

(No Model.)

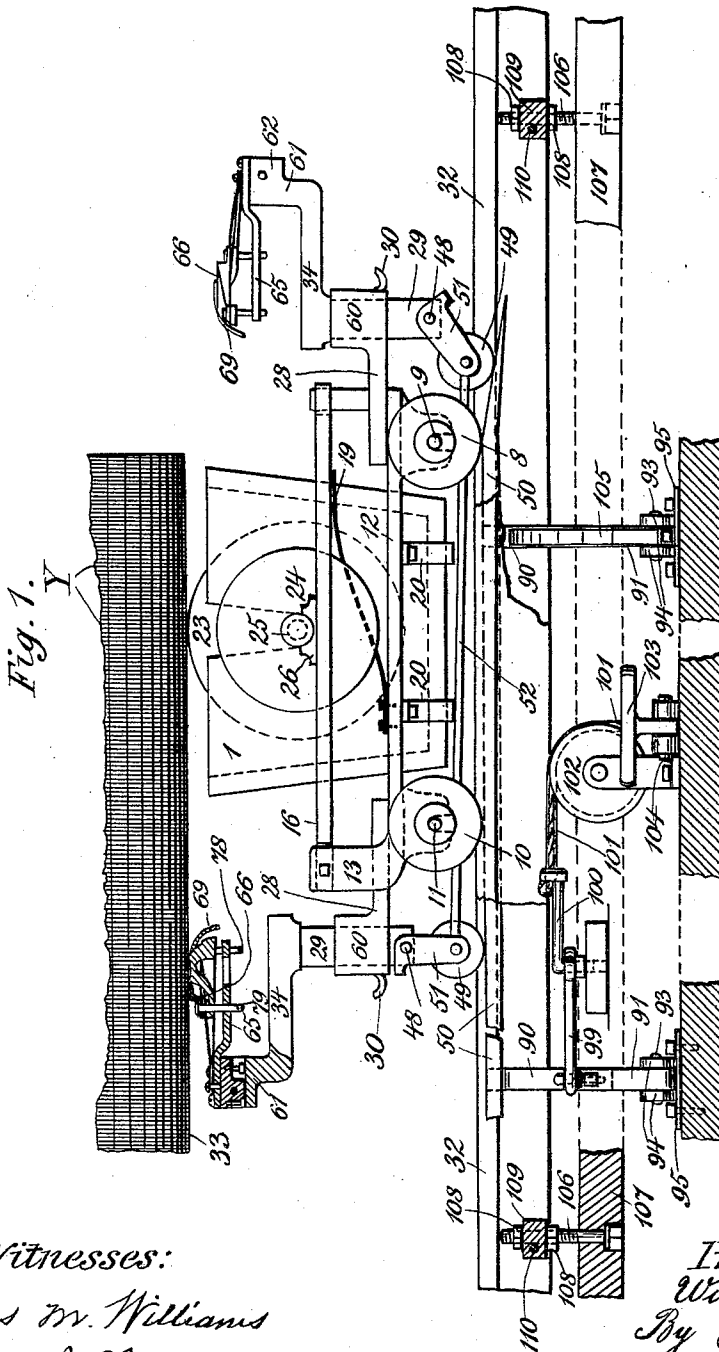
3 Sheets—Sheet 1.

W. SHAW.

APPARATUS FOR PRINTING CARPET YARNS.

No. 543,512.

Patented July 30, 1895.



Witnesses:

Rufus M. Williams
James McLane.

Inventor:

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(No Model.)

3 Sheets—Sheet 2.

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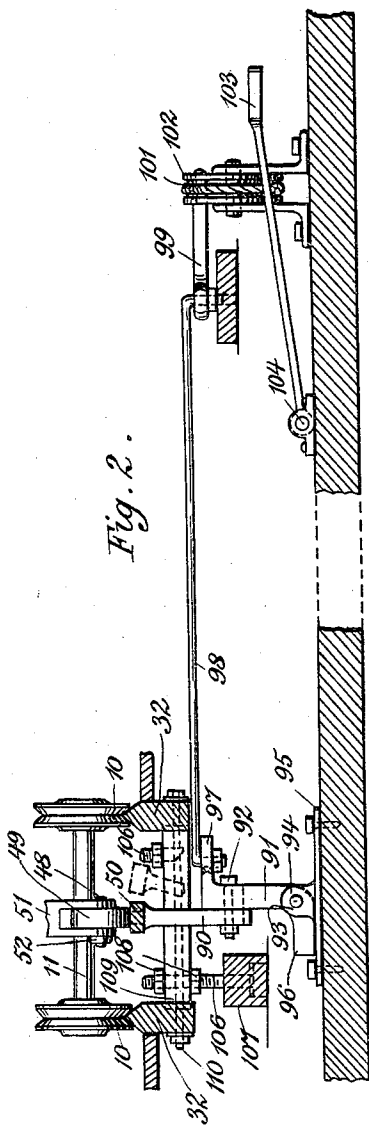


