

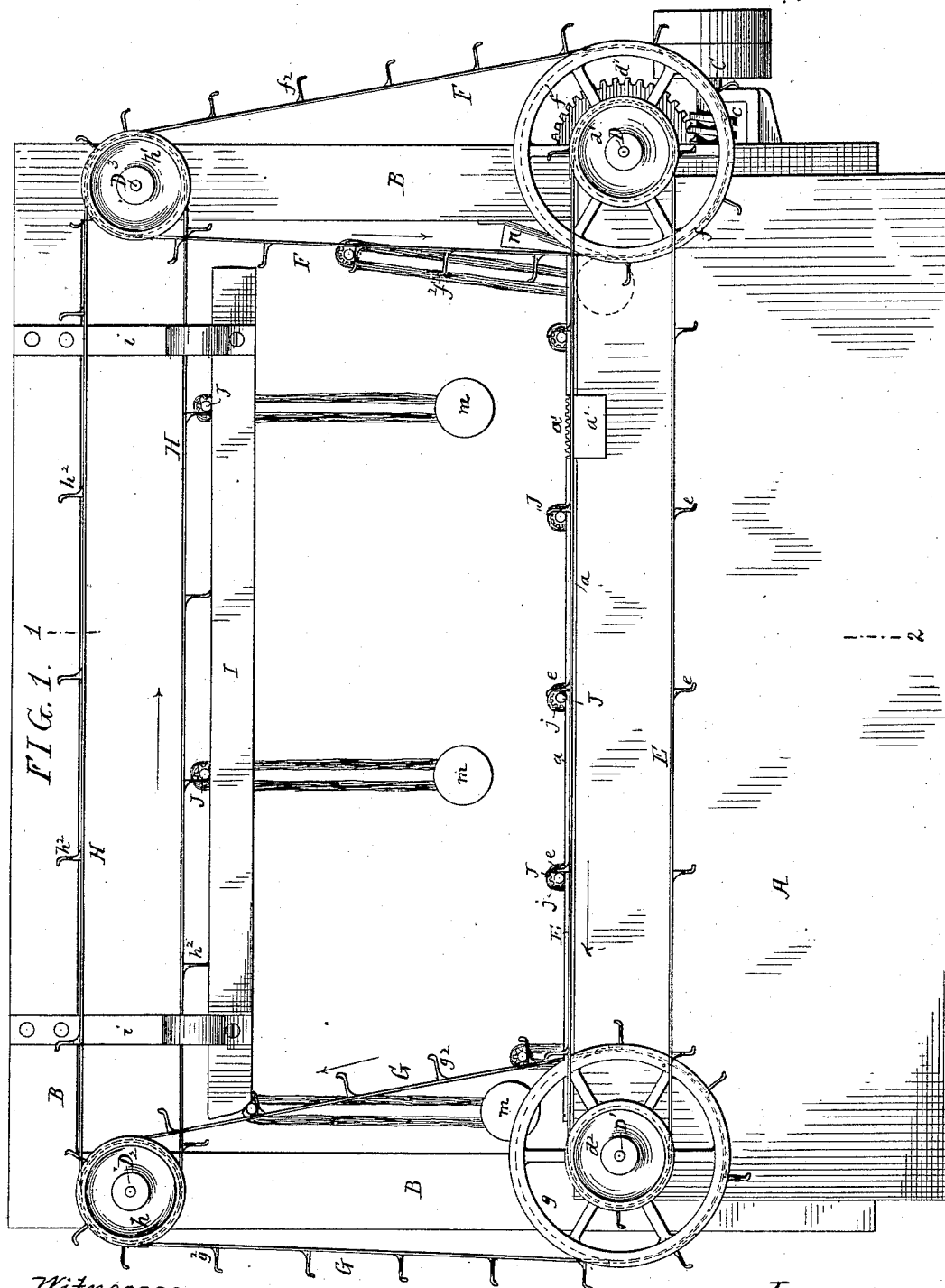
(No Model.)

3 Sheets—Sheet 1.

G. H. CRAVEN.
DYEING MACHINE.

No. 417,908.

Patented Dec. 24, 1889.



