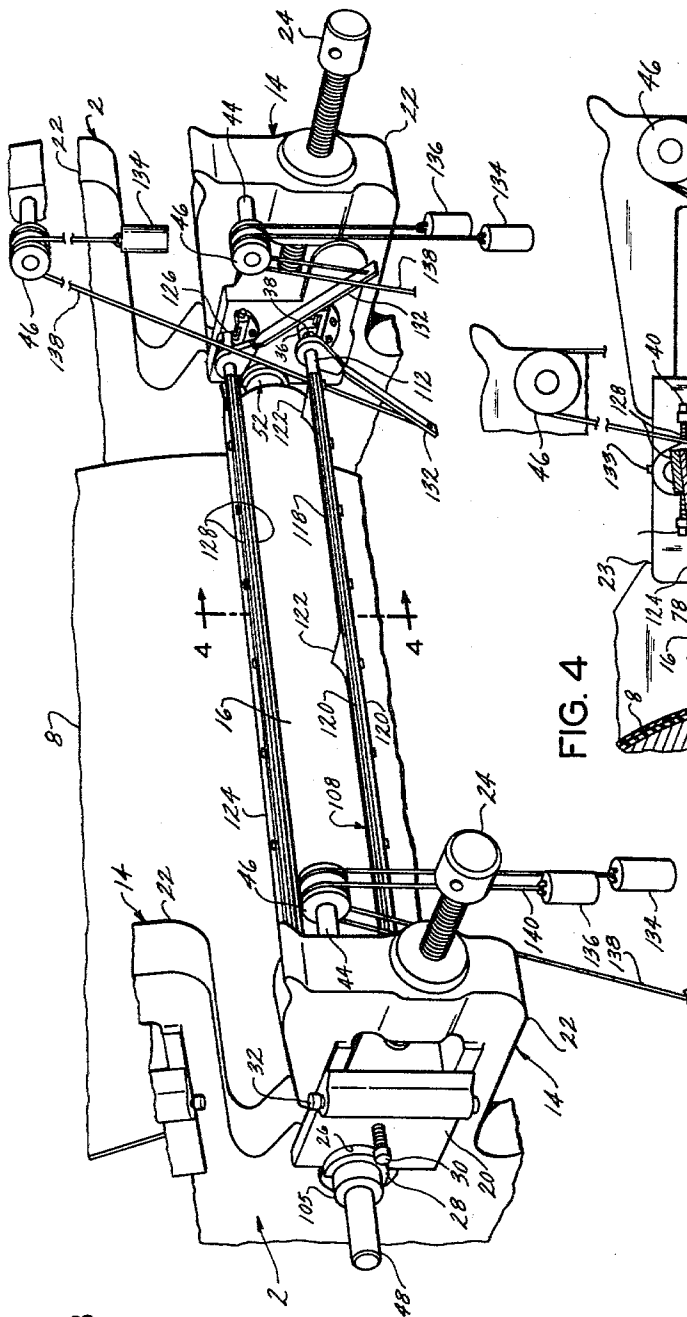


FIG. 3

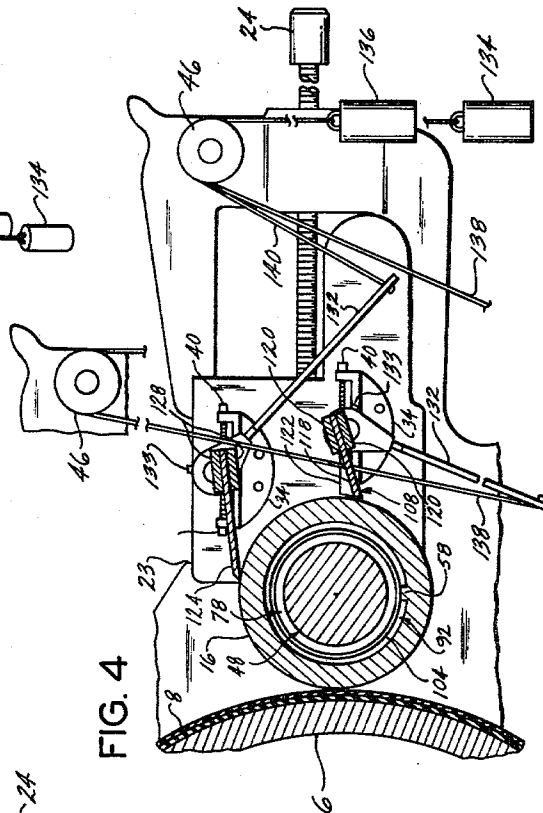


FIG. 4

INVENTOR.
ROBERT J. VERLIK

BY

Peter L. Costas

ATTORNEY

March 23, 1965

R. J. VERLIK

3,174,724