Fig. 2.

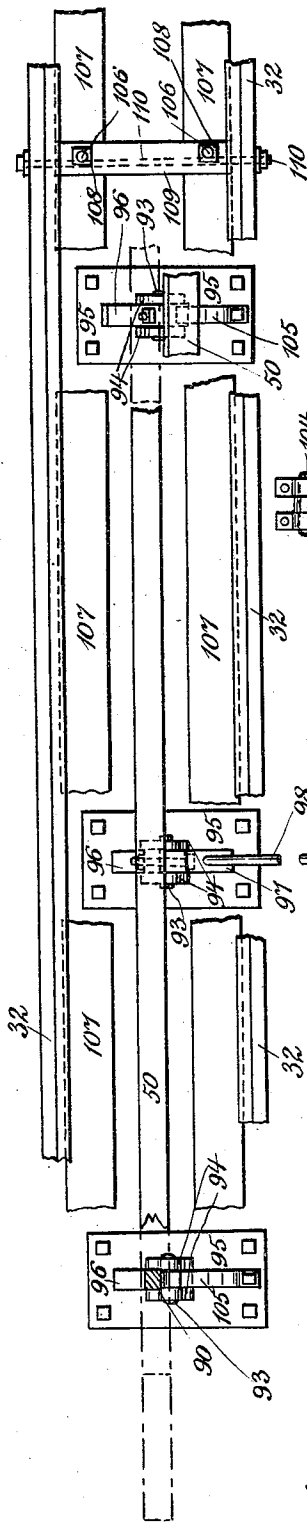


Fig. 3.

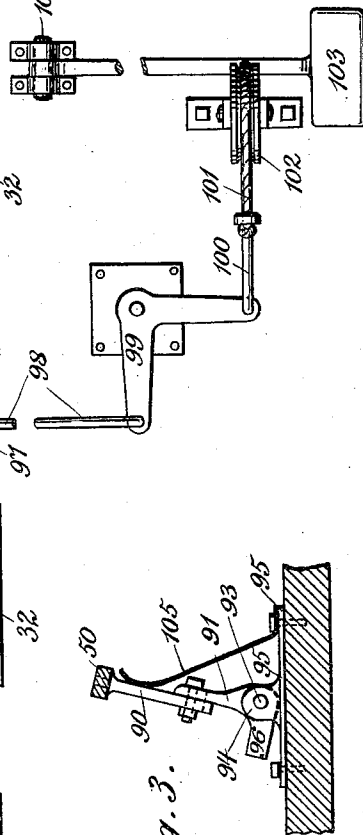


Fig. 4.