Witnesses
John Wilson Orr
Murray Cheston Boyer

Inventor
George H. Craven
by his Attorneys
Howson & Howson

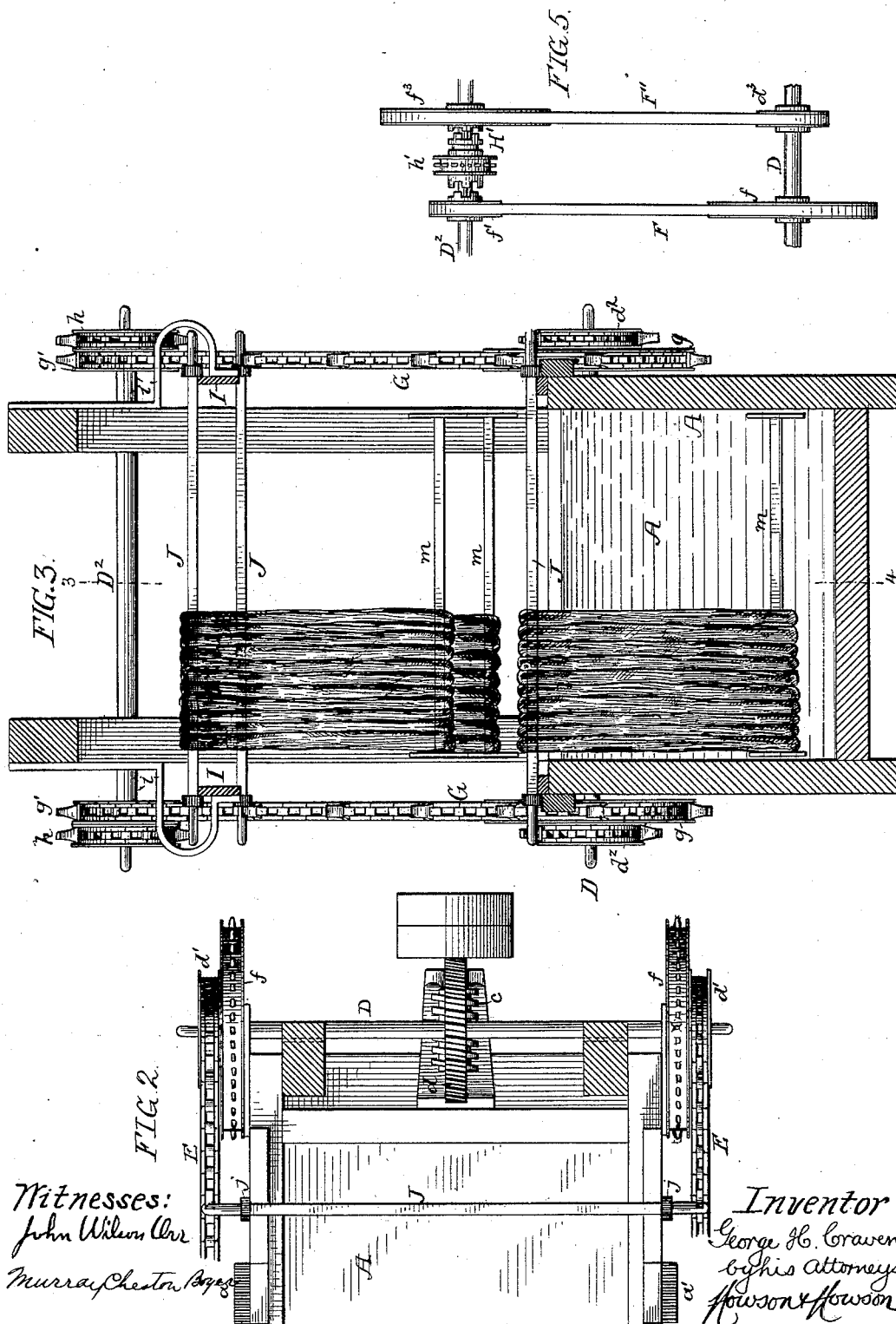
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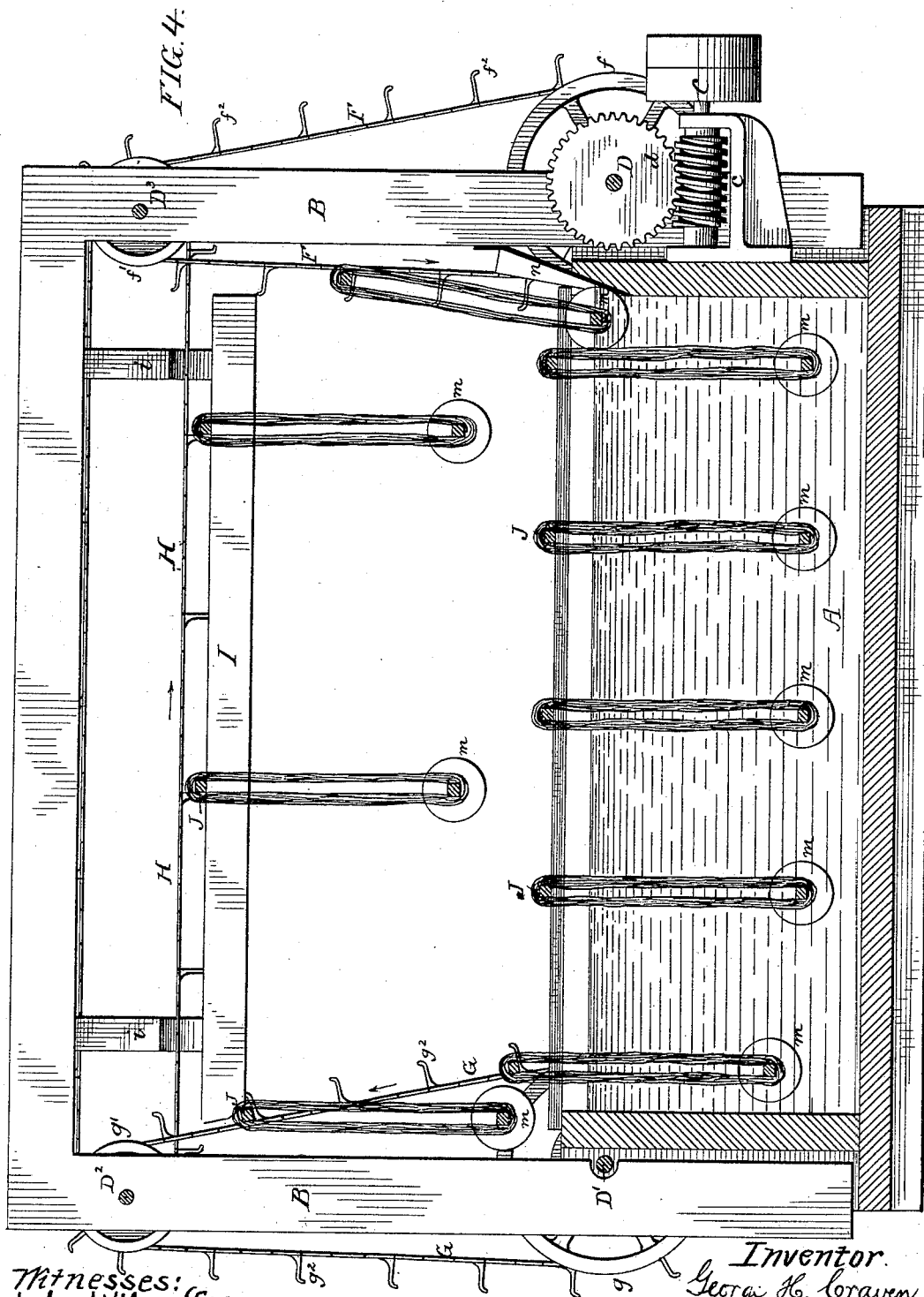
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UNITED STATES PATENT OFFICE.