ROLL CARRIER AND ELEVATING DEVICE FOR PRINTING APPARATUS

Filed Aug. 10, 1962

5 Sheets-Sheet 4

FIG. 5

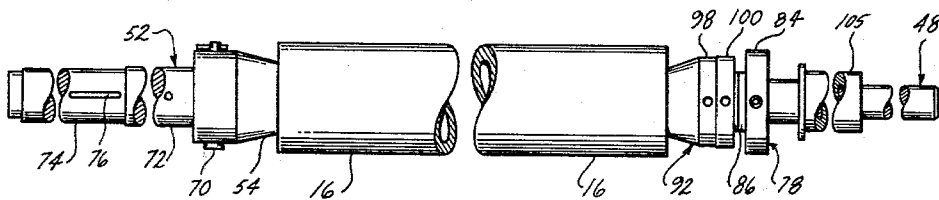


FIG. 6

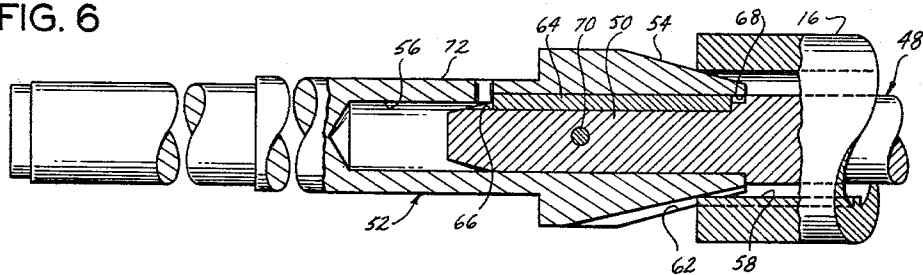
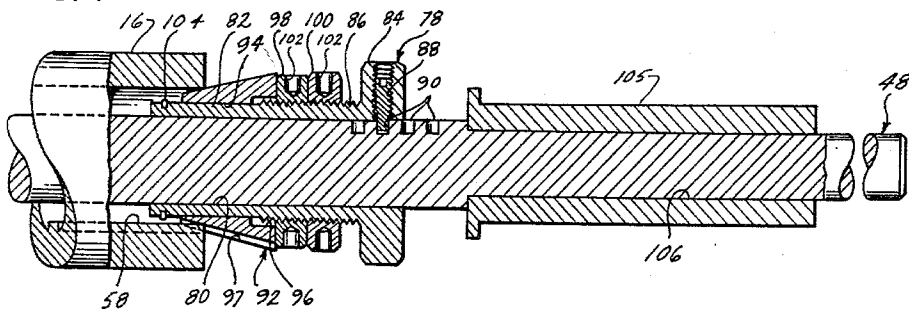


