(No Model.) 5 Sheets—Sheet 1.

L. WELDON.

YARN DYEING MACHINE.

No. 466,286. Patented Dec. 29, 1891.

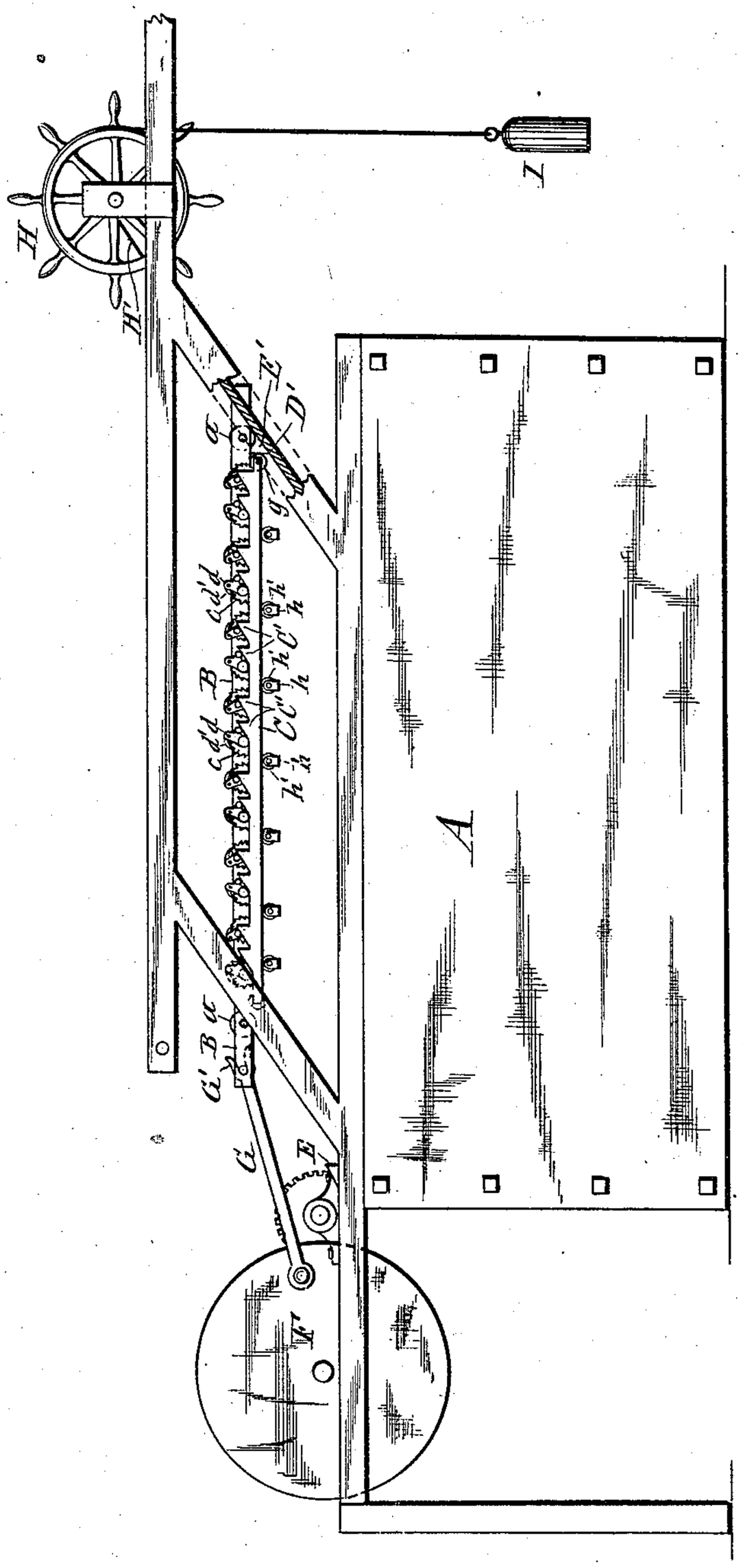

Fig. 1.

WITNESSES:

C. L. Burdixon

H. M. Beamans

INVENTOR:

Leonard Weldon

By Duell, Lauss & Duell

his ATTORNEYS.

(No Model.) 5 Sheets—Sheet 2.

