

(No Model.)

L. WELDON.
YARN DYEING MACHINE.

No. 466,285.

Patented Dec. 29, 1891.

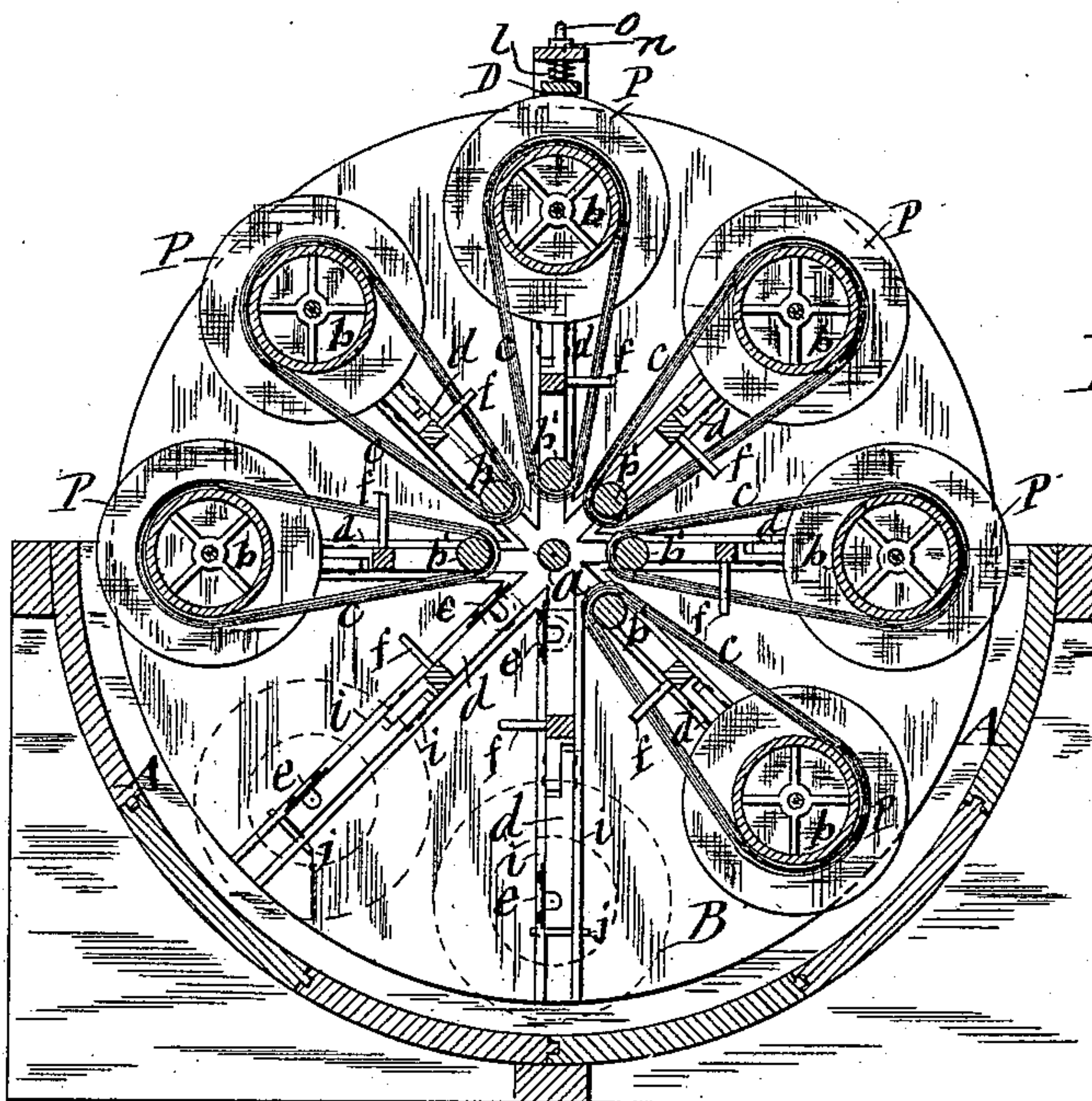


Fig. 2

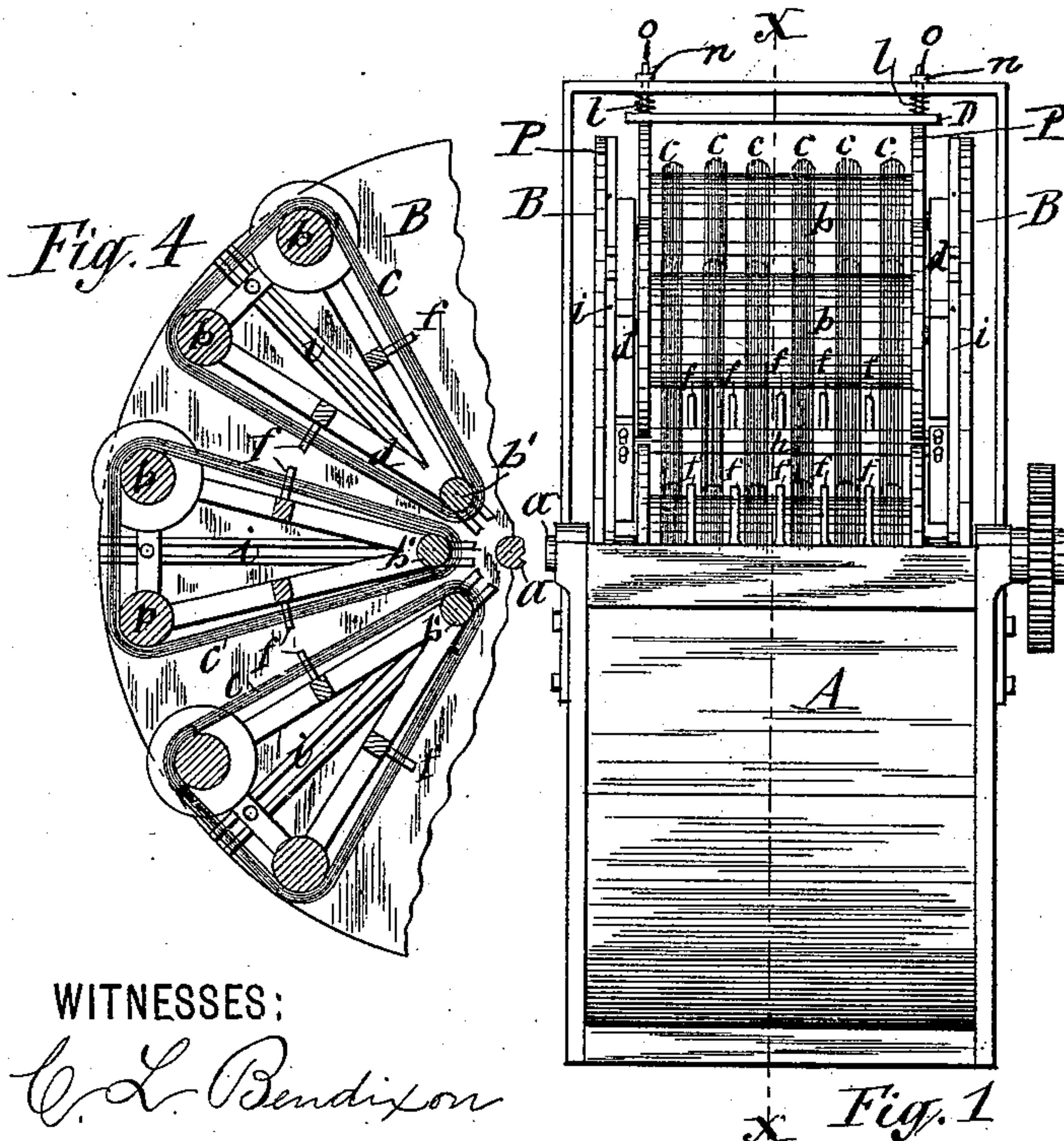


Fig. 4

