

(No Model.)

3 Sheets—Sheet 1.

I. F. PECK.  
MACHINE FOR DYEING YARN IN COPS.

No. 436,433.

Patented Sept. 16, 1890.

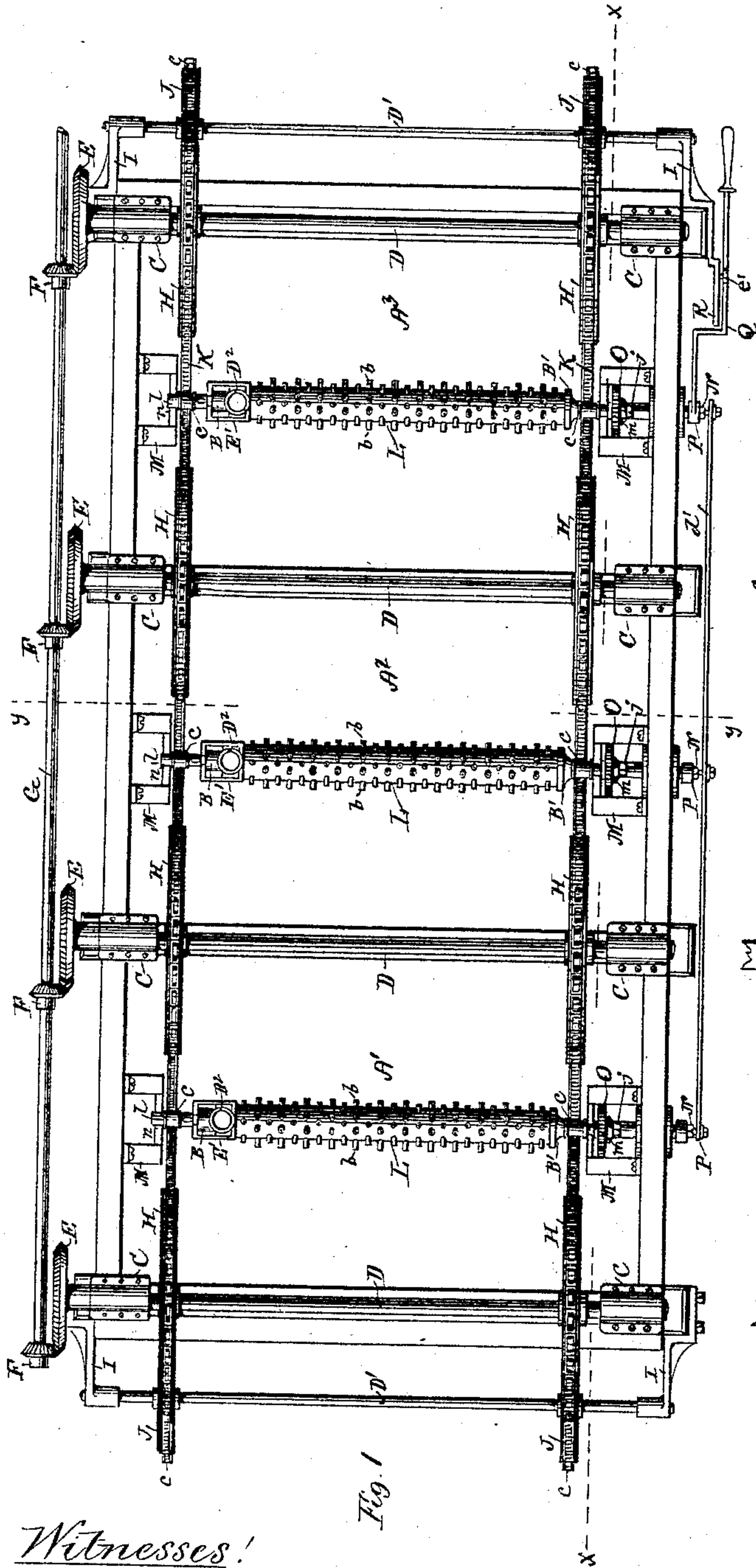


Fig. 1

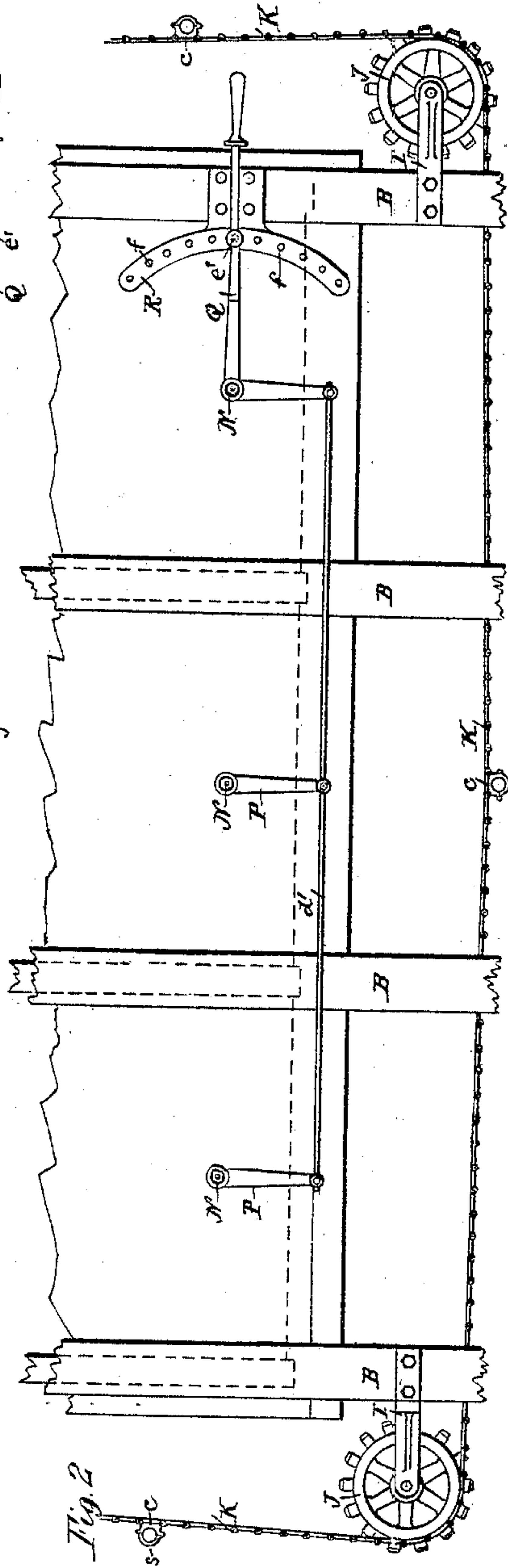


Fig. 2

Witnesses:

John S. Lynch  
P. A. Fairbrother, Jr.

Inventor:

Ira F. Peck  
per S. Scholfield  
attorney

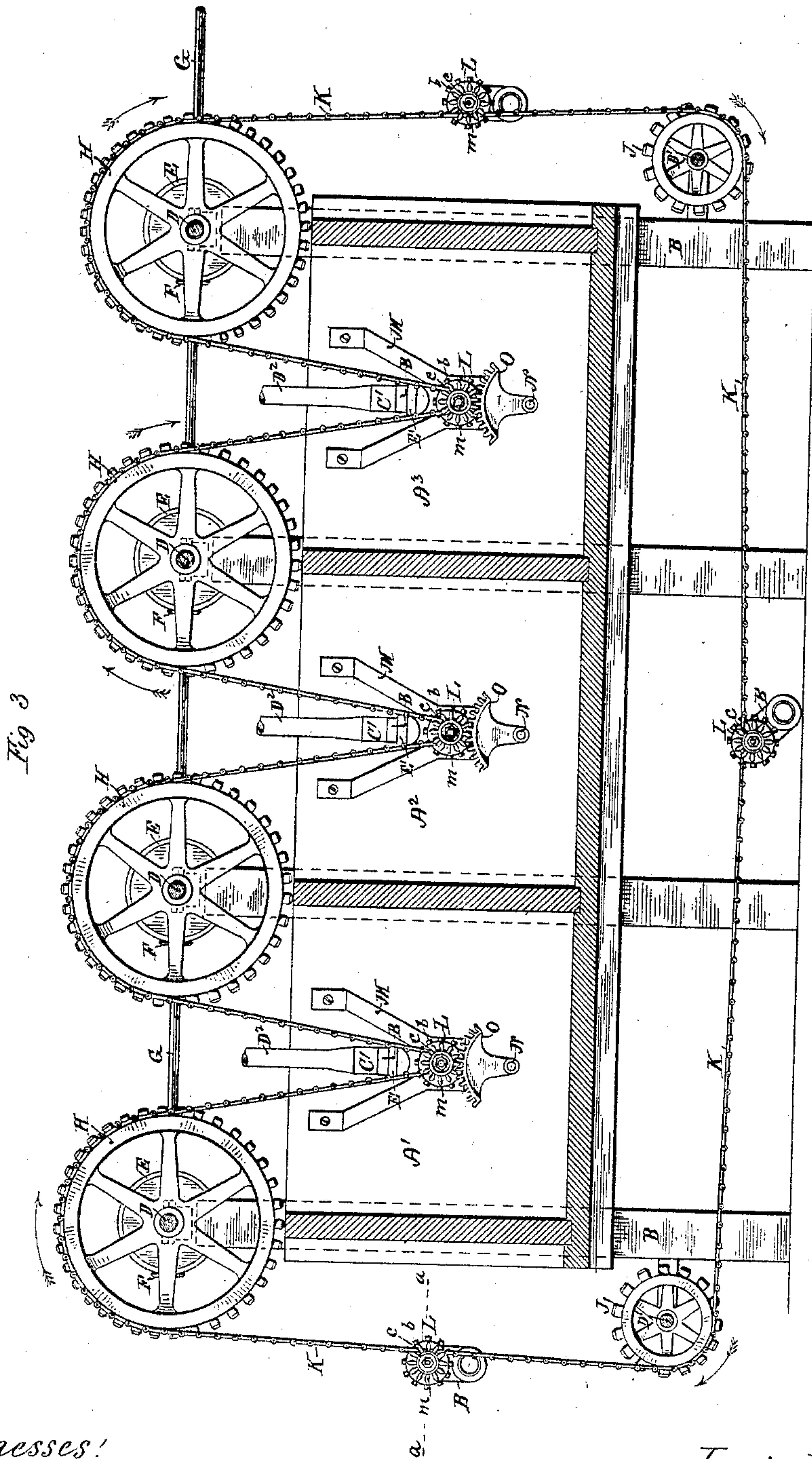
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