L. WELDON.

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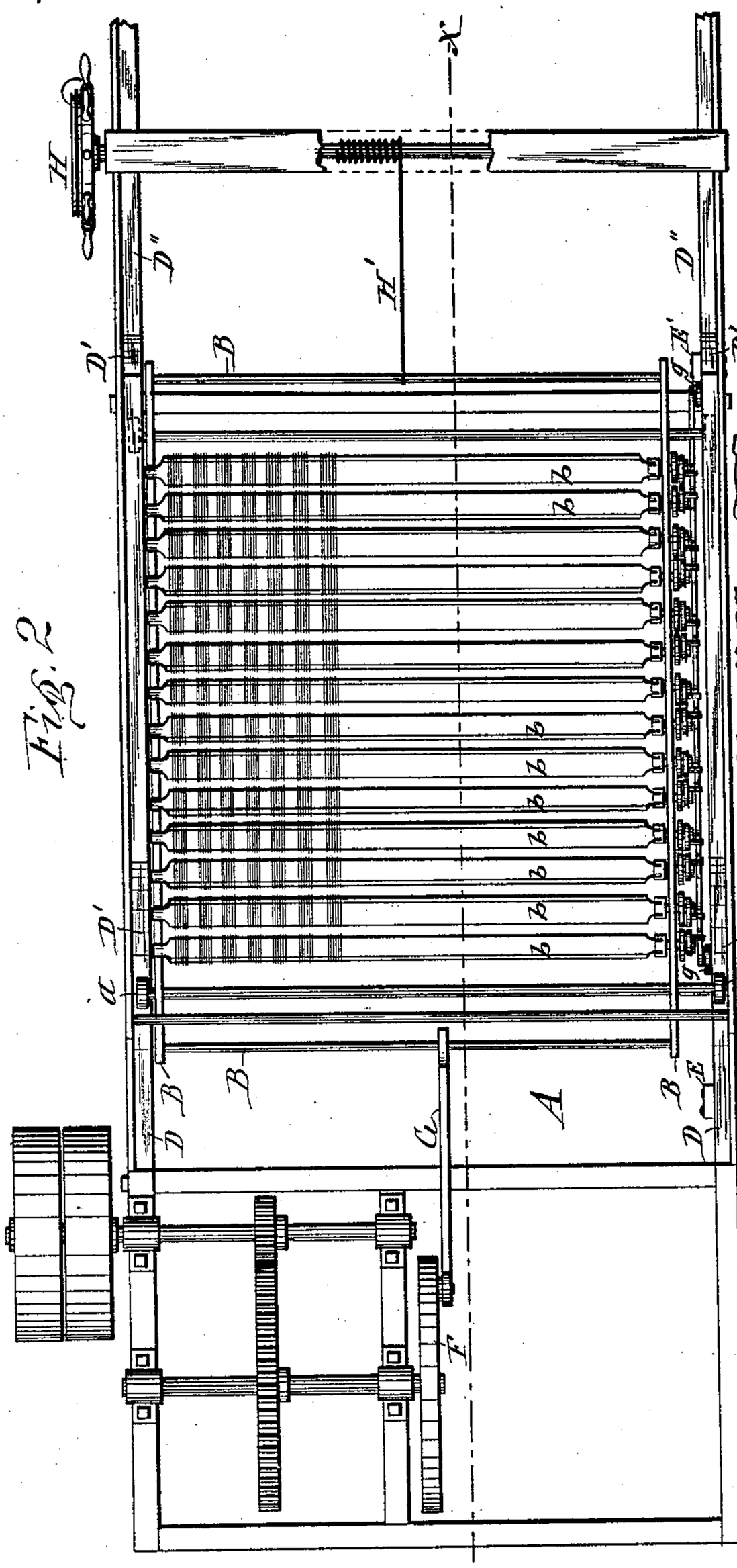


Fig. 2.