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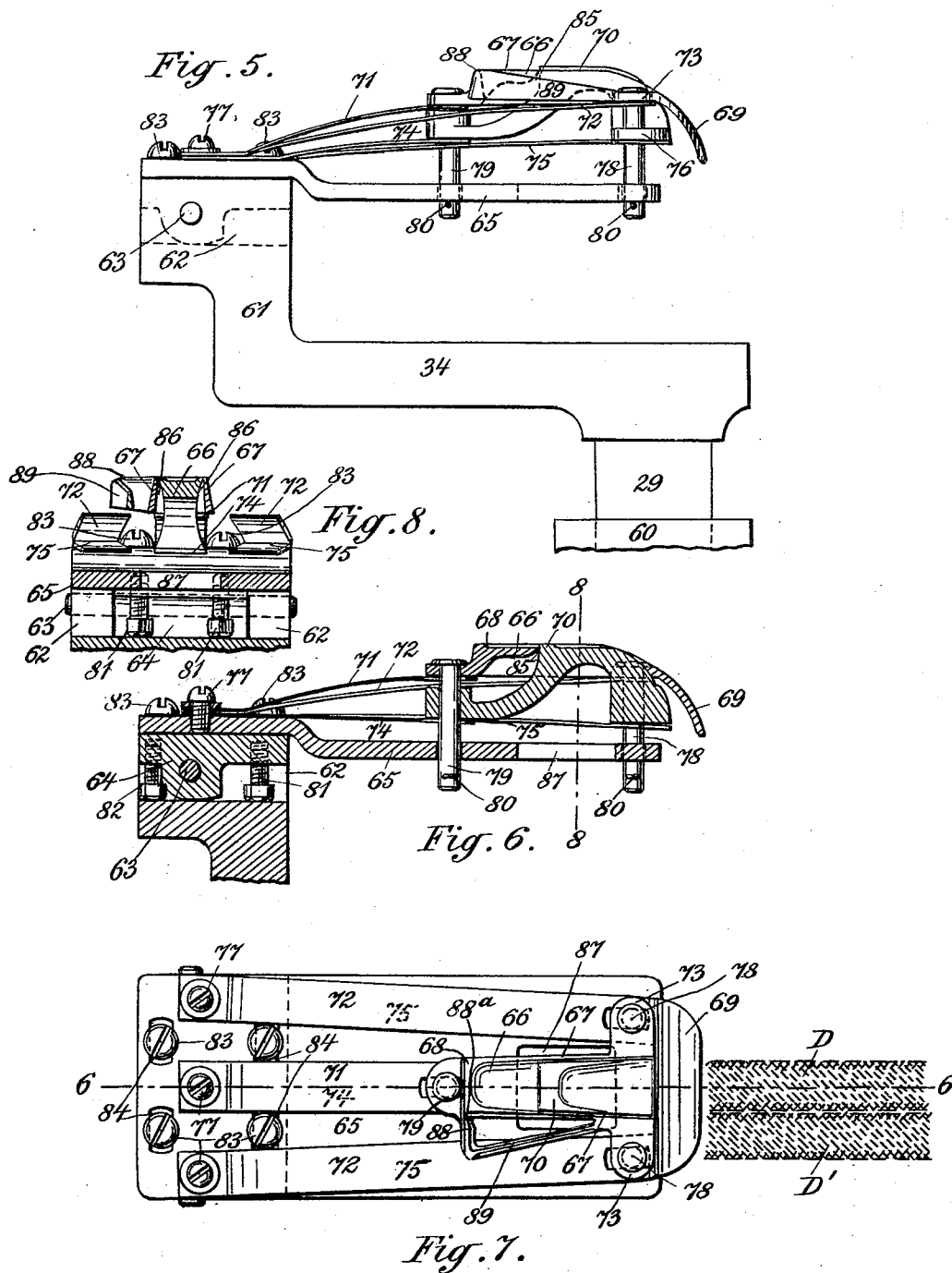
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UNITED STATES PATENT OFFICE.

WILLIAM SHAW, OF BROOKLYN, NEW YORK.

APPARATUS FOR PRINTING CARPET-YARNS.

SPECIFICATION forming part of Letters Patent No. 543,512, dated July 30, 1895.

Application filed May 6, 1895. Serial No. 548,273. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SHAW, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Apparatus for Printing Carpet-Yarns, of which the following is a specification.

My invention refers to improvements in apparatus for printing carpet-yarns, and particularly such as used in the manufacture of tapestry and velvet carpets.

The principal purpose of my invention is to provide suitable pressure devices for forcing liquid or semi-liquid coloring-matter which has been applied by a color-wheel principally to the surface of yarn wound on a drum into such yarn, and for insuring an approximately uniform distribution of this coloring-matter upon the outer surface of and throughout the interior fibers of the yarn, so that when the yarn shall afterward have been subjected to the usual steaming and washing process the same shall show uniform shades throughout.

A further purpose of my invention is to make provision for utilizing said pressure devices either in combination with and in the path of a color-wheel of single width (which, as commonly used, will produce a streak of coloring-matter about three-eighths of an inch wide) or in combination with and in the path of a color-wheel of double width, (producing a streak about three-fourths of an inch wide,) and, further, to provide an auxiliary or supplementary finishing device adapted to either accomplish uniform distribution of thin liquid coloring-matter throughout the fibers of the yarn immediately after such coloring-matter has been applied to it by the color-wheel, without the intercession of other rubbing or equalizing appliances, or, when thicker or semi-liquid coloring-matter is used, to serve as a means for finishing the rubbing and equalizing process previously performed by other suitable appliances, as will be particularly desirable where an extra wide color-wheel (covering about three-fourths of an inch in width, or the space ordinarily occupied by two neighboring narrow streaks) is employed, as more fully referred to hereinafter.

