No. 759,980. PATENTED MAY 17, 1904.

J. W. FRIES.

STEAMING AND DRYING MACHINE FOR TEXTILE FABRICS.

APPLICATION FILED JUNE 27, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

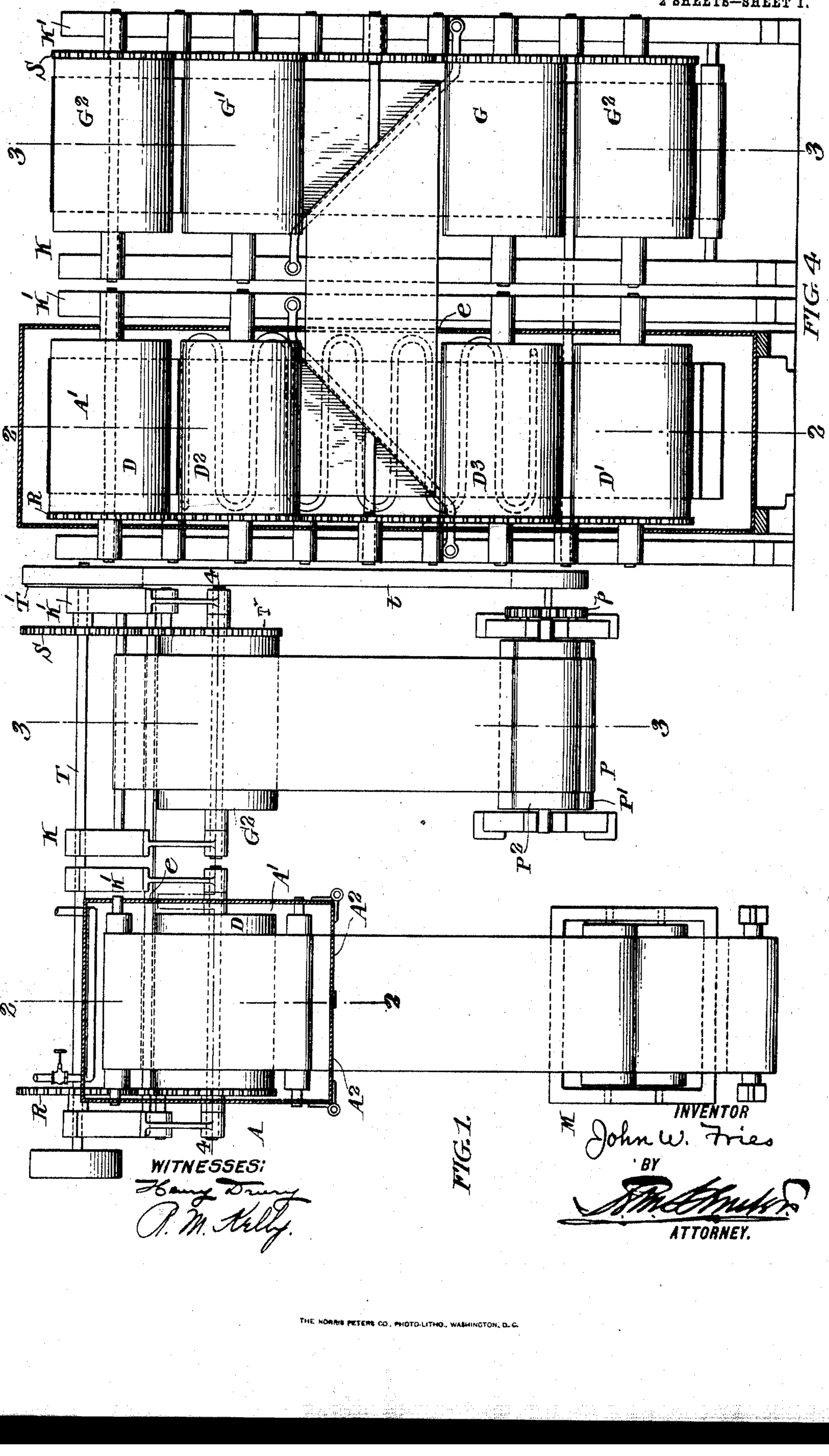

FIG. 4

FIG. 1.

