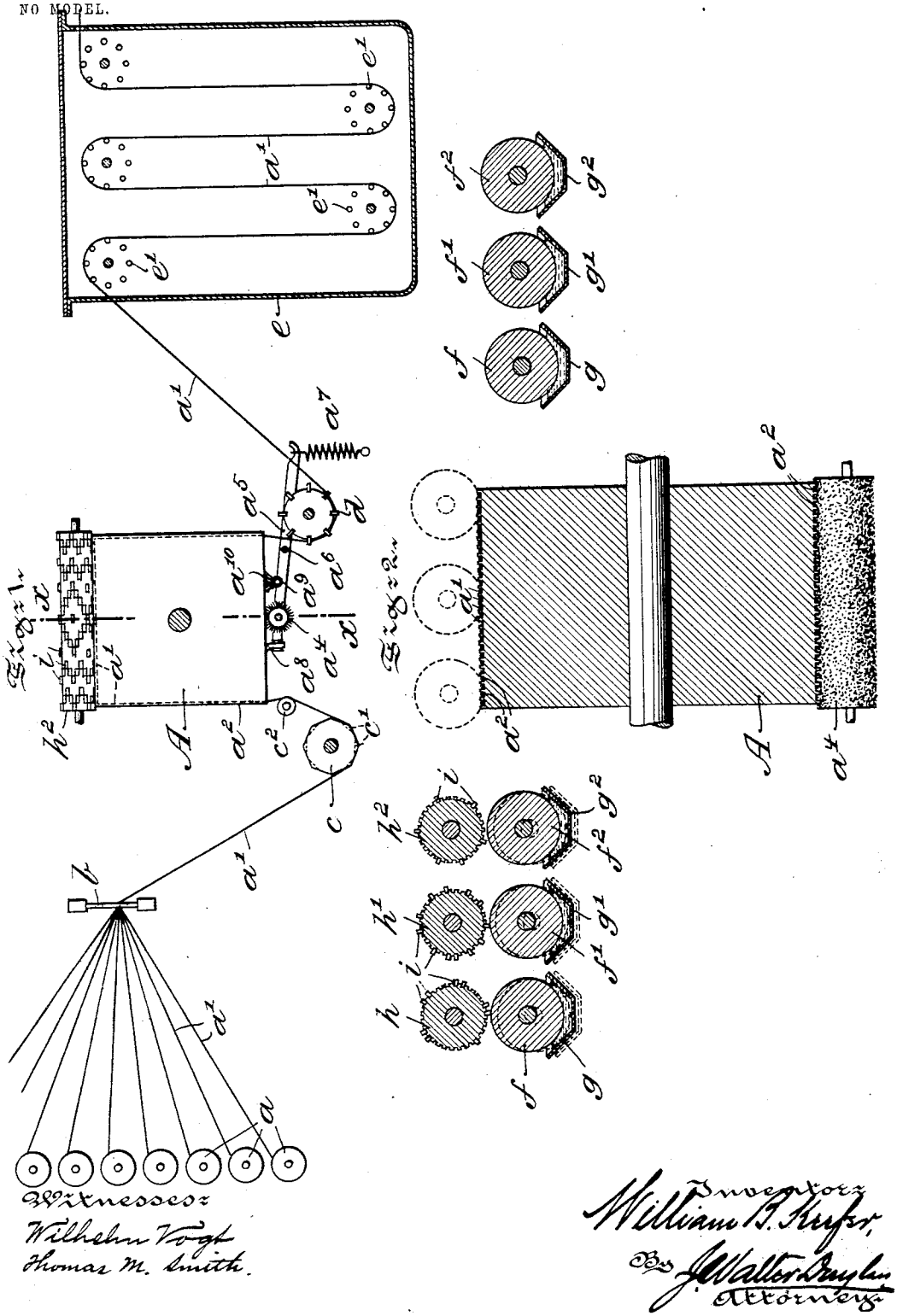
No. 747,306. PATENTED DEC. 15, 1903.

W. B. KEEFER.

METHOD OF PRINTING YARNS OR THREADS FOR WOVEN CARPET FABRICS.

APPLICATION FILED JULY 17, 1903.

NO MODEL.



Witnesses:
Wilhelm Vogt
Thomas M. Smith.

Inventor:
William B. Keefer,
By J. Walter Dayton
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 747,306. Patented December 15, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM B. KEEFER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO FREDERICK WILLIAM DOERR AND JOHN PHILIP DOERR, OF PHILADELPHIA, PENNSYLVANIA.

METHOD OF PRINTING YARNS OR THREADS FOR WOVEN CARPET FABRICS.

SPECIFICATION forming part of Letters Patent No. 747,306, dated December 15, 1903.