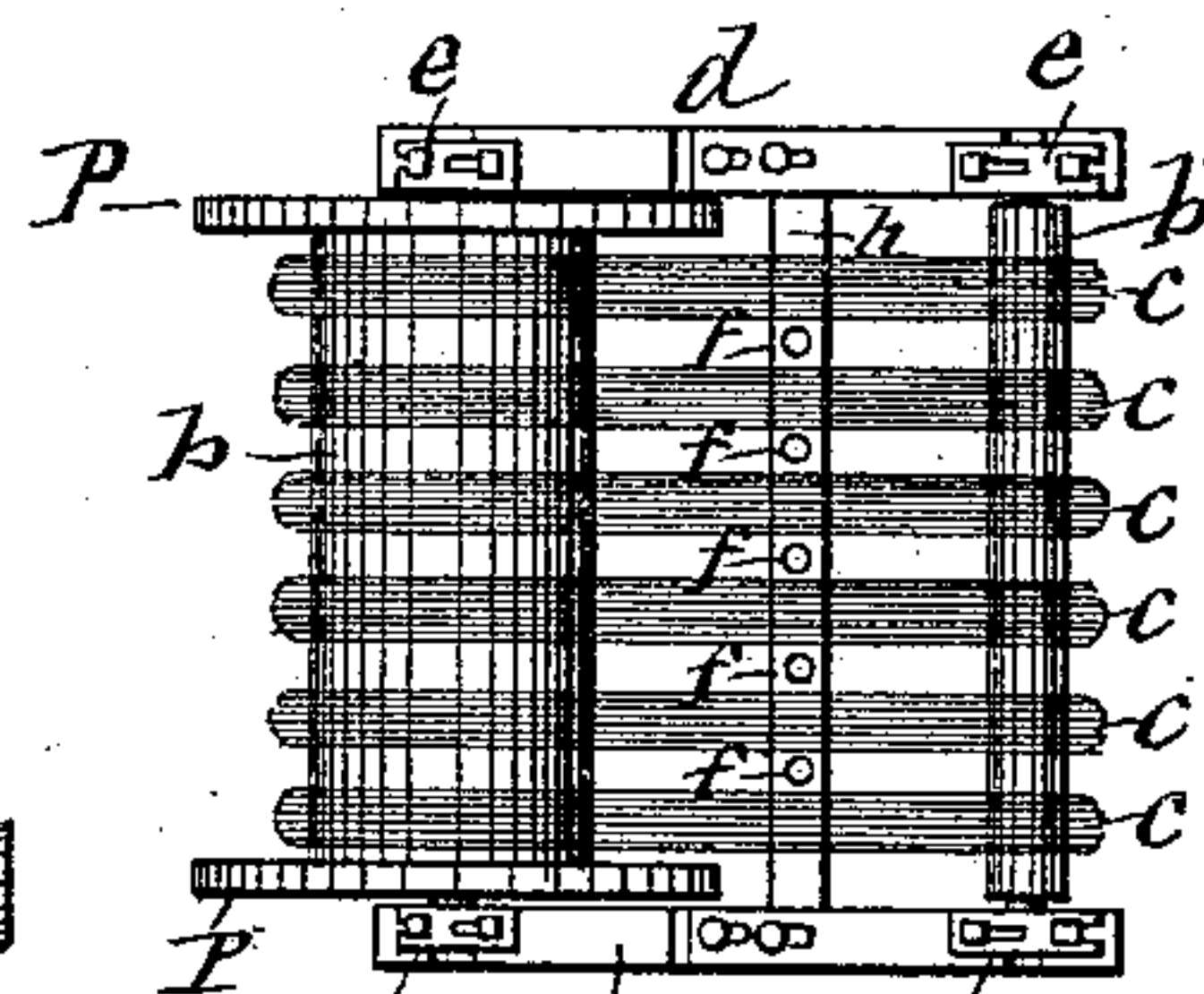


Fig. 3

WITNESSES:

INVENTOR

C. L. Bendixson

INVENTOR
Leonard Weldon

BY

Hull, Laass & Hull

ATTORNEYS-

Mark W. Dewey

UNITED STATES PATENT OFFICE.

LEONARD WELDON, OF COHOES, NEW YORK, ASSIGNOR TO THE KLAUDER-WELDON DYEING MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

YARN-DYEING MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,285, dated December 29, 1891.