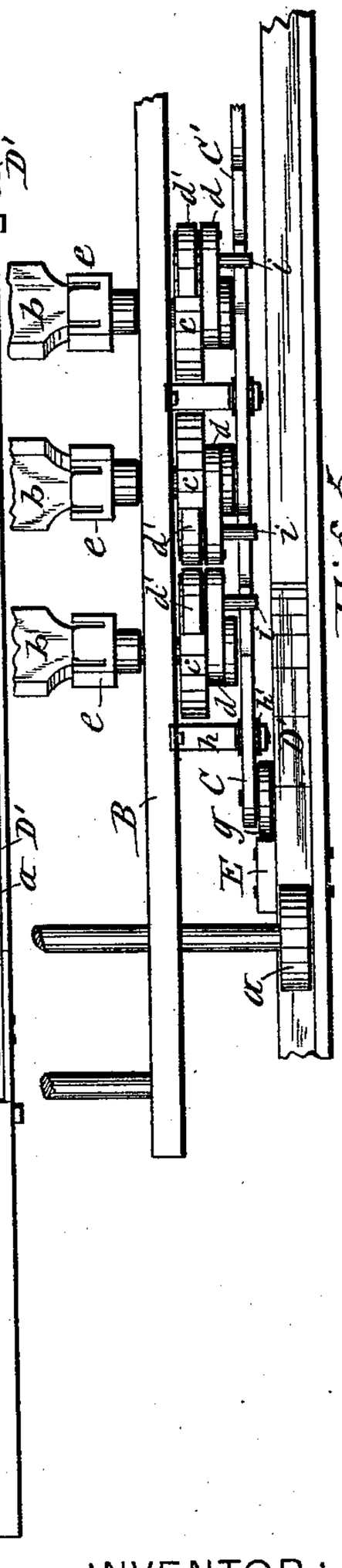


Fig. 3.

WITNESSES:
C. L. Bendixon
H. M. Seamans

INVENTOR:
Leonard Weldon
By Dodge, Laass & Dodge
his ATTORNEYS.

(No Model.) 5 Sheets—Sheet 3.

L. WELDON.

YARN DYEING MACHINE.

No. 466,286. Patented Dec. 29, 1891.

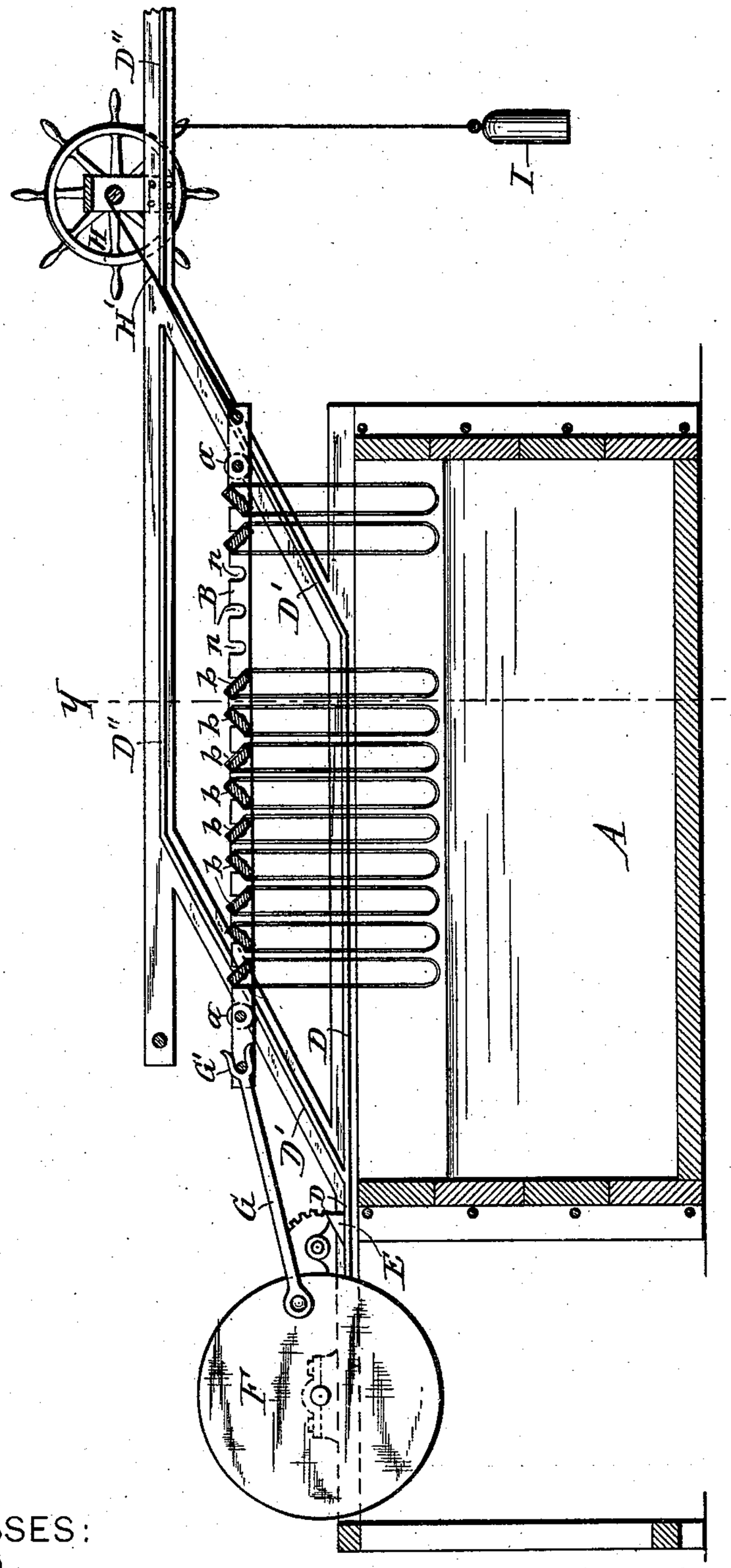


Fig. 3.