FIG. 7



INVENTOR
ROBERT J. VERLIK

BY

Peter J. Costas

ATTORNEY

March 23, 1965

R. J. VERLIK

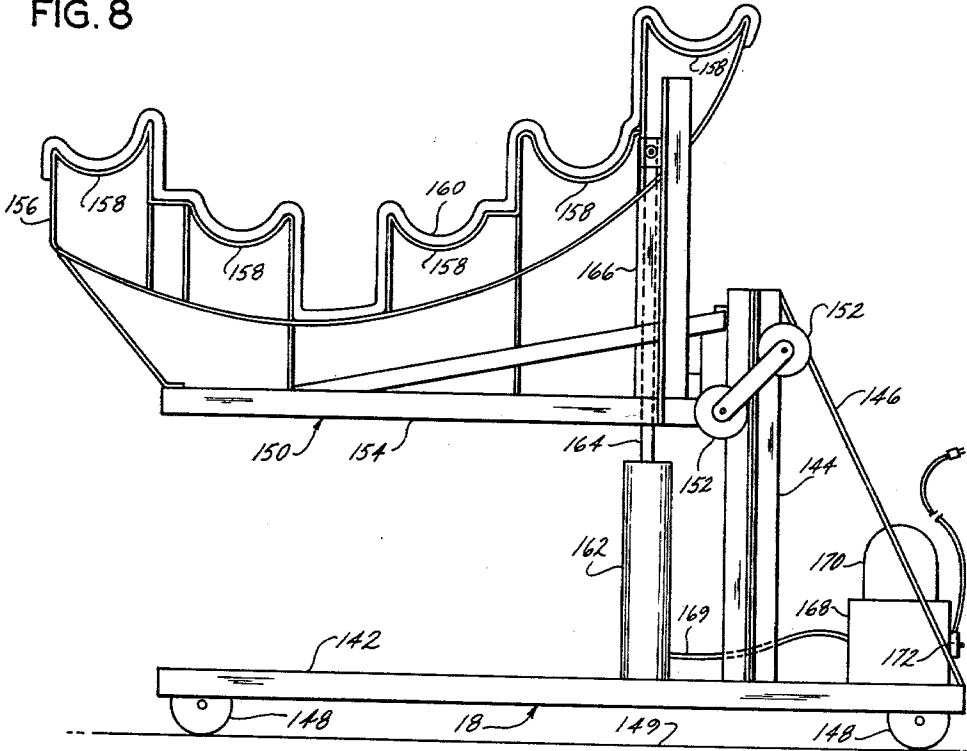
3,174,724

ROLL CARRIER AND ELEVATING DEVICE FOR PRINTING APPARATUS

Filed Aug. 10, 1962

5 Sheets-Sheet 5

FIG. 8



INVENTOR.
ROBERT J. VERLIK

BY

Peter L. Costas

ATTORNEY

1

3,174,724

ROLL CARRIER AND ELEVATING DEVICE FOR PRINTING APPARATUS

Robert J. Verlik, West Stafford, Conn., assignor to Stafford
Printers, Inc., Stafford Springs, Conn., a corporation of
New York

Filed Aug. 10, 1962, Ser. No. 216,160

7 Claims. (Cl. 254—133)

The present invention relates to printing apparatus and more particularly, to an improved apparatus for handling and mounting engraved printing rolls in the printing textiles and the like which is particularly adapted to the printing of short lengths or strike-offs of a pattern for evaluation of the pattern and color.

Textile printing apparatus employs a plurality of engraved printing rolls which are spaced about the periphery of the backing cylinder to apply to the fabric the individual colors which combine to produce the printed pattern. Conventionally, the printing rolls are rotatably mounted upon the frame of the apparatus by shafts which extend therethrough and seat in bearings secured in bearing supports or center boxes upon the frame, and the shafts are driven by fitting gears on one end thereof which mesh with the powered star gear. Generally, the shafts for the printing rolls are of solid steel dimensioned to fit tightly within the cylindrical printing roll and provide firm support therefor, and these heavy shafts are driven through the cylinder by a hydraulic press. The weight of the resultant assembly requires each roll assembly to be handled and hoisted individually onto the frame by block and tackle or a hydraulic lift and further requires three men for efficiency in the installation operation.

Conventionally, the color or dye is fed onto the surface of the printing roll by a brush which rotates through a color box containing a volume of the desired color. Because of the nature of the brush and the surface area to be covered, it is necessary to introduce 3 to 4 gallons of color into the color box to print even a small length of fabric. If it is desired to alter the color being delivered to a feed roll, it is necessary to remove and clean the feed brush and color box as well as to clean the surface of the printing roll and associated doctor blade, the cleaning operation generally requiring about ten to twenty minutes per roll.

In printing textiles, it is a desirable trade practice to run a strike-off or sample length of the pattern using the engraved rolls and the proposed dyes for preliminary customer or designer approval. Since the engraved rolls are of large width, a production-type machine ideally is required for the striking-off operation; however, it has been proposed to use a test apparatus wherein the rolls would be mounted individually for a sample strike-off, although subject to the objection that the colors would not be true to the production operation wherein "wet" color is printed upon "wet" color.

Because of the time required to insert the shafts in the printing rolls and to mount the printing rolls upon the frame, it has been customary to make the commercial run after receiving customer or designer approval and to maintain the machine idle while awaiting such approval. Since the customer or designer very frequently requires the color or shade of the several dyes to be varied before giving approval, it is necessary to remove and clean the color boxes and brushes involved as well as to clean the surfaces of the roll and doctor blade. About one hour is expended for each sample strike-off with a

2

change in color until approval is obtained. Oftentimes as much as eight hours, and even sixteen hours, will be required to set up the rolls and obtain approval for the production run with a resultant cost in lost production from the inoperative machine. Additionally, each change in color will result in a loss of substantially all the color added to the color box and taken up by the brush with a further considerable expense due to the costs of the dyes.

It is an object of the present invention to provide novel and improved apparatus for printing textiles and the like for facile mounting of the printing rolls to enable rapid assembly to the frame and particularly adapted to the printing of sample strike-offs of patterns.

A specific object is to provide a roll-carrying mechanism in combination with the printing apparatus for simultaneously elevating all the printing rolls into desired position to facilitate and accelerate the mounting operation.

A further specific object is to provide such an improved roll carrying mechanism for rapidly mounting printing rolls which is adapted to conventional textile printing apparatus to enable facile use thereof for printing samples or strike-offs to reduce down time on commercial production equipment.