A further purpose of my invention is to provide simple and effective means for shift-

ing laterally and out of its operative position the center rail, on which normally the supports for the equalizing and rubbing appliances are made to travel, so as to accomplish this shifting operation promptly and readily and with slight effort on the part of the operator, and to provide means for automatically returning said rail to its normal position.

The means for carrying out these and other useful purposes are more fully described hereinafter and set forth in the claims.

In applying my improvements relating to the color equalizing and rubbing appliances I prefer to make use of an apparatus of the general construction illustrated in my United States Patent for apparatus for printing carpet-yarn, No. 514,282, dated February 6, 1894, particularly as far as the color-carriage, the main distributing-wheel, and the vertically-movable supports are concerned, which carry the appliances for equalizing the coloring-matter and for rubbing it into the yarn.

In the accompanying drawings, forming part of this specification, and wherein like figures of reference refer to corresponding parts throughout the different views, Figure 1 is a side elevation, partly in section, of an apparatus embodying my improvements. Fig. 2 shows a cross-section of the track on which the color-carriage is made to travel and of my improved appliances for shifting the center rail laterally which supports the color equalizing and rubbing devices; and Fig. 3 a corresponding section of the center rail, together with an end view of one of the end supports of the same. Fig. 4 is a ground plan of said rails and of the apparatus for shifting the center rail. Fig. 5 is a side elevation; and Fig. 6, a longitudinal central section of my appliances for equalizing and rubbing into the yarn the coloring-matter applied thereto by the color-wheel, such appliances being shown in their depressed operative positions, while Fig. 7 is a ground plan of the same; and Fig. 8, a vertical cross-section along line 8 8 in Fig. 6, looking toward the left. Figs. 4 to 8, inclusive, are drawn to an enlarged scale.

Corresponding figures of reference throughout the different views refer to corresponding parts.

1 is the color-box for feeding the main distributing-wheel with liquid coloring-matter.

8 8 and 10 10 are wheels attached to axles

9 and 11, respectively. The main body 12 of the color-carriage engages with such axles in the usual way.

16 is the upper lid, pivoted to abutment 13 at one end, and receiving yielding or elastic upward pressure through two leaf-springs 19, attached to main carriage-body 12, one on each side. Color-box 1 is seated within proper openings in lid 16 and main body 12, and rests on straps 20 attached to the latter. Main distributing-wheel 23 is mounted on an axle resting in open bearings on lid 16, so as to be capable of revolving within color-box 1 and to be removed from the color-carriage, together with its axle, when the color-box is lifted from the same.

24 is a grooved pulley mounted on an axle 25, which latter rests in open bearings, as 26, and is placed in line with the main axle of the distributing-wheel and normally connected therewith by a suitable sleeve-coupling in the usual manner.

30 30 are hooks fastened to brackets 28 on the carriage-body, to which the ends of a continuous rope are attached for the purpose of thereby drawing the color-carriage and the equalizing and spreading and rubbing devices, supported thereby, forward and backward along rails 32 32 and parallel with drum 33, which latter carries the carpet-yarn Y which is to be printed, and which is wound around said drum in a continuous uniform layer, in a manner indicated particularly in Fig. 1. Said continuous rope runs around suitable pulleys placed near both ends of the track, and one of said pulleys usually receives its revolving motion from a gear wheel or pulley driven from some main shaft and attached to the main frame on which the drum is mounted. While the main distributing-wheel is thus being moved along said drum it will be held in contact with the yarn by the springs, as 19, forcing upward lid 16, and with it its bearings, and the friction so produced between such wheel and such yarn will keep the former revolving while such contact and such movement of the carriage continue, and will cause said wheel thereby to bring up from the bottom of box 1 the coloring-matter, in which it is immersed, which is to be applied to the yarn. It is, however, necessary to provide means for revolving distributing-wheel 23 while it is traveling toward said drum and before it comes in contact with the yarn, so as to have that part of its periphery, which at first comes in such contact, fully supplied with coloring-matter, and this is accomplished by revolving it by means of pulley 24, whose axle 25 is coupled together with that of the color-wheel, pulley 24 being revolved by a cord in the usual manner until the coloring-wheel comes in contact with the yarn and after it passes from under the drum.