WITNESSES:

C. L. Bendixon

H. M. Seamans

INVENTOR:

Leonard Weldon

By Dull, Laasat & Dull

his ATTORNEYS.

(No Model.) 5 Sheets—Sheet 4.

L. WELDON.

YARN DYEING MACHINE.

No. 466,286. Patented Dec. 29, 1891.

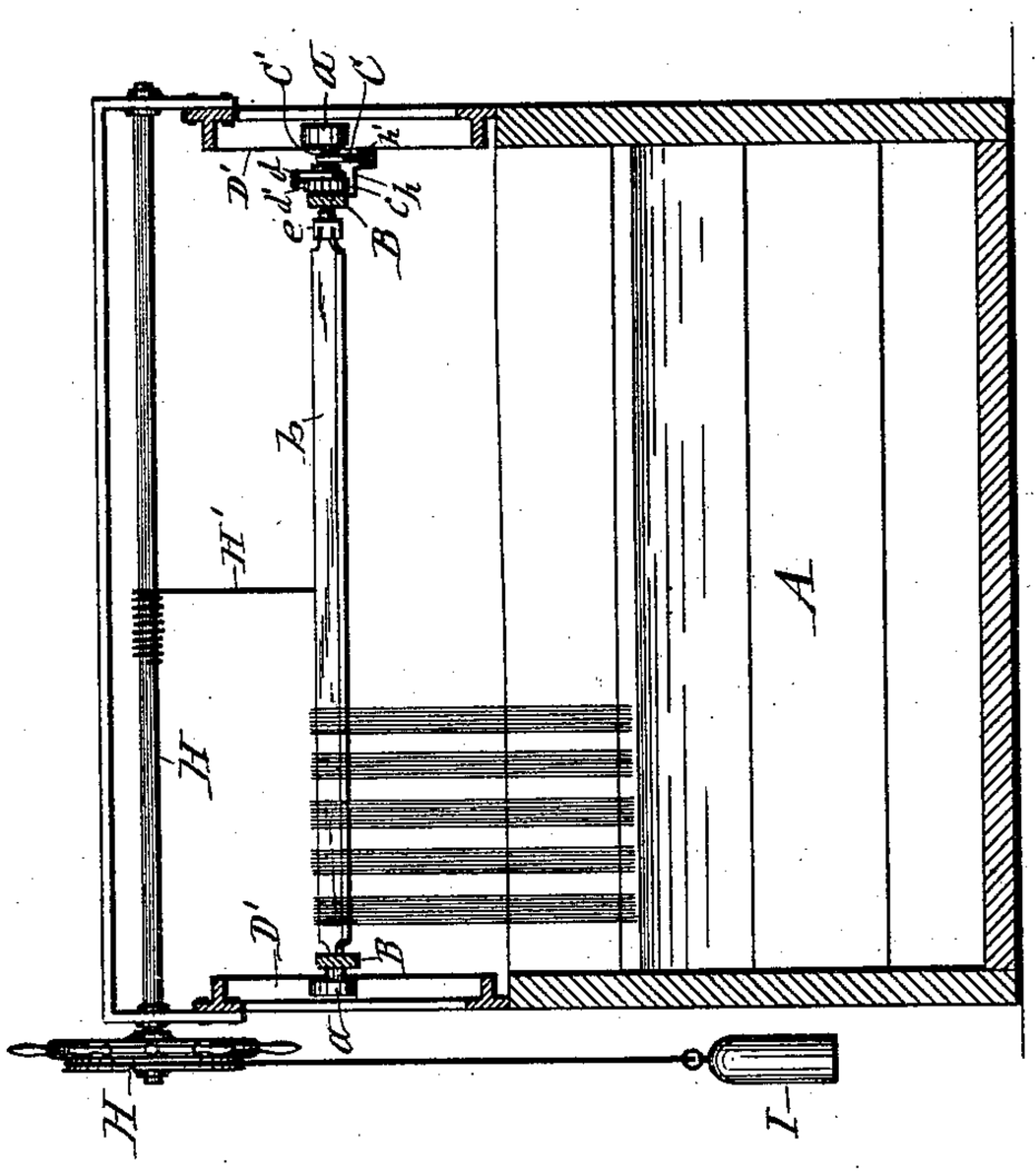


Fig. 4.