Other objects and advantages will be apparent from the following detailed description and claims and the attached drawing wherein:

FIGURE 1 is a fragmentary perspective view of a conventional textile printing apparatus of a type with which the present invention is desirably employed and of a roll-carrying apparatus of the present invention for use therewith;

FIGURE 2 is a fragmentary perspective view to an enlarged scale showing the printing apparatus and roll-carrying apparatus during the assembly operation;

FIGURE 3 is a similar fragmentary perspective view of the assembled apparatus;

FIGURE 4 is a fragmentary cross-sectional view to an enlarged scale along the line 4—4 of FIGURE 3;

FIGURE 5 is a fragmentary front view to an enlarged scale of the printing roll assembly;

FIGURE 6 is a fragmentary front elevational view to an enlarged scale of the fixed roll mounting end of the printing roll assembly in partial section to reveal internal construction;

FIGURE 7 is a similar fragmentary front elevational view of the adjustable roll mounting end of the printing roll assembly; and

FIGURE 8 is a side elevational view of the roll-carrying apparatus in elevated position.

It has now been found that the foregoing and related objects can be readily attained by a method and apparatus wherein a plurality of printing rolls are initially arranged on a carrier to establish the desired print pattern. The roll-supporting cradle portion of the carrier is dimensioned and configured to locate simultaneously the plurality of printing rolls in substantial alignment with the bearing supports upon the frame of the cooperating printing apparatus. After the desired pattern has been established, the carrier is moved into registry under the print apparatus and the cradle portion is elevated to locate simultaneously the plurality of rolls in substantial alignment with the bearing supports. Roll-mounting assemblies are rotatably seated in the bearing supports to rotatably mount the printing rolls upon the apparatus, and the cradle portion is then lowered. Lastly, the carrier is removed from under the printing apparatus. The steps may be inverted for removal of the rolls from the appa-

ratus, and two or more carriers are desirably provided for most speedy operation.

To supply small quantities of color to the printing roll, a color feed member is provided and mounted on the frame with the inner end of its bottom wall in close proximity to the surface of the printing roll to permit color received therein to flow onto the surface of the roll by gravity. One or more vertical partitions in the feed member are provided to limit the axial length of the printing roll covered by a single color and to enable the provision of several distinct colors across the axial length of the printing roll.

Referring now in detail to FIGURE 1 of the drawings, a conventional printing apparatus for textiles and the like is therein illustrated and includes the frame 2 on which the shaft 4 rotatably mounts the backing cylinder 6 about which the cloth or backing grey 8 extends. The gear 10 and chain 12 drive elements of the apparatus in the superstructure (not shown) in accordance with conventional practice. Outwardly of the backing cylinder 6 and generally along the lower half of the periphery thereof, the frame 2 is provided with a plurality of pairs of bearing supports generally designated by the numeral 14 which are adapted to rotatably support a plurality of engraved printing rolls 16 of generally cylindrical configuration which are being transported on the roll carrier generally designated by the numeral 18 and which will be described more in detail hereinafter.

Other conventional elements of the apparatus have not been shown for simplicity and clarity of illustration including the spider or main gear and the fitting gears which drive the individual printing rolls.

Referring now to FIGURE 2 wherein the bearing supports 14 are illustrated in greater detail, each of the several pairs of bearing supports is comprised of a fitting box 20 which is slidably mounted in the generally U-shaped support arm 22 of the frame 2, and is movable towards and away from the backing cylinder 6 by the lead screw 24. In the retracted position of the fitting box 20, the access slot 23 provided by the shorter upper leg of the U-shaped support arm is open for passage of elements therethrough. The inner face of the fitting box is provided with a transversely extending arcuate groove 26 in which is seated the bearing liner 28. As seen at the left of FIGURE 2, the bearing liner 28 is movable axially relative to the fitting box 20 and backing cylinder 6 by the backing-out screw 30 and the entire fitting box 20 is movable generally vertically within the support arm 22 or tangentially of the backing cylinder 6 by the side screw 32. On the inner sides of the fitting boxes 20 are provided support brackets 34 and slidably supported thereon are the holders 36 which have a generally arcuate notch 38 therein. The holders 36 are slidable towards and away from the bearing liner 28 by the adjusting screws 40 which are rotatably seated in the support brackets 34 and threadably engaged with the holders 36. The collars 42 limit axial movement of the adjusting screws 40 relative to the brackets 34 so that rotation thereof moves the holders 36 along the threaded screws 40. Mounted on the inner sides of the support arms 22 are shafts 44 which rotatably support pulley members 46 for a purpose to be described hereinafter.