The effect of drawing the coloring-wheel along the yarn, as described, will be the production of a "streak" of coloring-matter on the yarn about three-eighths of an inch wide

and slightly exceeding in width the face of of such wheel. Owing to the pressure applied to the distributing-wheel by springs 19 the greater part of such coloring-matter thus deposited on the yarn will be forced outward by such wheel, so as to form two ridges directly adjoining the path of such face of the wheel, while the space between such ridges will be covered by coloring-matter, but not as heavily.

Heretofore appliances substantially as described above have been employed. The coloring-wheel having traveled once along the drum, the latter was revolved around its axis sufficiently to bring another part of the yarn, which was to receive the same shade, in the path of such coloring-wheel, and thus after all the streaks of the same color and shade required had been made the color-box and coloring-wheel were lifted off from the carriage and a different set of them for applying a different color, or shade of color, were applied. Finally, after the entire surface of the yarn had thus been coated, operatives, using elastic hand-scrapers, would force the coloring-matter, forming the ridges above referred to into the intervening spaces, thus equalizing, as far as practicable, the distribution of the coloring-matter and removing any excess of the same. As this scraping of the yarn, under the circumstances, would necessarily take place some time after the application of the coloring-matter thereto, such coloring-matter would, owing to capillary attraction, have in a measure soaked into the yarn and the scraping by hand would be only an auxiliary step toward printing the yarn in a uniform manner.

It has been the practice heretofore, where an isolated streak of a certain color only was applied, (the streaks next adjoining being of a different shade or color,) to leave such a streak unscraped and to depend upon the scouring process, to which the printed yarn is always subjected after being removed from the drum, to equalize the coloring-matter therein, a single streak being so narrow as to make any inequalities in the coloring-matter applied thereto inappreciable in the finished fabric. The hand-scrapers heretofore employed have been of about double the width of a single streak, the operator in one stroke covering the coloring-matter on two adjoining streaks, scraping first in one and then in the opposite direction, thereby giving a rolling motion to the yarn. With my improvements I am enabled to likewise treat two adjoining streaks of ordinary widths of the same color and shade at a time, while I omit to equalize by mechanical appliances the coloring-matter in single streaks, throwing, in the latter case, such appliances in front as well as in the rear of the distributing-wheel temporarily out of operation.

When thin liquid coloring-matter is being applied to the yarn there are sometimes employed coloring-wheels of twice the operative widths of ordinary wheels, and as this kind

of coloring substance does not require as thorough rubbing in as the thicker kind I find it possible, by means of a lateral attachment to the main rubbing devices, to cover in one operation a streak or streaks aggregating in width four single or two double streaks.

28 28 are brackets having their horizontal arms fastened to the upper face of main carriage-body 12 and extending beyond the same, so as to bring their vertical arms in front and in the rear of the color-carriage. These vertical arms, indicated by 60, form bearings within which posts 29, made of rectangular cross-sections, are made to slide. From the upper ends of these posts extend horizontal platforms 34, having at their outer ends brackets 61, provided with outer lugs 62, between which extend an axle or pivot 63, carrying a swinging lug 64 adjoining said stationary, lugs 62. To the upper surfaces of lugs 64 there is attached the rear end of a rigid platform 65, which platform is made to extend over platform 34.

66 is an equalizer having two longitudinal bars 67, adapted to extend along the outer edges of a double streak, as D, Fig. 7, or of two single streaks, so as to have their operative edges terminate where nearest to the distributing-wheel, at substantially the same distances therefrom, thus making each of said arms perform the same amount of work and guarding such coloring-matter against spreading and conducting the same toward the cross connection 68, which is shown to be constructed as a rubber having a slight depression in its upper surface, within which coloring-matter temporarily removed from the yarn by bars 67 may be retained until again applied thereto by said rubber. The ends of bars 67 nearest the color-wheel are connected by an apron 69, which extends outward therefrom laterally and curves downward to a considerable depth. This apron is provided for the purpose of gradually guiding the equalizer underneath the end of the drum and thus guarding against its arms catching hold of the yarn there and breaking it.