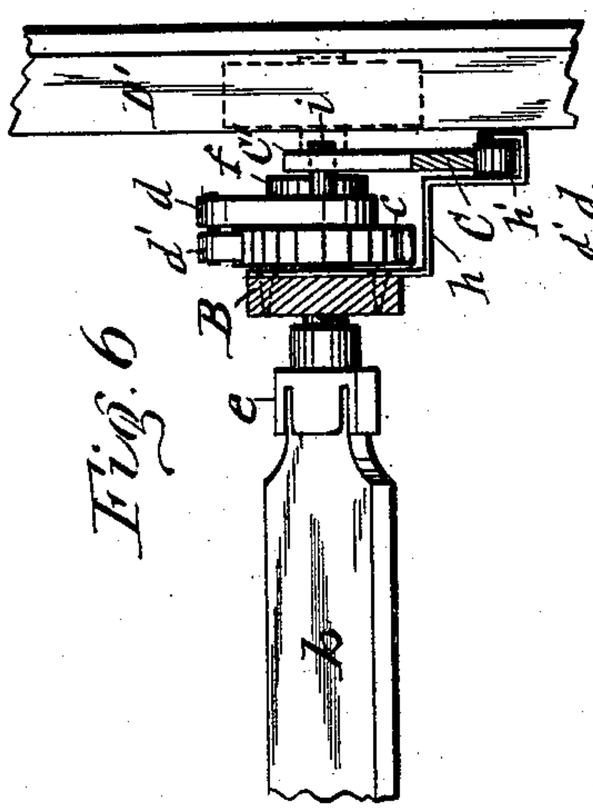


Fig. 6

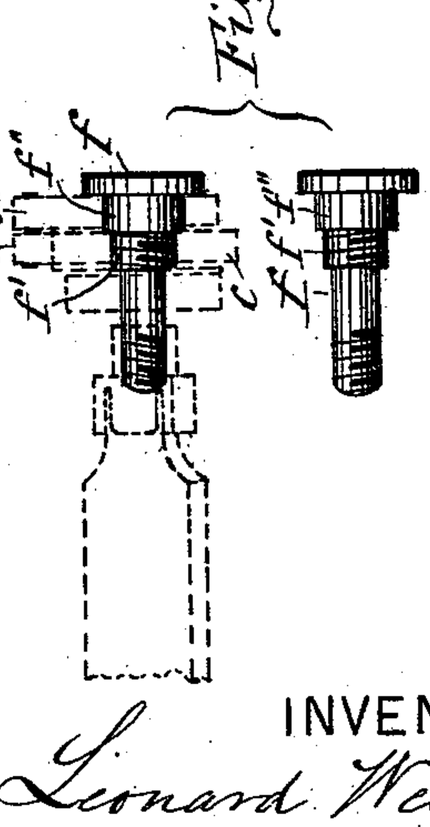


Fig. 7

WITNESSES:

C. L. Bendixon

H. M. Seamans

INVENTOR:

Leonard Weldon

By Hull, Lass & Hull

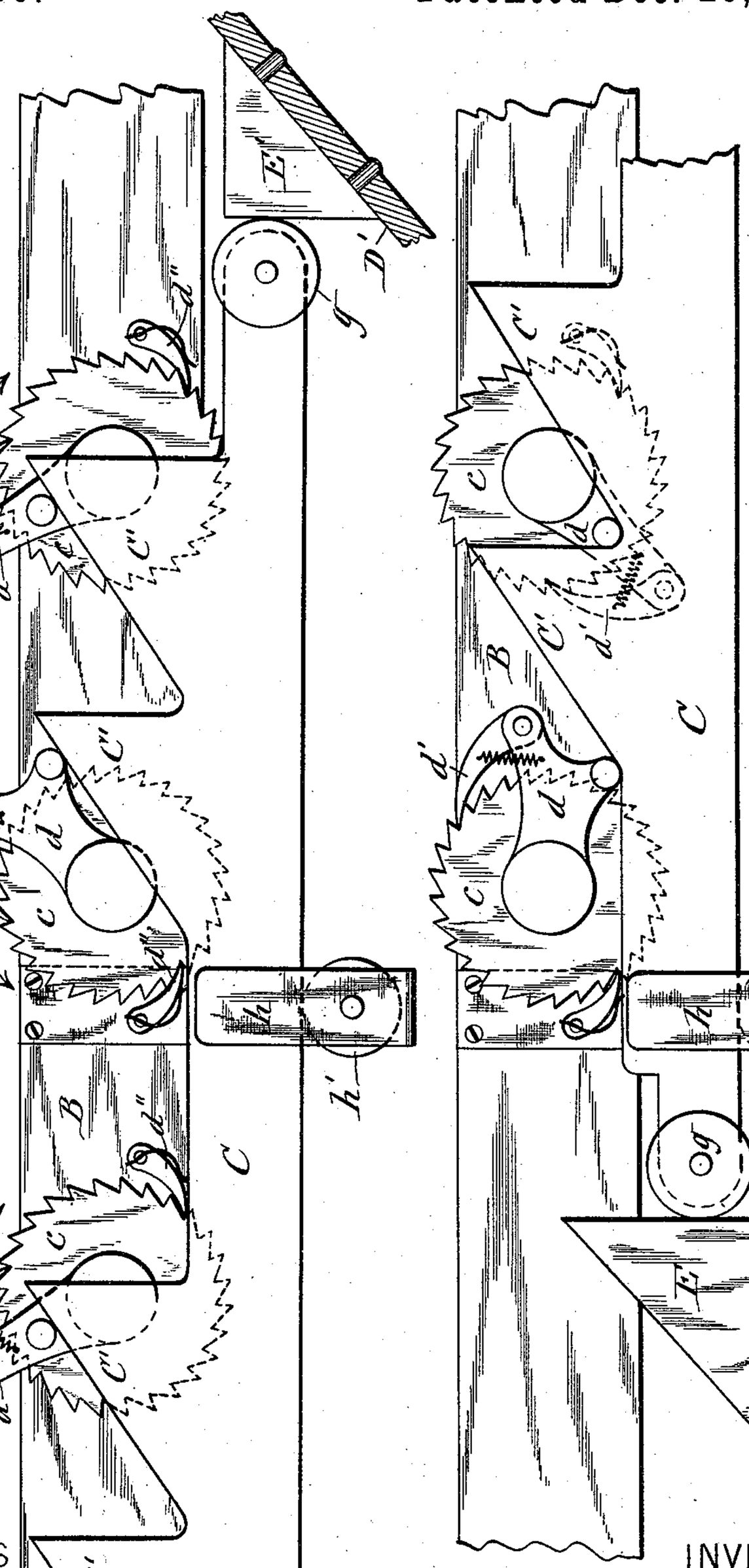
his ATTORNEYS.

(No Model.) 5 Sheets—Sheet 5.

L. WELDON.

YARN DYEING MACHINE.

No. 466,286. Patented Dec. 29, 1891.



WITNESSES
C. L. Burdixon
H. M. Seamans

INVENTOR:
Leonard Weldon
By Duell, Laass & Duell
his ATTORNEYS.

UNITED STATES PATENT OFFICE.

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

YARN-DYEING MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,286, dated December 29, 1891.

Application filed January 23, 1891. Renewed November 23, 1891. Serial No. 412,729. (No model.)

To all whom it may concern:

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

This invention consists in a novel organization of a machine which dips the entire batch of yarn simultaneously into the dye-liquor and lifts the same in like manner out of the dye-liquor and thus materially expedites the dyeing process, and which machine has each of its yarn-supporting bars arranged to rotate in opposite directions from the adjacent yarn-supporting bars and thereby effectually guards against the liability of the yarn on one bar becoming entangled with the yarn on the adjacent bars, and consequently permits said bars to be placed nearer to each other than in other machines of this class, said machine possessing various other advantages over prior machines of this class and combining simplicity of construction with superior efficiency of operation.

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

Figure 1 is a side elevation of a yarn-dyeing machine embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical longitudinal section on line *x x*, Fig. 2. Fig. 4 is a vertical transverse section on line *y y*, Fig. 3, minus some of the yarn-supporting bars to better illustrate the form of the journal-bearings in one side of the yarn-carrying frame. Fig. 5 is an enlarged top plan view of one of the end portions of one side of the yarn-carrying frame and the mechanism connected thereto for turning the yarn-supporting bars. Fig. 6 is an enlarged vertical transverse section of the aforesaid portion of the yarn-carrying frame and mechanism connected thereto. Fig. 7 shows detail views of the bolt which journals the yarn-supporting bar to the frame and connects to said bar the mechanism for turning it, and Figs. 8 and 9 are enlarged side views of said mechanism.

Similar letters of reference indicate corresponding parts.

A represents the vat in which is deposited the dye-liquor for dyeing the yarn. Said vat is preferably of rectangular form in its horizontal cross-section. To this vat are rigidly attached the parallel inclined ways D′ D′, which rise above the vat, as shown in Figs. 1 and 3 of the drawings, and may be terminated with horizontal ways D D at their bases. From the upper ends of the ways D′ D′ are extended horizontal ways D″ D″, for the purpose hereinafter explained.