The mounting assembly for rotatably supporting the printing rolls 16 in the bearing liners 28 of the bearing supports 14 is illustrated in detail in FIGURES 5-7. Extending through the generally cylindrical roll 16 is a shaft 48 of generally cylindrical configuration and of reduced diameter relative to the inner diameter of the roll 16 so as to provide substantial radial spacing therebetween.

As seen in FIGURE 6, on the star or main gear side (the right side in the drawings), the shaft 48 is provided with an end portion 50 of reduced diameter. The first or fixed mandrel generally designated by the numeral 52 has a generally frustoconical portion 54 which ex-

tends into the end of the roll 16 and has a cylindrical bore 56 extending therein in which the shaft end portion 50 is received in tight-fitting engagement. Relative rotation between the mandrel 52 and roll 16 is prevented by an axially extending key 58 integrally formed on the inner surface of the roll 16 which seats in an axially elongated slot or keyway 62 in the outer surface of the mandrel 52. Relative rotation between the mandrel 52 and shaft 48 is prevented by the key 64 which seats in aligned axially extending slots or keyways 66, 68 in the outer surface of the shaft 48 and in the bore 56 of the mandrel 52, respectively. Axial movement of the mandrel 52 relative to the shaft 48 in the direction of the roll 16 is limited by the abutment of the inner end of the mandrel 52 against the shoulder formed at the inner extremity of the reduced end portion 50 of the shaft and movement away from the roll is prevented by the locking pin 70 which extends through the mandrel 52 and shaft 48 and which also serves to position the mandrel on the shaft. The cylindrical bearing portion 72 of the mandrel 52 rotatably seats in the bearing liner 28 and, as best seen in FIGURE 5, the outer cylindrical gear portion 74 thereof has an axial keyway or groove 76 therein which is adapted to receive a key (not shown) for locking the fitting gear (not shown) thereon in full assembly of the apparatus.

On the opposite end of the shaft 48 is a sleeve generally designated by the numeral 78 which has a cylindrical bore 80 extending therethrough dimensioned for tight-fitting engagement upon the shaft. The cylindrical end portion 82 on the shaft extends inwardly of the end of the roll 16 and is spaced from a radial collar 84 at the opposite end thereof by an externally threaded portion 86. A locking screw 88 in the collar 84 seats in one of the several axially spaced radial apertures 90 in the shaft to lock the sleeve against axial movement on the shaft 48, and variations in length or distortion of the roll ends can be compensated by varying the location of the sleeve on the shaft to ensure firm fit.

Slidably mounted on the cylindrical end portion 82 of the sleeve 78 is the movable mandrel 92 which is of generally frustoconical configuration and has a cylindrical bore 94 extending therethrough dimensioned to provide a tight sliding fit upon the sleeve with a counterbore 96 at its outer end to permit extension over the threaded portion 86 without interference therewith. The mandrel 92 extends inwardly of the end of the roll 16 and has an axially elongated slot or keyway 97 in its outer surface in which is received the key 58 in the roll 16 to prevent relative rotation therebetween. A take-up or adjusting nut 98 adjacent the mandrel 92 and a locking nut 100 are threadably engaged upon the threaded portion 86 of the sleeve to move the mandrels and roll into tight assembly and maintain tight assembly during operation of the apparatus. More particularly, the adjusting nut 98 is rotated to drive the several components into tight assembly and then the locking nut 100 is rotated against the adjusting nut 98 to maintain the mandrels and roll in tight assembly. Radial apertures 102 are provided in the nuts 98, 100 for insertion of wrenches or other suitable tools to apply turning force thereto.

To limit movement of the mandrel 92 thereon, a locking ring 104 is seated in a circumferential groove at the inner end of the sleeve 78. A flanged bushing 105 is provided on the reduced end portion 106 of the shaft 44 to equal the diameter of the bearing portion 72 of the fixed mandrel 52 and seat snugly in the bearing liner 28, thus completing the roll-mounting assembly.

Referring now in detail to FIGURES 3 and 4, a gravity color feed member generally designated by the numeral 108 has projecting support rods 112 at its ends which seat rotatably in the arcuate notch 38 of the lower holder 36. The color feed member 108 has a planar bottom wall 118 which has a beveled inner edge and slopes downwardly towards the printing roll 16 and is

carried between the clamping plates 120 along its outer edge. At the ends and intermediate the length of the bottom wall 118 are provided vertical walls 122 defining a plurality of compartments therebetween so that colors or dyes placed therein will be confined and flow by gravity along the downwardly sloping bottom wall 118 onto the printing roll 16. To remove excess color from the surface of the printing roll 16, a doctor blade 124 is provided which has a beveled inner edge wiping the surface of the roll 16. The blade 124 is carried between clamping plates 128 and support rods 126 at its ends seat rotatably in the arcuate notches 38 of the upper holders 36.