Application filed July 17, 1903. Serial No. 165,938. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM B. KEEFER, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Printing Yarns or Threads for Woven Carpet Fabrics, of which the following is a specification.

My invention has relation in the production of woven carpet fabrics to the printing of the figure, pattern, or design on the yarn, threads, or the like in the requisite colors to appear in the different parts or portions of a woven carpet fabric; and in such connection my invention relates to the printing in desired colors, patterns, or designs the yarns, threads, or the like to constitute the complete pattern, design, or configuration of a carpet fabric to be woven by a single continuous operation.

My invention, stated in general terms, consists of the method of printing yarns, threads, or similar material by a single continuous operation, so as to constitute the complete design or pattern of a carpet fabric to be woven, substantially as hereinafter described and claimed.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a diagrammatic view, partly in elevation and partly in section, of an apparatus for printing in colors by a single continuous operation yarns, threads, or similar material to produce a complete pattern or design on the threads or similar material for being woven into a correspondingly-patterned woven fabric; and Fig. 2 is a similar view taken on the line $x\ x$ of Fig. 1.

In the drawings, a represents a series of spools from each of which a thread, yarn, or similar material a' is fed through a reed b, adapted to spread out and hold apart the yarns or threads in preferably a uniform plane. From thence the yarns or threads are passed over preferably a grooved octagonal-shaped drum c, each groove or channel c' of which is adapted to receive one or a number of yarns or threads to hold the yarns separated from each other and to prevent displacement of the same. After having passed over the octagonal-shaped drum c the yarns or threads a' are conducted around a grooved guide-roller c^2. The yarns or threads a' are then passed from the grooved roller c^2 to a table A of preferably rectangular form and having the four faces of the same provided with grooves a^2, joining with each other. This table A forms not only the impression-table, but also the means for positively feeding the yarn or threads thereto and thereover. The grooves a^2 in each of the respective faces of the table A correspond in number with the grooves of the drum c, grooved roller c^2, and reed b, as fully illustrated in Fig. 2. Each of the grooves a^2 of the table A receives one or a number of yarns or threads a', which are securely held in position and prevented from contacting with the yarns or threads a' in the adjoining grooves a^2 of the impression and yarn-feeding table A. It will be observed that as the impression and feeding table A is arranged for operation, as described, the yarns or threads in their travel over three sides or surfaces of said table, and hence during the imprinting of a pattern or design on the threads or yarns, which takes place on the upper side or surface thereof, will be held always in the proper printing position. From the table A the yarns or threads a' are conducted to a grooved octagonal roller d and from thence over a series of skeleton reels e', suitably arranged within a steaming and color-fixing chamber e, and from thence the printed yarns or threads pass to the final finishing of the same and beaming for use.

At either side of the table A are arranged in the present instance three rollers f, f', and f^2, partially submerged in liquid or dyestuffs carried by vats g, g', and g^2, each vat containing liquid or dyestuffs of a different color or tint. Above one set of dye or color rollers f, f', and f^2—in the present instance at the left-hand side of Fig. 2—are arranged rollers h, h', and h^2, in the periphery of which are arranged blocks or type i, the face of which contacts with the color-rollers and receives its

color or dyestuffs therefrom. The colors or dyestuffs are transmitted to all of the blocks or type i of the rollers h, h', and h^2 by rotating the color-rollers f, f', and f^2 in their vats g, g', and g^2 and at the same time rotating the rollers h, h', and h^2 with the same rate of speed, so that each of the blocks or type i in succession receives the color or dyestuff, which will be of a different or distinct color or tint for each of the rollers h, h' and h^2. The type or blocks i are of such cross-section or shape that the same will fit into the grooves or guideways a^2, arranged in the faces of the table A. After all of the blocks or type i are supplied with color or dyestuff in the manner hereinbefore described the color-rollers f, f', and f^2 are lowered to the position indicated by dotted lines at the left-hand side of Fig. 2, and the rollers h, h', and h^2 are now moved over the upper face of the table A toward the right of the same, during which movement the blocks or type in the periphery thereof engage the grooves or guideways a^2 and are brought into contact with the yarn or threads resting therein. As the rollers h, h', and h^2 are moved over the table A, one preceding the other, it follows that the yarn or threads a', resting in each individual groove or guideway a^2, will receive a number of colors or dyestuffs adjacent to each other and for a length corresponding with the length of a block or type i. These blocks or types are, however, so arranged in the rollers h, h', and h^2, as illustrated in Fig. 1, that a certain space will be left free between two adjoining colors on a yarn, so as to prevent the so-called "running" of the colors and to allow for the capillary attraction or spreading of such colors in the yarn.