70 is a rubber with a flat upper surface, preferably with a depression similar to that on cross connection 68, and for a corresponding purpose. Its upper surface also curves down gradually toward the distributing-wheel. The outer upper edges of rubber 70 correspond in their outlines approximately with the inner upper edges of equalizer 66, and said rubber is adjusted to have a slight play upward and downward within the opening in the equalizer, so as to bring such upper edges of the two devices directly opposite each other and close together when their upper surfaces are placed at the same elevation, which will be the case when said devices are held in contact with the yarn on the drum by the means herein-after described.

71 is a leaf-spring supporting the rear end of equalizer 66, and 72 72 are such springs supporting two lugs 73, provided on apron 69,

while 74 is a leaf-spring supporting the rear end of rubber 70, and 75 75 are such springs supporting two lugs 76 near the front end of said rubber. All said leaf-springs are secured by bolts 77 to the rear end of platform 65, and it will be seen that, owing to the lengths of said springs, considerable play upward and downward is given to equalizer and rubber.

78 are guide-bolts passing successively through lugs 73, springs 72, lugs 76, springs 75, and platform 65, and 79 is a guide-bolt passing successively through rear end of equalizer 66, spring 71, rear end of rubber 70, spring 74, and platform 65, the lower ends of all said bolts being permitted to play through suitable holes in platform 65, except as far as limited by keys 80, inserted near their ends; or said bolts may be rigidly connected with platform 65, and the rubber, equalizer, and leaf-springs may be allowed to play along said bolts.

81 are set-screws placed underneath the front end of lug 64 for limiting and adjusting the elevation of platform 65, while, 82 are set-screws inserted underneath the rear end of said lug. I have provided said set-screws 82, as I have found in practice that in the absence of said set-screws platform 65, and with it the appliances mounted thereon, are sometimes swung backward and upward inadvertently and left so, while the color-carriage passes underneath the drum. Set-screws 82 will guard against this and against accidents arising therefrom.

83 are screws for securing platform 65 to lug 64. They pass through slots 84 placed crosswise to said platform, and it will be seen that by said means such platform and the appliances carried by it may be displaced laterally until they occupy proper positions with reference to the color-wheel.

Assuming the double streak D or the second one of two single streaks aggregating the same width were being applied by the color-wheel, the equalizer will be guided underneath the drum by apron 69 and will be held in contact with the yarn directly outside of said streak or streaks. Rubber 70 will immediately afterward be forced downward in a like manner, owing to the downward curvature of its front end, bars 67 supplying coloring-matter from the outer color-ridges to rubber 70, as well as to rear portion 68 of equalizer 66, and by these instrumentalities all the coloring-matter applied to the yarn will generally be rubbed into the yarn readily and uniformly, the depressions on the operative surfaces of rubber 70 and of the rear cross connection of the equalizer serving to temporarily store surplus coloring-matter therein, forced inward by the longitudinal arms of the equalizer or removed from the yarn by the rubbing devices until reapplied to the yarn by said appliances at points of the drum where it may be needed. To prevent, however, any slight surplus quantities of coloring-matter from lodging between and perhaps gumming

together equalizer and rubber, I make the walls of said appliances, where facing each other, recede from each other, as shown at 85, in Figs. 5 and 6 and at 86 in Fig. 8.

- 5 87 is an opening within platform 65, through which such surplus coloring-matter may be made to drop into a suitable receptacle underneath.

Owing to the action of the leaf-springs above referred to, and owing to the action of guide-bolts 78 and 79, the upper surfaces of equalizer and rubber, while changing their elevations, will still remain substantially parallel with platform 65.

- 15 I have found in practice that the best results are obtained by making the rear portion of the equalizer, which serves as a rubber, non-elastic, and to likewise make the operative portion of rubber 70 non-elastic, the employment of apparatus so constructed producing more uniform results than can be obtained by the use of portion of a leaf-spring, as a rubber, as is proposed in my Patent No. 514,282, dated February 6, 1894.