The inner edges of the color feed member 108 and doctor blade 124 are biased against the surface of the printing roll 16 by dogs 132 which are locked on their respective support rods by set screws 133 and are subjected to the torque of weights 134, 136 on the ends of the cords 138, 140 extending about the pulley members 46. By use of weights 134, 136, the pressure exerted by the inner edges of the color feed member 108 and the doctor blade 124 on the surface of the printing roll 16 can be readily adjusted to ensure a close fit without injury to the surface of the roll.

Referring now to FIGURES 1 and 8, the roll carrier 18 has a frame or carriage 142 with a pair of upright posts 144 braced by the diagonal straps 146 and which is supported upon wheels 148 for movement along the tracks 149. The support member 150 is slidably supported for vertical movement on the upright posts 144 by the tied pairs of rollers 152 and has a base portion 154 and a cradle portion 156. The upper surface of the cradle 156 is formed with a plurality of parallel extending concave or arcuate seats 158 for the several rolls 16 with the parallel extending centers or axes of the seats 158 and thereby the rolls 16 received therein being located along an arc opening upwardly of the carrier and conforming substantially to the arc defined by the bearing supports 14 of the printing apparatus, and the seats 158 are spaced along the arc so as to conform to the spacing between the bearing supports 14. To prevent injury to the surface of the printing rolls 16, the seats 158 have a lining 160 of soft, resilient material such as rubber or vinyl plastisol. The frame and support element are cooperatively configured and dimensioned so that each of the plurality of seats in the cradle portion will be spaced upwardly of the frame adjacent the ends thereof when the support element is in its elevated position. In this manner the ends of the roll are freely accessible for insertion therinto of associated shaft elements for mounting of the rolls in the bearing supports of the printing apparatus.

Vertical movement of the support member 150 on the frame or carriage 142 is effected by operation of a hydraulic lifter having a vertical cylinder 162 mounted on the frame 142 and a piston 164 reciprocable therein which is fixed at its upper end to the diagonal straps 166 of the support member base portion 154. When fluid under pressure is supplied to the bottom of the cylinder 162 from the reservoir 168 through the conduit 169 upon actuation of the motor 170 by the three-position switch 172, the piston 164 and thereby the support member 150 are driven upwardly.

After elevation of the support member 150, the switch 172 is moved to neutral position in which the valve for the conduit 169 is closed and the motor 170 is de-energized. The support element 150 is lowered simply by moving the switch to the third position wherein the valve for the conduit 169 is opened and the weight of the support member returns the fluid to the reservoir 168.

In operation of the apparatus of the present invention, the several printing rolls 16 are placed in seats 158 of the roll carrier 18 corresponding to the desired location about the periphery of the backing cylinder 6 to establish the desired pattern. In the initial position, the center boxes 20 are backed away from the backing cylinder 6 to

open the access slots 23 in the support arms 22. The carrier 18 is moved into position under the backing cylinder 6 and the switch 172 is moved into position to open the valve and actuate the motor 170 to supply fluid to the cylinder 162 and raise the support member 150 until the axes of the printing rolls 16 are aligned substantially with the several bearing supports 14, as shown in FIGURE 2.

The switch 172 is then moved into neutral position to continue to support the rolls 16 in the desired position during further operation. Into the end of each roll 16 opposite the star or main gear (the left side in the drawings) is inserted a shaft 48 which has been preassembled with the bushing 105 and the adjustable sleeve and mandrel subassembly until the key 58 in the roll 16 seats in the keyway 97 of the mandrel 92 and the bushing 105 is properly seated within the bearing liner 28. Into the star or main gear end of the roll (the right side in the drawings) is inserted the fixed mandrel 52 with the end of the shaft 48 fitting into the cylindrical bore 56 and the key 58 of the roll into the keyway 62 of the mandrel while the keyways 66, 68 on the shaft and mandrel respectively are aligned and locked by the key 64. The bearing portion 72 of the mandrel 52 is properly seated in the bearing liner 28 of its bearing support 14 and the locking pin 70 is inserted and fastened.

After the several rolls 16 have been mounted on the frame, the switch 172 on the carrier 18 is moved to open the valve and allow the support member 150 to descend, and the carrier 18 is then removed from the apparatus frame 2. The roll mounting assemblies are then tightened to ensure a very firm fit by using a wrench or other tool to turn the adjusting nut 98 and drive the movable mandrel 92 inwardly against the end of the roll 16 and the roll 16 against the fixed mandrel 54. The locking nut 100 is then tightened against the adjusting nut 98 to lock the assembly. The several rolls are rotated to move the pitch marks thereon (not shown) into proper position for alignment of the patterns thereon. The lead screws 24 are then tightened to move the rolls 16 against the backing gear 8 and backing cylinder 6 and then the fitting gears (not shown) are mounted on the outer gear portions 74 of the fixed mandrels 52 in meshing engagement with the star or main gear (not shown).