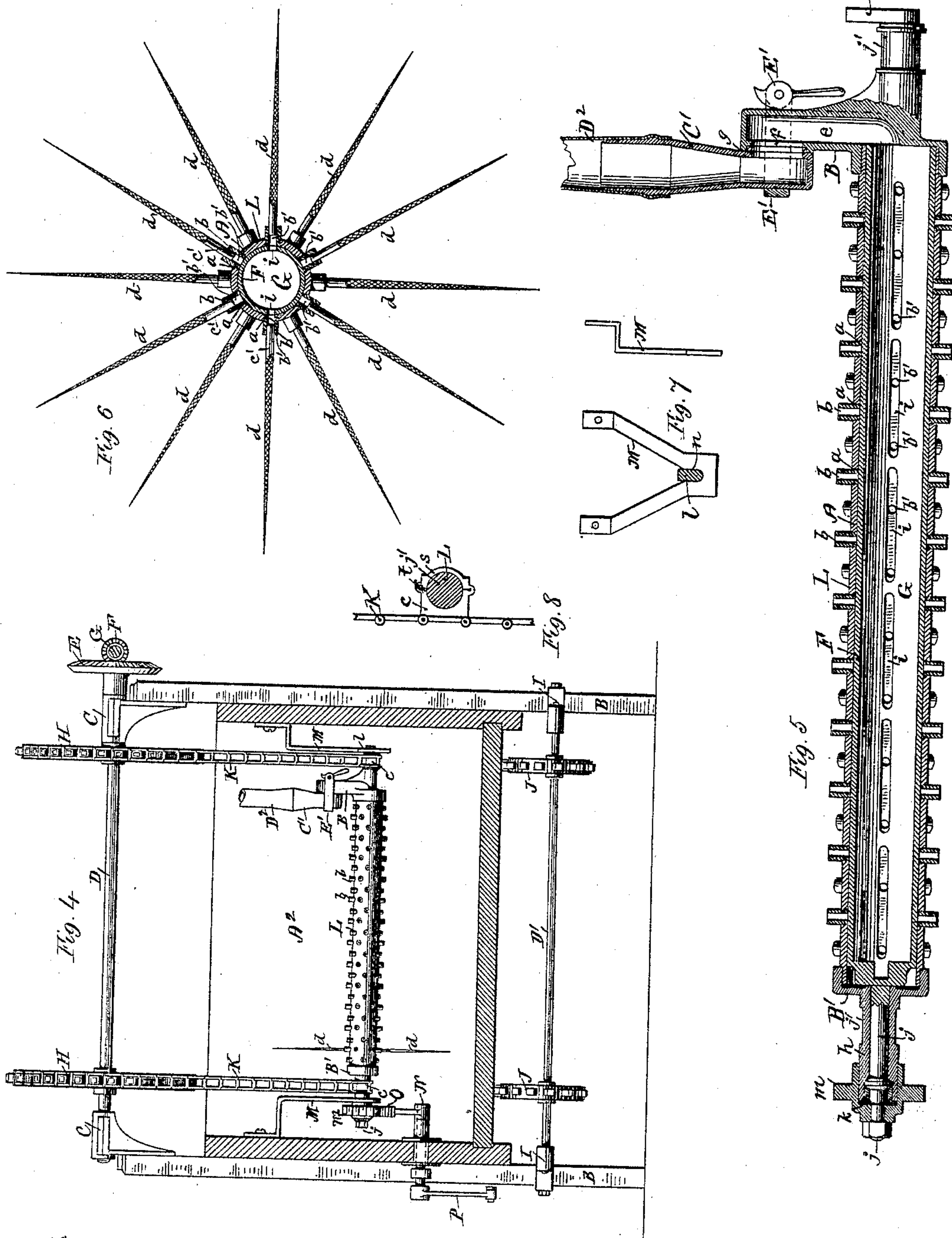
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Witnesses,