GEORGE H. CRAVEN, OF PHILADELPHIA, PENNSYLVANIA.

DYEING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 417,908, dated December 24, 1889.

Application filed July 22, 1889. Serial No. 318,237. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. CRAVEN, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Dyeing-Machines, of which the following is a specification.

The object of my invention is to so construct a machine for dyeing skeined yarn that the yarn will be carried through the dyeing-liquid, up over the vat, and into the liquid again by continuously-moving mechanism, and this object I attain in the manner hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of my improved yarn-dyeing machine. Fig. 2 is a sectional plan view of one end of the machine. Fig. 3 is a transverse sectional view on the line 1 2, Fig. 1. Fig. 4 is a longitudinal sectional view on the line 3 4, Fig. 3. Fig. 5 is a view of a detail of my invention.

A is the vat or tank containing the dyeing or other liquid, this tank in the present instance being quadrangular in form and open at the top.

B is a frame mounted on the vat or tank and provided with bearings for four transverse shafts D, D', D², and D³, D being the driving-shaft, provided in the present instance with a worm-wheel *d*, meshing with a worm *c* on a short shaft C, which has fast and loose pulleys for the reception of the belt by which the machine is driven.

On each side of the vat A is a longitudinal belt E, which passes over a sprocket-pulley *d'* on the shaft D and over a belt-pulley *d''* on the shaft D', each belt E being provided with a series of fingers *e e*, preferably with bent ends, which engage with the ends of the yarn-carrying bars or sticks J, which slide upon rails *a a* on the upper edge of the tank or vat A. Chain belts are shown in the present instance; but any suitable belts may be used.

On the shaft D are sprocket-wheels *f*, around each of which passes a vertical belt F, which extends up to and around a wheel *f'* on the shaft D³. These belts also have fingers *f''*, on which are carried the yarn bars or sticks J, the belts being so timed that the fingers on the belts F will remove the bars J from the fingers of the belt E.