After the rolls 16 have been mounted and positioned, the end rods 112 of the color feed member 108 are assembled with dogs 132 and seated in the notches 38 of the lower holder 36. Any necessary adjustment of the holder 36 relative to the print roll 16 is effected by the adjusting screws 40, and weights 134 are placed on the cords 138 to adjust the rotational force on the feed member 108 and thereby the closeness of the fit between its beveled edge and the surface of the print roll. The doctor blade 124 is similarly mounted and adjusted. Those printing rolls which pass through the color before reaching the bottom wall 118 of the color feed member 108 (the rear of the machine in the drawings) do not require separate wipers or doctor blades since the bottom wall 118 will wipe the surface of the roll 16 as it passes thereby. The vertical walls 122 may be provided conveniently by plastic inserts or an inert putty so as to enable ready variation of the width of pattern being printed by a given color and to permit printing of several different colors and color combinations simultaneously. Generally, the printing of sample strike-off lengths of a yard in length and a yard in width requires only a cup of color. In running the sample strike-off, a machine speed of 3 to 10 yards per minute has been found satisfactory with a speed of about 6 to 8 yards being most advantageously utilized.

If it is desired to alter the colors, the color feed members 108 involved are pivoted to spill the excess color, and the operator then readily wipes or sponges the surfaces of the roll 16, feed member 108 and doctor blade 124 without removing any of the elements from the machine.

7

To remove the rolls 16, the color feed member 108 and doctor blade 124 are removed and the fitting gears are also removed. The fitting boxes 20 are then backed away from the backing cylinder 6 and the roll carrier 18 moved into position and elevated to seat the several rolls 16 in the seats 158. The locking pin 70 is removed from the fixed mandrel 52 which is then slid outwardly from the end of the roll. The shaft 48 and adjustable mandrel subassembly are then extracted from the other end of the printing roll and machine frame. After all the rolls have been dismounted, the support member 150 is depressed and the roll carrier 18 moved away.

By the structure and method of the present invention, it has been found that the apparatus can be fully assembled for a strike-off with a set of five printing rolls in fifteen to twenty-five minutes and disassembled in ten to fifteen minutes, most conveniently by a pair of workmen. Very small amounts of color are required for each strike-off, and a color used in a feed member can be altered in three to five minutes, thus enabling rapid variation to obtain customer or designer approval. By use of the present invention in a production-type machine separate from the normal production equipment, a number of strike-offs can be quickly effected while maintaining full production on the remaining equipment, and the sample strike-offs can be made well in advance of the time for the production run to ensure unbroken production on the commercial units.

Although but one specific embodiment of the invention has been shown and described herein, it will be understood that modifications may be made within the spirit of the invention.

Having thus described the invention, I claim:

1. A roll carrier for use with printing apparatus of the type having a plurality of cylindrical printing rolls spaced along the periphery of a backing cylinder, and axially spaced bearing supports for shaft elements supporting printing rolls, said carrier comprising a frame; a support element mounted on said frame for upward and downward movement relative thereto, said support element having a cradle portion in the upper portion thereof providing a plurality of parallel extending concave seats spaced along the upper surface thereof with the parallel extending centers of said seats being spaced along an arc opening upwardly of said carrier, each of said plurality of seats of said cradle portion being spaced upwardly of the frame longitudinally adjacent the ends thereof in the elevated position of said support element, said concave seats providing firm seating for the periphery of a plurality of associated cylindrical rolls, said cradle portion being dimensioned and configured to locate simultaneously the rolls carried thereon along an arc in axial alignment with the bearing supports of an associated printing apparatus when said support element is elevated relative to said frame, said cradle portion being configured and elevatable relative to said frame to raise the associated cylindrical rolls seated thereon from a lowered position to a mounting position wherein the rolls on said cradle portion are axially aligned with the bearing supports and with the ends of the associated rolls being freely accessible for insertion therein of associated shaft elements for mounting thereof in the bearing supports of the printing apparatus; and power means for elevating and lowering said support elements relative to said frame between said lowered and mounting positions.

2. The roll carrier of claim 1 wherein said cradle portion has a covering of relatively resilient material about the seats thereon to prevent injury to the surfaces of associated printing rolls.