John S. Lynch  
P. A. Fairbrother, Jr.

Inventor.

Gra. H. Beck  
 per S. Scholfield  
 Attorney



# UNITED STATES PATENT OFFICE.

IRA F. PECK, OF PROVIDENCE, RHODE ISLAND.

## MACHINE FOR DYEING YARN IN COPS.

SPECIFICATION forming part of Letters Patent No. 436,433, dated September 16, 1890.

Application filed May 21, 1890. Serial No. 352,648. (No model.)

*To all whom it may concern:*

Be it known that I, IRA F. PECK, a citizen of the United States, residing at Providence, in the State of Rhode Island, have invented a new and useful Improvement in Machines for Dyeing Yarn in Cops, of which the following is a specification.

In dyeing yarn in cops which are immersed in the dyeing-liquor upon hollow spindles, through which the dyeing-liquor is made to pass by means of a suction-pump, it is very desirable to be able to operate upon a few spindles at a time while a comparatively large number of spindles are being held in the vat of dyeing-liquor ready to be acted upon alternately with the others, and by this means a uniform shade of color will be produced in all of the cops in the vat, and the time employed for properly dyeing the yarn will be greatly lessened; and my invention consists in the devices employed for moving the spindle-carriers from one vat of the dyeing apparatus to another, and in the devices for causing the required movement of the valve of the spindle-carriers, as hereinafter fully set forth.

Figure 1 represents a top view of a cop-dyeing machine embodying my invention. Fig. 2 represents a partial side elevation of the same, showing the mechanism for adjusting the valves of the spindle-carriers. Fig. 3 represents a vertical section taken in the line  $x x$  of Fig. 1. Fig. 4 represents a transverse section taken in the line  $y y$  of Fig. 1. Fig. 5 represents a longitudinal section of the spindle-carrier. Fig. 6 represents a transverse section of the same. Fig. 7 represents a face and an edge view of one of the fixed side guides for holding the spindle-carrier firmly in position while the valve is being rotated, the stem-guide of the carrier be- shown in section. Fig. 8 represents an enlarged side elevation of the link of the chain which forms a bearing for the stem of the carrier.

In the accompanying drawings,  $A' A^2 A^3$  are adjoining vats adapted to hold the several solutions required to properly dye the yarn, and which are supported at the proper height above the floor by means of the posts  $B B$ . At the upper ends of the posts  $B B$  are placed the bearing-boxes  $C C$ , in which are

placed the chain-driving shafts  $D$ , and upon one end of each of the shafts  $D$  is placed a bevel-gear  $E$ , which engages with a pinion  $F$ , placed upon the shaft  $G$ , so that upon the rotation of the shaft  $G$  by any suitable means the shafts  $D$  will all be rotated in the same direction.