From the above-stated manner of printing or coloring the yarn or threads in each of the grooves or guideways a^2 of the table A it will be readily understood that a complete pattern or design can be printed on said yarns or threads by a single continuous operation and for a length at least corresponding to the length of each face or surface of the impression and feeding table A. Before the printing-rollers h, h', and h^2 have reached a position on the right-hand side of the impression and feeding table A corresponding to a position illustrated at the left-hand side of Fig. 2 the color-rollers f, f', and f^2 at this side of the impression and feeding table A are lowered and are raised only after the printing-rollers have occupied a position directly above the same. As soon as the printing-rollers h, h', and h^2 have reached their position at the right-hand side of the impression and feeding table A in Fig. 2 the table is rotated for one-fourth of a revolution and a side or surface of the table adjacent to that previously presented to the printing-rollers is moved into the printing position, carrying therewith another length of the yarns or threads to receive the imprint of colors or dyestuffs from the rollers h, h', and h^2, which in this instance are moved from the right in Fig. 2 toward the left of said figure. After the yarns or threads a' have been printed the same are conducted to and through the steaming and color-fixing chamber e.

Under the table A is provided a rotatable brush a^4, carried by a bracket a^5, which is pivotally supported at a^6. This bracket a^5 is engaged by a spring a^7, tending to hold the said brush normally in contact with a printing-surface of the table A and during the rotation of said table. The object of this brush a^4 is to cleanse the grooves a^2 of the table and remove therefrom all accumulating dyestuff or other matter that may adhere to the surfaces of the grooves a^2. The bracket a^5 is also provided with a strip of felt or other suitable absorbent material a^8, arranged in advance of the brush a^4, and is adapted to absorb any fluid matter accumulating in the grooves a^2 of the table A, and thus with the brush a^4 maintaining the printing-surface of the table A always in a thoroughly-clean condition. In the rear of the brush a^4 is arranged a perforated tube a^9, through which flame-jets a^{10} issue, striking the under side of the table A, which is always maintained free of yarns or threads, the object of such flame-jets being to thoroughly dry the grooves a^2 of the table A, thus preventing any transmission of still-adhering dyestuffs in the grooves to the yarns or threads to be printed.

It will be understood from the foregoing description that the entire length of the grooves a^2 is wiped, brushed, and dried during one-fourth of a revolution of the table A, as the wiper a^8, brush a^4, and jet-flames a^{10} during such revolution are brought and held in engagement with the free side of the impression and feeding table A, extending from the middle to a point about the middle of the next adjoining side or surface of the table, which through the revolution of the table becomes the free side or surface thereof.

From the foregoing description it will be readily understood that any number of yarns or threads can be printed in any number of colors or tints by a single continuous operation and by successive steps of printing and, further, that a complete pattern or patterns of one or a series of designs can be printed by this single continuous operation on a number of yarns or threads, which when formed into a fabric will contain said pattern or design or combinations of the colored threads, yarns, or similar material.

It will be manifestly obvious that modifications in the apparatus may be made for the conduct of the method of my said invention and still be within the scope of the same for the carrying out thereof.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The method of printing yarns or threads, which consists in drawing the yarns or threads

by a movable means to and over said means and passing a printing means over the yarns or threads while the yarns or threads are held by said movable means to transfer to said yarns or threads the color, pattern or design.

2. The method of printing yarns or threads by a single continuous operation, which consists in drawing the yarns or threads by a movable means to and over said means and passing a printing means over a portion of the yarns or threads while held by said movable means to transfer to said yarns or threads the colors of a pattern or design.

3. The method of printing yarns or threads, by a single continuous operation, which consists in drawing the yarns or threads by a movable means to and over said means and passing successive printing means over portions of the yarns or threads while held by said movable means to transfer to said yarns or threads successive portions of a complete pattern or design.

4. The method of printing yarns or threads by a single continuous operation, which consists in drawing the yarns or threads by a movable means to and over said means, passing a printing means over a portion of the yarns or threads while held by said movable means to transfer to said yarns or threads the color, pattern or design, and cleaning and drying said movable means.

5. The method of printing yarns or threads by a single continuous operation, which consists in drawing the yarns or threads by a movable means to and over said means, passing a printing means over a portion of the yarns or threads while held by said movable means to transfer to said yarns or threads the color, pattern or design, and thereafter cleaning and drying said movable means prior to succeeding transfers of color to the yarns or threads.

6. The method of printing yarns or threads by a single continuous operation, which consists in positively drawing the yarns or threads in predetermined length by a supporting medium to and over said medium and passing a printing means transversely over the yarns or threads while held on said supporting medium to transfer to the yarns or threads a color, pattern or design.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

WILLIAM B. KEEFER.

Witnesses:
J. WALTER DOUGLASS,
THOMAS M. SMITH.