B represents a horizontal rectangular frame, which is provided at the ends of its sides with carrying-wheels *a a*, by which said frame is mounted on the aforesaid ways. Said frame is caused to move up and down on the inclined ways D′ D′, and consequently toward and from the vat A, by means of a crank or wheel F, provided with a crank-pin, to which is connected the pitman G, which has its opposite end fork-shaped, as shown at G′, so as to allow it to engage a cross-bar on the end of the frame B and push said frame up on the inclined ways D′ D′. The frame, descending by gravity during the reverse movement of the pitman, maintains the latter in connection with the aforesaid cross-bar. The fork-shaped end of the pitman allows the frame B to be drawn out of engagement with the pitman and up to the upper horizontal ways D″ D″ and along on said ways when desired to remove the frame from over the vat.

For the purpose of thus drawing the frame B to the upper ways D″ D″, I secure to the latter a windlass H, which has its shaft extended across the said ways and journaled in posts secured thereto, and to this shaft is attached one end of a chain or cable H′, the opposite end of which is connected to the frame B. This windlass I also utilize to facilitate the upward movement of the frame during the operation of the machine by attaching to said windlass a counter-weight I.

b b b denote the bars upon which are hung the skeins of yarn to be dyed. These bars are preferably rectangular or otherwise polygonal in cross-section and extended across

the frame B, and journaled and detachably connected thereto by being seated at one end in notches *n n* in the top of the rear side rail of the frame B, as shown in Fig. 3 of the drawings. The opposite end is inserted in a cup *e*, secured to the end of a bolt *f*, which has a smooth portion by which it is journaled in the front side rail of the frame B, as shown in Fig. 6 of the drawings, and is formed with circumferentially-enlarged steps *f'* and *f''*, one of which is screw-threaded, and the other is smooth, as illustrated in Fig. 7 of the drawings. To the screw-threaded portion *f'* of each bolt is fastened a ratchet-wheel *c*, and to the smooth portion *f''* is pivoted a gravitating arm *d*, to the free end of which is connected a pawl *d'*, which engages the ratchet-wheel.

For turning the bars *b b* automatically, so as to shift the yarn longitudinally during the operation of the machine, I employ a bar C, extending lengthwise of the frame B and carried thereby movably longitudinally and partly independently of the frame by means of hangers *h h*, attached to the front side rail of the frame and having pivoted to them sheaves *h' h'*, on which the bar C rides. Said bar is formed with upward-projecting V-shaped cams C', which engage pins *i i*, secured to the arms *d d*.

To one of the lower horizontal ways D or bases of the inclined ways D' at one end of the vat A is attached a stop E, and a similar stop E' is secured to the upper part of the inclined way D' at the opposite end of the vat and same side of the apparatus. Said stops are in the path of the bar C, so as to cause one end of said bar to encounter the upper stop E' when the frame B is pushed up on the inclined ways D' D' by the pitman G. Said frame travels a sufficient distance after the encounter of the bar C with the stop E' to cause the said bar to be pushed back on the frame, and, by the engagement of the cams C' C' C' with the pins *i i i*, actuate the arms *d d d*, so as to turn the ratchet-wheels *c c c* by the pawls *d' d' d'*. The bars *b b b* being compelled to turn with the ratchet-wheels, causes the skeins of yarn hung on said bars to shift longitudinally thereon, said movement of the yarn being insured by the weight of the yarn, which at that time is lifted out of the vat and saturated with the dye-liquor, and thus has a firm hold on the polygonal bar *b*. A dog *d''* is pivoted to the frame B and engages the ratchet-wheel *c*, so as to prevent its reverse movement while the frame B descends on the inclined ways D' D' and dips the yarn into the dye-liquor in the vat A. In the latter part of this descending movement of the frame B the end of the bar C collides with the lower stop E, and is thereby pushed toward the opposite end of the frame sufficient to bring the bases of the cams C' C' under the pins *i i*, and thus the arms are allowed to drop by gravity, and the pawls *d' d'* obtain a hold on another portion of the ratchet-wheels, while the latter are held stationary by the dogs *d'' d''*. Inasmuch as the bar C has a vertical movement while in engagement with the aforesaid stops, I guard against undue friction between said parts by pivoting rollers *g g* to the ends of said bar.

To guard against the entanglement of the yarn on one bar *b* with that hung on the adjacent bar or bars and to also allow the said bars to be arranged closer to each other, and thus increase the capacity of the machine, I make each bar rotate in opposite direction from the adjacent bar or bars by pitching the teeth of each ratchet-wheel in opposite direction from those of the adjacent wheel or wheels and arrange the arms *d d* and pawls *d' d'* accordingly, as illustrated in Figs. 8 and 9 of the drawings.