Upon the shafts  $D$ , at the inner side of the boxes  $C C$ , are secured the sprocket-wheels  $H H$ , and upon the shafts  $D'$ , supported by the brackets  $I$ , which are attached to the end posts  $B$ , are placed the sprocket-wheels  $J$ , and upon the sprocket-wheels  $H$  and  $J$ , at opposite sides of the machine, are placed the chains  $K K$ , to which the spindle-carriers  $L$  are to be attached, a link  $c$  at proper intervals in the chain being made to loosely embrace the end portion of the carrier, as shown enlarged in Fig. 8.

The spindle-carrier  $L$  is provided with a perforated cylindrical shell  $A$ , into the perforations  $a a$  of which are inserted the short tubes  $b b$ , the said tubes being adapted to receive the tapered inserting shank  $c'$  of the hollow spindle  $d$ , upon which the cop is to be placed. The shell  $A$  is provided at one end with the hollow head  $B$ , which may be fastened upon the end of the shell by means of a screw-thread, and which is provided with a passage  $e$ , which extends to an opening  $f$  at the coupling-joint  $g$ . The hose  $D^2$ , which is to be connected to a suitable pump for drawing the dyeing solution through the cop, is provided with a hollow joint-piece  $C'$ , which is held against the head  $B$  at the opening  $f$  to form a tight coupling-joint at  $g$  by means of the hand-clamp  $E'$ . At the opposite end of the shell  $A$  is secured the head  $B'$ , provided with the hollow hub  $h$ , and within the bore of the cylindrical shell  $A$  and closely fitting the same is placed the valve  $F$ , which extends from end to end of the shell  $A$ , the said valve being provided at its opposite sides with the openings  $i i$ , so that the opposite longitudinal series of spindles  $d d$  will be acted upon by the vacuum in the chamber  $G$ , while the remaining spindles around the shell  $A$  will be unacted upon. The valve-stem  $j$  passes through the hollow hub  $h$ , which is provided with a stuffing-box  $k$ , and upon the projecting end of the stem  $j$  is placed a gear  $m$ , by means of which the valve  $F$  may be ro-



tated within the shell A to successively cover and uncover the openings  $b'$  to the spindles  $d$ , the shell A being at the same time held stationary by means of the angularly-shaped side guide M, which holds the flattened stem-guide  $l$  of the carrier, as shown in Fig. 7, and as the valve F is turned within the shell A the several longitudinal series of spindles  $d$ , which project from the periphery of the shell, will be successively brought under the action of the vacuum employed for causing the dyeing solution to flow through the cops placed upon the spindles.

Upon the inner end of the short shaft N, extending through the side of the vats A with a stuffing-box bearing, is placed the segment-gear O, which is adapted to engage with the gear  $m$ , connected with the valve F, and upon the outer end of the shaft N is placed the arm P. The several arms P at the outside of the vats A are connected to each other by means of a rod  $d'$ , so that the several shafts N and segment-gears O can be moved equally and in unison with each other. To the end of one of the shafts N is attached the hand-lever Q, provided with a pin  $e'$ , which is adapted to enter the holes  $f$ , made in the side of an arc R, attached to the post B, and the holes  $f$  are so graduated that when the hand-lever Q is moved from one hole to the next adjoining hole the connected segment-gears O will be moved through a space sufficient to cause the closing of one series of apertures leading to the spindles and the opening of the adjoining series of apertures, and by the movement of the hand-lever Q from hole to hole on the arc R the spindles  $d$  will be brought successively under the action of the pump employed to produce a vacuum in the chamber G of the valve F.