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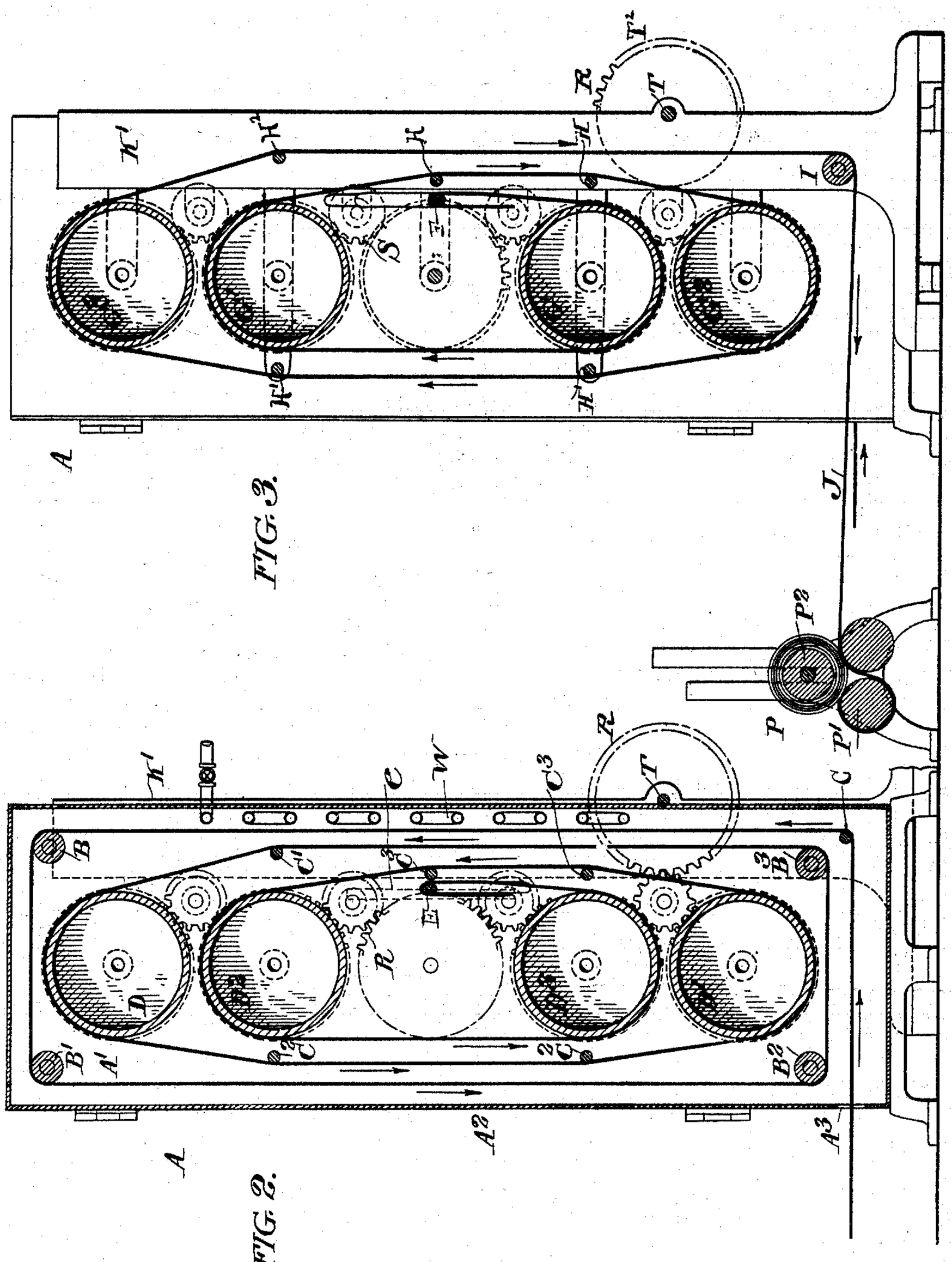

FIG. 2.

FIG. 3.

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UNITED STATES PATENT OFFICE.

JOHN WM. FRIES, OF WINSTON-SALEM, NORTH CAROLINA.

STEAMING AND DRYING MACHINE FOR TEXTILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 759,980, dated May 17, 1904.

Application filed June 27, 1903. Serial No. 163,292. (No model.)

To all whom it may concern:

Be it known that I, JOHN WM. FRIES, of Winston-Salem, Forsyth county, State of North Carolina, have invented an Improvement in Steaming and Drying Machines for Textile Fabrics, of which the following is a specification.

My invention has reference to steaming and drying machines for textile fabrics; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide a construction of steaming and drying machine in which the fabric shall at all times travel upon the guides and cylinders with one of its faces alone in contact, so that the other face shall not be crushed or subjected to direct pressure. This is important in the treatment of such fabrics as velvets, plushes, and corduroys in which it is desired that no pressure shall come upon the pile. The invention is also useful in the treatment of other goods where the finish upon the back and front is different.

The object of my invention is also to apply moisture to the fabric, which is vaporized into steam by heat of a suitably-constructed steaming-box and the fabric treated and subsequently dried, the said steps being taken in succession and so that the fabric receives such treatment in a continuous manner.