Application filed December 31, 1888. Serial No. 295,070. (No model.)

To all whom it may concern:

Be it known that I, LEONARD WELDON, of Cohoes, in the county of Albany, in the State of New York, have invented new and useful
5 Improvements in Yarn-Dyeing Machines, of which the following, taken in connection with accompanying drawings, is a full, clear, and exact description.

This invention consists in a novel construction of a machine by means of which skein-
10 yarn can be dyed uniformly and perfectly at a minimum expense of manual labor, and which machine is capable of dyeing a large quantity of yarn compared with the space oc-
15 cupied by the machine.

The invention is fully illustrated in the annexed drawings, in which—

Figure 1 is a front view of a machine embodying my invention. Fig. 2 is a vertical
20 transverse section on line *xx*, Fig. 1. Fig. 3 is a detached plan view of one of the stretcher-frames with the skein of yarn hung thereon, and Fig. 4 is a section of a dipping frame or wheel embodying a modification of my in-
25 vention.

Similar letters of reference indicate corresponding parts.

A represents the tank or vat containing the dye-liquor, preferably of semi-cylindrical
30 form internally. In the vat is arranged a rotary dipping frame or wheel consisting, chiefly, of two heads B B, secured to the end portions of a shaft *a*, which extends horizontally across the top portion of the vat and is journaled in
35 suitable boxes or bearings on the end walls of the vat. By means of a pulley or suitable gear attached to the shaft *a* at the exterior of the vat and connected with a suitable motor the aforesaid dipping frame or wheel receives
40 rotary motion and is caused to revolve partly in the dye-liquor in the vat A.

b b' represent the yarn-supporting bars or rollers, which are arranged parallel with the shaft *a* and in pairs or sets and proper dis-
45 tances apart in each pair or set to sustain the skeins of yarn stretched around them, as represented at *c c c* in the drawings. In order to economize in space and reduce the diameter of the dipping-wheel, I arrange each set

or pair of said bars or rollers in planes radial
50 to the aforesaid axis, and by making the outer bar or roller *b* of a greater diameter than the inner bar *b'*, as shown in Fig. 1 of the drawings, or employing in each set two outer rollers *b b*, with the single inner bar *b'*, as shown
55 in Fig. 4 of the drawings, the distance between the inner and outer bars is reduced and each set or pair of bars occupies a sector of the cylindrical space between the two heads B B. When the stretcher-frames are to be
60 placed in radial guides *i i*, they are to be retained therein by suitable locking devices, which are represented in the form of pins *j j*, passing transversely through the guides at the front ends of the stretcher-frames.
65

To facilitate the application of the yarn to the bars *b b'* and to also allow the yarn to be shifted longitudinally on the bars during the dyeing process, I journal each set or pair of said bars in a stretcher-frame consisting,
70 chiefly, of two parallel bars *d d*, united by a cross-bar *h* and provided at their ends with suitable bearings for the journals of the bars *b b'*. Said stretcher-frames are inserted with their bars *d d* movable longitudinally
75 in radial guides *i i* on the inner sides of the heads B B, and are retained therein by suitable locking devices, which are represented in the form of pins *j j*, passing transversely through the guides at the outer ends of the
80 stretcher-frames. Said frames may be made adjustable in length to accommodate them to different lengths of skeins of yarn. The bars or rollers *b b'* may be made detachable from the stretcher-frame by making the journal-
85 bearings in the latter open to the top thereof and connecting to the stretcher-frame movable plates or slides *e*, adapted to open and close said journal-bearings.

In order to maintain the skeins of yarn in
90 their proper places on the bars *b b'*, and thus prevent them from becoming entangled, I secure to the cross-bar *h* of the stretcher-frame suitable guards, preferably of the form of pins or fingers *f f*, attached to said cross-bar
95 and projecting therefrom at right angles to the plane of the stretcher-frame, so as to pass between the skeins of yarn.