In operating with the machine the vats  $A^1 A^2 A^3$  are to be filled with the properly-graduated dyeing solutions, and a carrier L, provided with its complement of spindles  $d$  and attached cops, is to be secured to the chain by means of the specially-arranged links  $c$ , which are each provided with the hinged arm  $s$ , secured at its outer end by means of a pin  $t$  and adapted to embrace the cylindrical bearing  $j'$  of the carrier, so that when the carrier is in any position out of the angularly-shaped side guides M it may be rotated in the bearings formed by the opposite links  $c$  of the chains K K, and when the pump-hose  $D^2$  has been secured in place by means of the clamp E, then by turning the shaft G in the proper direction the carrier L, which may be attached to the chain at the line  $a$ , Fig. 3, will be carried forward into the first vat  $A^1$  of the series, the gear  $m$  being carried down by the weight of the carrier into contact with the segment-gear O and the flattened upwardly-projecting stem-guide  $l$  of the carrier being held in the notch  $n$  at the apex of the angularly-shaped guide M, so that the shell A of the carrier will be firmly held pending the movement of the valve F,

as before described, by means of the hand-lever Q. When the cops upon the first attached carrier have been successively treated to the circulation induced by the pump and have become thoroughly saturated with the solution in the first vat, the pump-hose  $D^2$  is to be removed and a second carrier, with its attached spindles and cops, is to be attached to the next succeeding link  $c$  of the chains at the line  $a$  and a separate pump-hose  $D^2$  is to be attached to each of the two carriers. Then by turning the shaft G the first carrier will be carried with the chains from the first vat over into the second vat and the second carrier will be carried into the first vat, so that both carriers will be in the proper position for the movement of their respective valves by means of the hand-lever Q, and when the cops upon the spindles of both carriers have been sufficiently treated by the forced passage of the solution in the vats through the immersed cops the separate pump-hose  $D^2$  is to be removed from each, and another carrier, with its attached spindles and cops, is to be attached to the next succeeding attaching-link  $c$  of the chains at the line  $a$  and a separate pump-hose  $D^2$  is to be attached to each of the three carriers. Then by turning the shaft G the first carrier will be carried over into the third or finishing vat, the second carrier will be carried over from the first vat into the second, and the third carrier will be carried over into the first vat, and then by means of the hand-lever Q the valves of each of the carriers will be operated simultaneously until all of the cops have been successively treated and thoroughly saturated with their respective solutions, and thereafter upon the attachment of another carrier with its charge of spindles and cops with the disengagement and reattachment of the pump-hose  $D^2$  and the forward movement of the chains, as before. By turning the shaft G the first carrier, with the spindles  $d$  and their completely-dyed cops, can be removed from the chains, the said carrier having passed from the third vat to a convenient position at the end of the machine. The further operation of the machine will be continuous, a carrier having its spindles provided with fresh cops being supplied to the chains at one end of the machine, while the carriers with the completely-dyed cops can be removed from the chains at the opposite end of the same; or, if preferred, a carrier can be permanently held in each of the links  $c$  of the chains, as shown in Fig. 3, and the fresh cops be supplied to the carrier at the entering end of the machine and the properly-dyed cops be removed from the carrier at the discharging end of the same, whereby the operation of the machine will be continuous, the forward movement of the carriers being arranged at proper intervals.

I claim as my invention—

1. In a machine for dyeing yarn in cops, the combination, with the vats, of the spindle-carrier chains, the spindle-carriers arranged



at intervals upon the chains, and the fixed guides in the vats for the opposite ends of the carriers, substantially as described.

2. In a machine for dyeing yarn in cops, the combination, with the vats, of the spindle-carrier chains, the spindle-carriers arranged at intervals upon the chains, and the movable pump hose or pipe, by means of which the required circulation of the dyeing solution is effected, substantially as described.

3. In a machine for dyeing yarn in cops, the combination, with the vats, of the spindle-carrier chains, the spindle-carriers arranged at intervals upon the chains and provided with an interior valve having a gear upon its stem, the attached pump hose or pipe, the fixed guides in the vats for the opposite ends of the carriers, and the connected segment-

gears for operating the valve of the carriers, and means for holding the valve in its required positions for successive operation upon the cops, substantially as described.

4. In a machine for dyeing yarn in cops, the combination, with the vats, of the spindle-carrier chains provided with links which form suitable bearings for the carriers, the spindle-carriers loosely held in the carrier-bearings of the chain, the fixed guides in the vats for the opposite ends of the carriers, and the stem-guide for holding one end of the carrier stationary while the valve is being operated, substantially as described.

IRA F. PECK.

Witnesses:

JOHN S. LYNCH,  
SOCRATES SCHOLFIELD.