In carrying out my invention the textile web after being dyed or treated in any suitable manner is guided through a steaming-box provided with steam-heated cylinders and guides in such a manner that one face only of the web is brought into contact with said cylinders and guides. The box is further provided with a diagonal guide about which the web is guided and caused to pass laterally from the box and be received upon a similar diagonal guide, whereby it is again caused to travel in a similar direction to that first assumed. The web is then guided over a series of drying-cylinders and guides, still maintaining the same face in contact with the said cylinders and guides that was in contact with the cylinders and guides in the steaming-box.

My invention also comprehends means for carrying out the above operation and also details of construction, all of which will be better understood by reference to the drawings, in which—

Figure 1 is a sectional view of a complete apparatus embodying my invention with the fabric shown in position. Fig. 2 is a sectional elevation of the same on line 2 2, Figs. 1 and 2. Fig. 3 is a sectional elevation of Fig. 1 on line 3 3, and Fig. 4 is a front sectional elevation of Fig. 1 on line 4 4.

A is a steaming box or case and is provided on the front with doors A^2, which are steam-tight at their upper portion, but do not quite fit at the bottom and which when closed leave a transverse opening or slot A^3 and at the back with steam-coils W. The interior of the box is provided with steam-heated cylinders D, D′, D^2, and D^3. The textile web N passes from a dyeing or coloring machine M through the slot A^3 in the box to the rear of the box, where it is guided under a cross-bar C. It then passes upward and over guide-rollers B and B′ at the top, thence downward and under guide-rollers B^2 B^3, thence upward over a guide C′ and over the upper steam-cylinder D, then downward around guides C^2 and under the lower steam-cylinder D′, thence upward around guides C^3 and over the steam-cylinder D^2, thence downward under steam-cylinder D^3, and finally upward and over a diagonal flat guide-bar E, about which the web is bent on the diagonal and caused to pass laterally from the box through the vertical slot *e* in the side of the box shown in Fig. 1. From the steaming-box the textile web passes to the drying apparatus, which is essentially similar to the cylinders and guides within the box, but arranged without any surrounding case. The web, however, traverses the cylinders and guides in the reverse direction to what it did the corresponding parts in the steaming-box.

Referring more specifically to the drying apparatus, the web is led to the diagonal guide-bar F, around which it is bent on the diagonal, so as to be once more directed vertically. From the bar F it passes downward and around the drying-cylinder G, thence upward

and around the drying-cylinder G′, thence downward over the guide-rods H H, thence around and under the drying-cylinder G^2, thence upward and over guide-rods H′ H′, thence over the drying-cylinder G^3, thence downward around the guides H^2, thence around roller I, from which the web passes to the cloth-winding machine P. This folder comprises tension-rollers P′, driven by gearing *p*, and a winding-roller P^2, which is adapted to receive the fabric and is rotated by friction created by the roller and its contents resting upon the rollers P′. The web may be wound upon a roller, such as P^2, in any other manner, if so desired.

The drying-cylinders G to G^3, inclusive, are journaled in bearings secured to an upright frame K′, having a base K. This frame K′ is made hollow and is adapted to supply steam through the bearings to the cylinders in any well-known manner—such, for example, as shown in my Patent No. 696,032, dated March 25, 1902. The steam is thus caused to traverse the drying-cylinders to heat them. The several drying-cylinders are geared together, as at S. The gearing is driven by power devices of any suitable construction. As shown, a shaft T, having a gear T^2, meshes with the gears S. This shaft T has a pulley T′, which by a belt *t* drives the cloth-winding machine P. By the arrangement of gearing shown all of the steam and drying cylinders are caused to rotate at the same surface speeds.

The general construction of the cylinders and guides within the steam-box A is similar to that of the drying apparatus and is driven from the same power-shaft T, which may extend through the box at the rear and near the lower part. The vertical slot *e* for the passage of the web from the box is made to just allow the free passage of the web, so as to prevent free escape of steam or vapor.

In operation the moisture absorbed by the web in passing through the dyeing or coloring machine M is vaporized into steam by the heat of the steam-heated cylinders D to D^3 and coils W within the steam-box, and the denser portions of this steam settle down to the bottom and escape from the lower openings, leaving only the hotter and drier portions of the steam within the upper portion or that traversed by the web. While the fluid or moisture to be absorbed by the fabric in the steaming-box is usually applied in the form of a dyeing or coloring compound, thereby applying color simultaneously with the moisture, the invention, broadly considered, would include the application of the moisture or fluid with or without coloring-matter. The web is guided around the cylinders and guides in the steam-box and in the drying apparatus in such a manner that only one surface comes into contact with the same, and this is also true of the passage of the web over the diagonal guides E and F. In this way the face or pile would not be crushed or injured in any manner.