To dye the yarn evenly it is essential to move the same at regular intervals longitudinally on the stretcher-frame, and to accomplish this automatically without resorting to the employment of intermittingly-operating fixed toothed gearing, which are liable to fail to mesh in their approach, and thus break the gearing, I firmly attach to one or both ends of the roller *b* a friction pulley or pulleys *P*, and arrange in the path of said pulleys a detent or friction-block *D*, preferably hung on a cross-beam secured to the upper ends of posts rising from the vat, as shown in Fig. 1 of the drawings. By means of a spring or springs *l*, interposed between the cross-beam and friction-block *D*, the latter is yieldingly sustained in a radial position toward the dipping-wheel and in the path of the pulleys *P*, which during the rotation of the dipping frame or wheel come successively in contact with the detent or block *D*, and are thereby caused to turn on their axes. The rollers *b*, turning with them independent of the rotation of the dipping-wheel, cause the yarn to be shifted longitudinally on the rollers *b*.

In practice I have found that there are two conditions of the detent which are very essential to the successful operation of the machine, viz: The detent must be yielding in its position, and its power of resistance must be adjustable for the following reasons, to wit: It frequently happens that some portions of the skein hang more loosely than other portions and will wrap around the bottom or inner roller, and thereby resist the longitudinal movement of the skein. If then the detent is rigid or positive in its action, the yarn breaks and causes numerous loose ends that confuse the winder and make it impossible for him to wind the skeins on the bobbins. Sometimes the so-called "lye-bands" wrap around the roller. These lye-bands keep the skein divided into small portions, and the two loose ends of the skeins are tied to said lye-bands, and when the winder breaks the lye-band he takes the right end of the yarn with it and can wind the skein off complete. Should this lye-band wrap around the roller and the detent be fixed and positive in its operation, said lye-band and also a number of threads break, leaving the skein with a lot of loose ends and without a guide by which the winder can ascertain which end to draw. The result is that he can wind perhaps half of the skein, and the remainder is a mass of tangled waste. Consequently a very sensitive yielding detent is essential, and its detaining power must be adapted to be regulated for different qualities and classes of yarn. For instance, if silk No. 1 were carried on the roll-

ers and subjected to the same strain of the detent designed for turning the rollers carrying coarse hard-twisted cotton No. 4 the yarn would be broken and completely spoiled, so that it would not wind on the bobbins, and, vice versa; if coarse yarn No. 4 were on the rollers and the tension of the detent adjusted for silk, the detaining power would be insufficient to turn the rollers with heavy saturated yarn carried thereon, and therefore the portion of the yarn lying on the rollers would be light-colored.

To obviate the aforesaid defects I not only employ the yielding detent, but also render the tension thereof adjustable by supporting the detent by means of bolts *o o*, provided with nuts *n n*, which allow the detent to be set to a greater or less degree in the path of the friction-pulleys *P* and also allow the springs *l l* to be removed and other springs of greater or less power of resistance to be substituted.

What I claim as my invention is—

1. In combination with the dye-liquor vat, the yarn-dipping wheel consisting of the shaft *a*, mounted on opposite ends of the vat, and heads *B B*, rigidly secured to said shaft and having radial ways *i i*, open at their outer ends, a plurality of stretcher-frames, each consisting of the parallel end bars *d d*, united by the cross-bar *h* and seated with their end bars longitudinally removable in the aforesaid ways, and yarn-carrying bars connected to the end bars *d d*, substantially as set forth.

2. In combination with the vat, rotary yarn-dipping wheel, and yarn-carrying rollers journaled in said wheel, pulleys fixed to said rollers and a detent sustained yieldingly in the path of the said pulleys and adjustable in its tension to suit different classes of yarn, as set forth.

3. In combination with the vat, rotary yarn-dipping wheel, and yarn-carrying rollers journaled in said wheel, friction-pulleys fixed to the said rollers, posts rising from the vat, a cross-beam uniting the upper ends of the posts, a friction-block connected vertically movable to said cross-beam and sustained in the path of the friction-pulleys, and a spring interposed between the friction-block and cross-bar, substantially as described and shown.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, at the city of Cohoes, in the county of Albany, in the State of New York, this 27th day of December, 1888.

LEONARD WELDON. [L. S.]

Witnesses:

MARTIN McDERMOTT,
LEES WRIGLEY.