On the shaft D' are belt-wheels *g g*, around each of which passes a vertical belt G, which extends upward and over a belt-wheel *g'* on the shaft D². This belt has fingers *g''*, similar to the fingers *e* on the belt E.

Extending from the shaft D² to the shaft D³ are two belts H, which pass over belt-pulleys *h h* on the shaft D² and over sprocket-pulleys *h'* on the shaft D³. These belts H are provided with fingers *h''*, which traverse the yarn-carrying bars from one vertical belt to the other. The direction of the movement of the belts is indicated by the arrows, Fig. 1.

Hung by brackets *i i*, on each side of the frame B, are rails I I, on which rest the bars J in their travel across the machine from the vertical belts G to the belts F, under control of the belts H. It will be noticed, on referring to the drawings, that the inner run of each belt G is inclined, which tends to prevent the bars from dropping off the belt when they are raised from the belt E to the belt H.

The machine is so timed that the fingers on the belts G will remove the bars J from in front of the fingers on the belts E without stopping the machine, and the fingers on the belts H will likewise remove the bars from the belts G and transfer them onto the rails I without stoppage of the machine. The fingers on the belts H push the bars J from off the rails I onto the fingers on the inner run of the vertical belts F, which deposit the bars onto the rails *a a*, allowing the yarn to be submerged in the liquid in the tank or vat.

A flanged roller *m* is hung in the skeins of yarn, so as to keep them from tangling and twisting in their passage through the liquid and over the tank.

In order to guide the rollers *m* and the yarn into the vat, I provide inclined guideways *n*, adjacent to the belts F, so that as the bar carrying the yarn and the roller is let down into the liquid by the belt the flange of the roller will strike the inclined guideways *n* and be directed into the tank. It will be seen that the yarn is not wholly submerged in the liquid, a portion of the yarn being above the liquid, and in order to dye this portion the bars are given a slight rotary motion as they pass through the liquid, thus subjecting the whole of each hank or skein to treatment. On each edge of the tank is a

short rack a' , which engages with pinions j on the bars, and as the bars are carried over this rack by the belts E they will be rotated and the yarn turned, as will be readily seen on reference to Figs. 1 and 2.

The details of construction of the frame of the machine may be varied without departing from my invention.

In order to test the yarn at intervals, I provide means by which all the sticks or bars J can be permitted to accumulate upon the rails I I, clear of the tank, so that the yarn can be inspected, and if further treatment is desired can be again submerged in the liquid. For this purpose the shaft D is provided with a second sprocket-wheel d^3 , of less diameter than the wheel d' , and on the shaft D³ is a sprocket-wheel f^3 , of greater diameter than the wheel h' . (See Fig. 5.) These wheels are connected by a belt F', and the hubs of the wheels f' f^3 are provided with clutch-teeth, with which may engage the teeth on the clutch H', carrying the wheel h' of the belt H, so that when it is wished to place all the sticks or bars upon the rails I I the clutch is thrown in gear with the teeth of the wheel f^3 , thus diminishing the speed of the belts H, allowing the sticks to accumulate on the rails I I, after which the machine is stopped.

I claim as my invention—

1. The combination, in a yarn-dyeing machine, of the vat, the loose yarn-carrying bars, with horizontal belts E and H and vertical belts G and F, having fingers thereon, and mechanism for driving said belts, whereby the yarn is carried longitudinally through the vat and raised clear of the same and transferred to the opposite end of the vat, substantially as set forth.

2. The combination, in a yarn-dyeing machine, of the vat, the frame carrying the longitudinal rails I, loose-yarn bars adapted to the rails, horizontal belts adapted to traverse the yarn carried by the bars through the liquid, vertical belts for raising the bars to the rails I, horizontal belts for traversing the bars on the rails I, and vertical belts for transferring the bars from the rails to the vat, substantially as set forth.

3. The combination, in a yarn-dyeing machine, of the vat, the frame with independent horizontal and vertical fingered propelling-belts, mechanism for driving said belts, with loose-yarn-carrying bars propelled by said belts in a manner substantially as specified.

4. The combination, in a yarn-dyeing machine, of the vat, yarn-carrying bars, a series of belts driven substantially as described, with guides n at the feed end of the vat and adapted to direct the yarn into the vat as the carrying-bars are lowered, substantially as set forth.

5. The combination, in a yarn-dyeing machine, of the vat, the frame, rails carried thereby, loose-yarn-carrying bars, with horizontally-driven belts E and H and vertically-driven belts G and F, and mechanism, substantially as described, for decreasing the speed of the belt H, by which the yarn-bars are packed on the rails, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE H. CRAVEN.

Witnesses:

HENRY HOWSON,
HARRY SMITH.