3. A roll carrier for use with printing apparatus of the type having a plurality of cylindrical printing rolls spaced along the periphery of a backing cylinder, and axially spaced bearing supports for shaft elements supporting printing rolls, said carrier comprising a frame having vertical guide posts thereon; a support element mounted

8

for vertical movement on said vertical guide posts of said frame, said support element having a cradle portion in the upper portion thereof providing a plurality of parallel extending concave seats spaced along the upper surface thereof with the parallel extending centers of said seats being spaced along an arc opening upwardly of said carrier, each of said plurality of seats of said cradle portion being spaced upwardly of the frame longitudinally adjacent the ends thereof in the elevated position of said support element, said concave seats providing firm seating for the periphery of a plurality of associated cylindrical rolls, said cradle portion being dimensioned and configured to locate simultaneously the axes of associated rolls carried thereon along an arc in axial alignment with the bearing supports of associated printing apparatus when said support element is elevated relative to said frame, said cradle portion being configured and elevatable relative to said frame to raise the associated cylindrical rolls seated thereon from a lowered position to a mounting position wherein the rolls on said cradle portion are axially aligned with the bearing supports and with the ends of the associated rolls extending outwardly of the side margins of the adjacent portions of said carrier to permit substantially unobstructed access to the ends of the associated rolls for insertion therein of associated shaft elements for mounting thereof in the bearing supports of the printing apparatus; and power means for elevating said support element relative to said frame including a cylinder on said frame, a piston reciprocable in said cylinder and mounted on said support element, a conduit connected to the end of said cylinder opposite said piston and motor means for supplying fluid under pressure to the cylinder through said conduit to elevate said piston and thereby said support element.

4. In printing apparatus of the type having a frame, a backing cylinder rotatably mounted in the frame, a plurality of axially aligned pairs of bearing supports on the frame outwardly of the cylinder and spaced about the lower periphery thereof along an arc, a plurality of cylindrical printing rolls, and a plurality of shaft elements extending into the ends of the printing rolls and rotatable in the axially aligned pairs of bearing supports, the combination with said printing apparatus of a roll carrier to locate a plurality of cylindrical printing rolls supported thereon in alignment with the axially aligned pairs of bearing supports for insertion therein of the shaft elements, said carrier comprising a frame; a support element mounted on said frame for upward and downward movement relative thereto, said support element having a cradle portion providing a plurality of parallel extending concave seats spaced along the upper surface thereof with the parallel extending centers of said seats being spaced along an arc opening upwardly of said carrier, each of said plurality of seats of said cradle portion being spaced upwardly of the frame longitudinally adjacent the ends thereof in the elevated position of said support element, said concave seats firmly seating said cylindrical rolls about their periphery and locating simultaneously the axes of said rolls along an arc corresponding to that defined by the axes of said bearing supports when said support element is elevated relative to said frame, said rolls being supported on said cradle portions in the elevated position of said support element with the ends thereof spaced above the adjacent portion of the carrier frame for free access thereto and insertion therein of said shaft elements to mount said rolls in said bearing supports of the printing apparatus, said carrier being movable into and outwardly from a position underlying said backing cylinder of the printing apparatus in the lowered position of said support element, said cradle portion being elevatable relative to said carrier frame to raise said cylindrical rolls seated thereon from a lowered position spaced downwardly from said bearing supports of said printing apparatus wherein the carrier may be moved inwardly and outwardly of said backing cylinder and to an

elevated mounting position wherein the axes of said rolls are aligned with the axes of said bearing supports; and power means of raising and lowering said support element relative to said carrier frame between said lowered and mounting positions.

5 5. The printing apparatus of claim 4 wherein said cradle portion is of lesser dimension than the length of said rolls and said rolls project outwardly therefrom.

6. The printing apparatus of claim 4 wherein said cradle portion has a covering of relatively resilient material about the seats thereon to prevent injury to the surfaces of associated printing rolls.

7. The printing apparatus of claim 4 wherein track means are provided in predetermined alignment with said apparatus frame and said carrier is moveable thereon inwardly and outwardly of said apparatus frame to insure proper alignment thereof with said apparatus frame.

References Cited by the Examiner

UNITED STATES PATENTS

675,024	5/01	Sonntag	101—351
998,211	7/11	Slentz.	
1,360,377	11/20	Drange	29—464
1,907,024	5/33	Willard et al.	254—93
2,105,249	1/38	Lang	101—157
2,377,110	5/45	Smith	101—157
2,487,160	11/49	McCalley	254—93
2,558,535	6/51	Billings.	
2,668,496	2/54	Thompson	101—178
2,966,846	1/61	Lime	101—178
3,061,922	11/62	Lysett	29—464

15 WILLIAM FELDMAN, *Primary Examiner.*

MILTON S. MEHR, EUGENE R. CAPOZIO, *Examiners.*