To allow the frame B to be drawn up onto the upper horizontal way D'' when desired, I make the upper stop E' removable from the way D' in any suitable manner.

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

1. The combination, with the dye-liquor vat, of inclined ways rising to an elevation above the vat to carry the yarn out of the dye-liquor, a horizontal frame provided with carrying-wheels, mounted on said ways, yarn-supporting bars connected to said frame, a rotary crank, and a pitman connecting said crank with the aforesaid frame, as set forth.

2. The combination, with the dye-liquor vat, of parallel inclined ways rising above the vat, a frame mounted on said ways movable toward and from the vat, yarn-supporting bars journaled to said frame, ratchet-wheels attached to said bars, pawls engaging said ratchet-wheels, and a bar extending lengthwise of the aforesaid frame, partly movable longitudinally independent of said frame and actuating the aforesaid pawls to turn all the yarn-supporting bars simultaneously, substantially as set forth.

3. In combination with the dye-liquor vat, parallel inclined ways at opposite sides of said vat, a frame mounted on said ways and movable toward and from the vat, yarn-supporting bars journaled to said frame, ratchet-wheels attached to the axes of said bars, gravitating arms pivoted to said ratchet-wheels, pawls connected to said arms and engaging the ratchet-wheels, a bar extending lengthwise of said frame and carried thereby and movable longitudinally partly independent thereof, cams on said bar engaging the aforesaid arms, and stops arresting the movement of said bar during part of the movement of the frame, as and for the purpose set forth.

4. In combination with the vat A, the parallel inclined ways D' D', rising above the vat, the horizontal frame B, provided with carrying-wheels *a a* and mounted thereby on the aforesaid ways, the yarn-supporting bars *b b b*, journaled to said frame, ratchet-wheels *c c c*, secured to said bars at one end, the gravitating arms *d d*, having pawls *d' d'*, en-

gaging the ratchet-wheels, the longitudinal bar C, carried by the frame B, movable longitudinally independent thereof and having cams C′ C′, engaging the aforesaid gravitating arms, and the stops E and E′, respectively at the base and upper part of the inclined ways and in the path of the bar C, substantially as described and shown.

5. In combination with the dye-liquor vat, parallel inclined ways rising above the vat, horizontal ways extending from the upper ends of the inclined ways and beyond the end of the vat, and a yarn-carrying frame mounted on said ways and movable toward and from the vat, as and for the purpose set forth.

6. In combination with the dye-liquor vat, parallel inclined ways rising above said vat, horizontal ways extending from the upper ends of the inclined ways, a yarn-carrying frame mounted on said ways and movable toward and from the vat, and a windlass on the upper horizontal ways and connected by chain or cable with the movable frame, as set forth.

7. In combination with the vat A, inclined ways D′ D′, and yarn-carrying frame B, the rotary crank F, the pitman G, pushing the frame B, the windlass H, connected to the said frame by chain or cable, and a counterweight connected to said windlass, as and for the purpose set forth.

8. In combination with the vat A, inclined ways D′ D′, and yarn-carrying frame B, mounted on said ways, the horizontal ways D′ D′, extending from the upper ends of the inclined ways, and the pitman G, having the forked end G′, adapted to engage and release the frame and allow the same to move away from the vat, as set forth.

9. In combination with the dye-liquor vat, yarn-supporting bars disposed parallel side by side and pivoted at their ends, ratchet-wheels secured to said bars and each of said ratchet-wheels having its teeth pitched in opposite directions from those of the adjacent ratchet-wheel, pawls engaging said ratchet-wheels, and a bar extending across the ends of said yarn-supporting bars and actuating all of the pawls simultaneously, as set forth.

10. In combination with the vat A, the inclined ways D′ D′, frame B, mounted on said ways and movable toward and from the vat, the yarn-supporting bars *b b b*, journaled to said frame, ratchet-wheels *c c c*, secured to said bars and each of said ratchet-wheels having its teeth pitched in opposite directions from those of the adjacent ratchet-wheels, gravitating arms *d d d*, having pawls *d′ d′ d′*, engaging said ratchet-wheels, the longitudinal bar C, carried by the frame B and movable longitudinally independent thereof, cams C′ C′ on said bar engaging the aforesaid gravitating arms, and stops E E′ in the path of the bar C to temporarily arrest the movement of said bar during the movement of the aforesaid frame, substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name this 16th day of December, 1890.

LEONARD WELDON. [L. S.]

Witnesses:
MARK W. DEWEY,
H. M. SEAMANS.