- 25 88 is a rubber in the form of an arm extending laterally from the rear portion of equalizer 66. Its upper surface is made narrow and rounding and of substantially the same elevation as the highest portion of the equalizer. It extends outward sufficiently to cover an adjoining streak D', of double width, or together with the equalizer to cover single streaks of equal aggregate width as two double streaks. Its outer end is joined to the front end of said equalizer by a connecting-bar 89 slanting inward and downward. The function of said rubber will be a different one under different conditions. If a color-wheel making streaks of single or double widths be employed (rubber 88) should happen to glide over other streaks previously made, it would have a tendency to further rub in the coloring-matter therein, and to thus impart a certain finish to said streaks. A further function is to act as a complement to equalizer 66 and rubber 70 in case a color-wheel, having an operative face equal to the widths of two single streaks, is employed. In that case while the wheel makes the first streak all the rubbing devices will be kept out of action; but when said wheel makes the second streak, traveling in the opposite direction, said rubber 88 in that case will pass over the first double streak so applied to the yarn, the equalizer 66 and rubber 70 rubbing in simultaneously the second double streak which is being applied at that time. As these extra wide color-wheels are only employed when very thin coloring-matter is being used, this employment of said rubber 88 will generally give very satisfactory results. Where thick coloring-matter is being applied by narrow color-wheels, rubber 88, when passing over streaks previously treated by equalizer 66 and rubber 70, will produce a particularly smooth surface on the colored yarn. The upper edge

of rubber 88 may be narrowed at 88^a to guard against too copious flow of coloring-matter from the equalizer outward along said edge and beyond its outer end. I prefer for such purpose to make the two edges of said rubber 88 converge toward the point where rubber 88 joins the equalizer, thereby guiding any surplus of coloring-matter back into the path of the equalizer.

48 48 are pins or pivots extending outward from the lower extremities of posts 29, to which are hinged levers 51, carrying at their lower ends rollers 49 49, journaled thereto in such a manner that such rollers will ride on a rail 50, placed underneath drum 33, and that lever 51 will be compelled to assume a vertical position underneath the support 29, which follows after the distributing-wheel, thereby bringing the appliances supported by it in operative contact with the yarn on the drum, as shown on the left-hand side of Fig. 1, while the same left-hand lever 51, when passing underneath the drum on its return trip and moving ahead of the distributing-wheel on rail 50, will assume the inclined position similar to that shown on the right-hand side of Fig. 1, its inclination, however, being in the opposite direction.

52 is a connecting-rod hinged to the journals of both rollers 49 49 and made of such length that when the levers 51 51, attached to one of the rollers, are in a vertical position those of the other roller are forced into an inclined position and thereby draw downward the post 29 to which they are attached, withdrawing at the same time the equalizer and rubber supported by such post from contact with the yarn.

The right-hand lever 51 in Fig. 1, with its roller are shown to have passed down an inclined plane which terminates rail 50. Before reaching such incline the position of said lever, while of the same general direction, will be almost level. Such an incline is provided at each end of rail 50, and near the end of drum 33, for the purpose of thereby gradually elevating the post 29 following after the color-wheel and the appliances supported by it, for the purpose of bringing the latter in operative contact with the yarn.

The equalizer and rubbers in front and in the rear of the distributing-wheel are placed in line with each other for the same reasons which govern like locations of spreaders and equalizers. (Shown in Letters Patent No. 514,282.)

For the purpose of throwing the equalizers and rubbers in front as well as in the rear of the distributing-wheel out of action while an isolated streak or the first streak of a series is being made I employ the following appliances:

Rail 50 is supported by three or more sets of sectional standards 90 91, jointed together by bolts 92 passing through suitable slots in said standards, whereby said rail 50 may be

raised and lowered and adjustment of the equalizing and rubbing appliances supported thereby may be obtained.

93 are pivots passing through suitable lugs 94 on horizontal plates 95, to which standards 91 are hinged.

96 are toe-pieces so extending from the lower extremities of standards 91 as to come to rest upon plates 95 when the rail 50 is in its operative position, wherein it supports the rubbing and equalizing appliances, such toe-pieces being employed to give stability to said rail in such position. Lower standard 91 underneath the middle portion of rail 50 has a flange 97 extending from its upper end, with which connects a rod 98, leading to one arm of a bell-crank lever 99, the other arm communicating by means of a rod 100 and a wire rope or chain 101 passing around part of the periphery of a grooved pulley 102, with a treadle 103 hinged to pivot 104. Against the upper standards 90, near the ends of rail 50, leaf-springs 105 are made to rest, so as to resist the lateral displacement of said rail from its operative position and to bring it back into said position when the agencies which have been employed to remove it cease to operate. When only an isolated narrow streak is being produced by the color-wheel, and it is therefore desired to keep the equalizing and rubbing appliances on both sides of said wheel from contact with the yarn the operator can accomplish this by depressing treadle 103 with his foot, whereby rail 50 will be swung laterally around pivots 93, as will readily appear from Fig. 4, and when the operator withdraws his foot from the treadle springs 105 will force said rail back into its original position.