While I prefer the construction shown as being excellently adapted for the purposes of my invention, I do not limit myself to the details thereof, as they may be modified in various ways without departing from the spirit of the invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for treating textile fabric in the web, a steaming-box having heated cylinders and guides within it for guiding the web up and down within the box, a horizontal entrance for the web and a vertical slit in the side of the box for the delivery of the web, in combination with a series of drying-cylinders and guides alongside of the steaming-box for guiding the web up and down thereon, an oblique guide within the steaming-box for giving the web a diagonal fold to guide it through the vertical slit, and a diagonal guide arranged adjacent to the drying apparatus and in transverse alinement with the slit in the steaming-box for giving to the web a diagonal fold to guide it vertically upon the drying-cylinders.

2. In a machine for treating textile fabric in the web, a steaming-box having heated cylinders and guides within it for guiding the web up and down within the box, a horizontal entrance for the web and a vertical slit in the side of the box for the delivery of the web, in combination with a series of drying-cylinders and guides alongside of the steaming-box for guiding the web up and down thereon, an oblique guide within the steaming-box for giving the web a diagonal fold to guide it through the vertical slip, a diagonal guide arranged adjacent to the drying-cylinders and in transverse alinement with the slit in the steaming-box for giving to the web a diagonal fold to guide it vertically upon the drying-cylinders, and power devices for causing the steam and drying cylinders all to rotate at the same surface speeds.

3. In a machine for treating textile fabric in the web, a steaming-box having heated cylinders and guides within it for guiding the web up and down within the box, a horizontal entrance for the web and a vertical slit in the side of the box for the delivery of the web, in combination with a series of drying-cylinders and guides alongside of the steaming-box for guiding the web up and down thereon, an oblique guide within the steaming-box for giving the web a diagonal fold to guide it through the vertical slit, a diagonal guide arranged adjacent to the drying-cylinders and in transverse alinement with the slit in the steaming-box for giving to the web a diagonal fold to guide it vertically upon the drying-cylinders, power devices for causing the steam and drying cylinders all to rotate at the

same surface speeds, a cloth-winding mechanism for receiving the web from the drying-cylinder devices, and means for causing the folder mechanism to wind up the web with a speed commensurate with that of the steaming and drying cylinders.

4. In a machine for treating textile fabric in the web, the combination of means for applying a fluid to the web, a steaming-box having steaming-cylinders and guides for guiding the web vertically within the box, a drying apparatus arranged alongside of the steaming-box having drying-cylinders and guides for guiding the web vertically, means for rotating the steaming and drying cylinders at the same surface speeds, and means for guiding the web into diagonal folds without the steaming-box and adjacent to the drying-cylinder whereby the web travels transversely in its passage from the steaming-box to the drying apparatus.

5. In a machine for treating textile material in the web a steaming-box having a transverse slot near its bottom for the entrance of the web, a vertical slot in its side for the delivery of the web in combination with a series of steam-cylinders and guiding devices within the box for guiding the web vertically up and down within the box, and a diagonal guide within the box in transverse alinement with the vertical slot for producing a diagonal fold to the web and guiding it transversely through the vertical slot.

6. In a machine for treating textile fabric in the web, a steaming-box having entrance and exit slots, combined with steam-cylinders D D′ D^2 D^3 arranged one above the other, transverse guides C′ C^2 C^3 for holding the web away from the intermediate steam-cylinders, and guides C, B, B′, B^2, B^3 for guiding the web around the steam-cylinders without touching them.

7. In a machine for treating textile fabric in the web, a steaming-box having entrance and exit slots at right angles to each other, combined with a series of steam-cylinders D, D′, D^2, D^3, transverse guides C′ C^2 C^3 for holding the web away from the intermediate steam-cylinders, guides C, B, B′, B^2, B^3 for guiding the web around the cylinders without touching them, and a diagonal guide E intermediate of the upper and lower steam-cylinders for guiding the web and giving it a diagonal fold to change its direction of travel whereby it is caused to pass out of the exit-slot at right angles to the direction of its entrance into the steaming-box.

8. In a machine for treating textile material in the web, a steaming-box having a transverse slot near its bottom for the entrance of the web, a vertical slot in its side for the delivery of the web, in combination with a series of steam-heated cylinders and guiding devices within the box, a diagonal guide within the box in transverse alinement with the vertical slot for producing a diagonal fold to the web and guiding it transversely through the vertical slot, and a high-temperature-steam coil arranged within the box and to one side of the textile material guided over the steam-cylinders.

9. In a machine for treating textile fabric in the web, a steaming-box having entrance and exit slots, combined with steam-heated cylinders D D′ D^2 D^3 arranged one above the other, transverse guides C′ C^2 C^3 for holding the web away from the intermediate steam-heated cylinders, guides C, B, B′, B^2, B^3 for guiding the web around the steam-heated cylinders without touching them, and a high-temperature-steam coil arranged within the box and to one side of the textile material guided over the steam-heated cylinders and guides.

In testimony of which invention I hereunto set my hand.

JOHN WM. FRIES.

Witnesses:

ADELAIDE L. FRIES,

GEORGE ACHESON.