Rails 32 are shown here to be capable of vertical adjustment for the purpose of regulating the pressure of springs 19, by means of which the color-wheel is forced against the yarn. Such adjustment is accomplished by screw-threaded bolts 106, having their heads embedded in sills 107 and provided with lock-nuts 108 108, whereby cross-beams 109, extending between rails 32 32 and fixedly secured thereto by iron rods 110, passing through said cross-beams, and with them said rails, may be raised and lowered at will.

I claim as new and desire to secure by Letters Patent—

1. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel and two rubbers having their operative portions non elastic and adjusted to simultaneously slide in the path of the wheel one behind the other, and independent means for holding each of said rubbers in contact with the yarn, substantially as set forth.

2. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel, an equalizer constructed as a two armed blade with proper cross connection and having its arms extending along and outside of the path of the wheel and a

rubber inserted between said arms and having a depression on its upper surface, substantially as set forth.

3. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel, an equalizer consisting of a heel and a two armed blade and provided with a tongue sloping from its heel toward the distributing wheel and an independent rubber inserted between said arms and provided with a depression on its upper surface, substantially as set forth.

4. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel and a rubber having an elongated operative surface extending parallel with and along the drum a stationary rigid platform, guide bolts passing through the rubber near its forward and rear end and adjusted to play in suitable holes in said platform and springs for actuating said rubber, substantially as set forth.

5. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel and a rubber, having an elongated operative surface extending along the yarn drum independent leaf springs supporting the forward and the rear end of the rubber, a rigid platform on which said springs are mounted, guide bolts passing through said springs and the platform, and connected with the rubber, substantially as set forth.

6. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel and two rubbers each actuated by independent springs, a platform, and guide bolts adjusted to play within suitable holes therein and serving for the rubbers jointly, substantially as set forth.

7. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel and an equalizer comprising two longitudinal arms having the portions nearest the distributing wheel which carry their operative edges, terminate at substantially the same distances from said wheel and a cross connection, and a rubber extending laterally from said equalizer and beyond the path of its broadest portion and provided with an operative surface of substantially the same elevation as that of said cross connection, all substantially as set forth.

8. In an apparatus for printing carpet yarns, in combination with a yarn drum, a distributing wheel and an equalizer, comprising two longitudinal arms and a cross connection, the portions of the arms nearest the distributing wheel which carry their operative edges, terminate at substantially the same distances from said wheel an arm extending laterally from said equalizer and beyond the path of said portions of the arms and provided with a narrow, rounding, upper edge, substantially as set forth.

9. In an apparatus for printing carpet yarns, in combination with a yarn drum and a distributing wheel, an equalizer comprising

two longitudinal bars and a suitable cross connection, and provided with an apron at its forward end and extending between said longitudinal bars, said apron curving downward 5 and toward the distributing wheel, for the purpose of gradually guiding the equalizer underneath said drum substantially as set forth.

10 10. In an apparatus for printing carpet yarns, in combination with the yarn drum, a distributing wheel, an equalizer comprising two longitudinal arms and a cross connection and a sliding rubber inserted between said portions of the equalizer and having its upper outer edges correspond substantially with the 15 upper and inner edges of the arms and cross connection of the equalizer, said rubber being capable of vertical displacement with reference to the equalizer, substantially as set forth.

20 11. In an apparatus for printing carpet yarns, in combination with the yarn drum, a distributing wheel, an equalizer comprising two longitudinal arms and a cross connection

and an independent sliding rubber inserted between said portions of said equalizer and 25 having its upper outer edges correspond substantially with the upper and inner edges of the equalizer, the walls of the equalizer and the rubber underneath said edges being made to recede from each other, substantially as set 30 forth.

12. In an apparatus for printing carpet yarns, in combination with the color carriage and its track, rubbing devices on suitable supports, a rail on which the same travel 35 mounted on a hinged support, bell crank mechanism 98, 99, 100, pulley 102, rope or chain 101 and treadle 103, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 19th day of 40 April, A. D. 1895.

WILLIAM SHAW.

Witnesses:

JOHN C. GULICK,
C. L. HORACK.