

(No Model.)

4 Sheets—Sheet 1.

L. WELDON.
DYEING APPARATUS.

No. 566,258.

Patented Aug. 18, 1896.

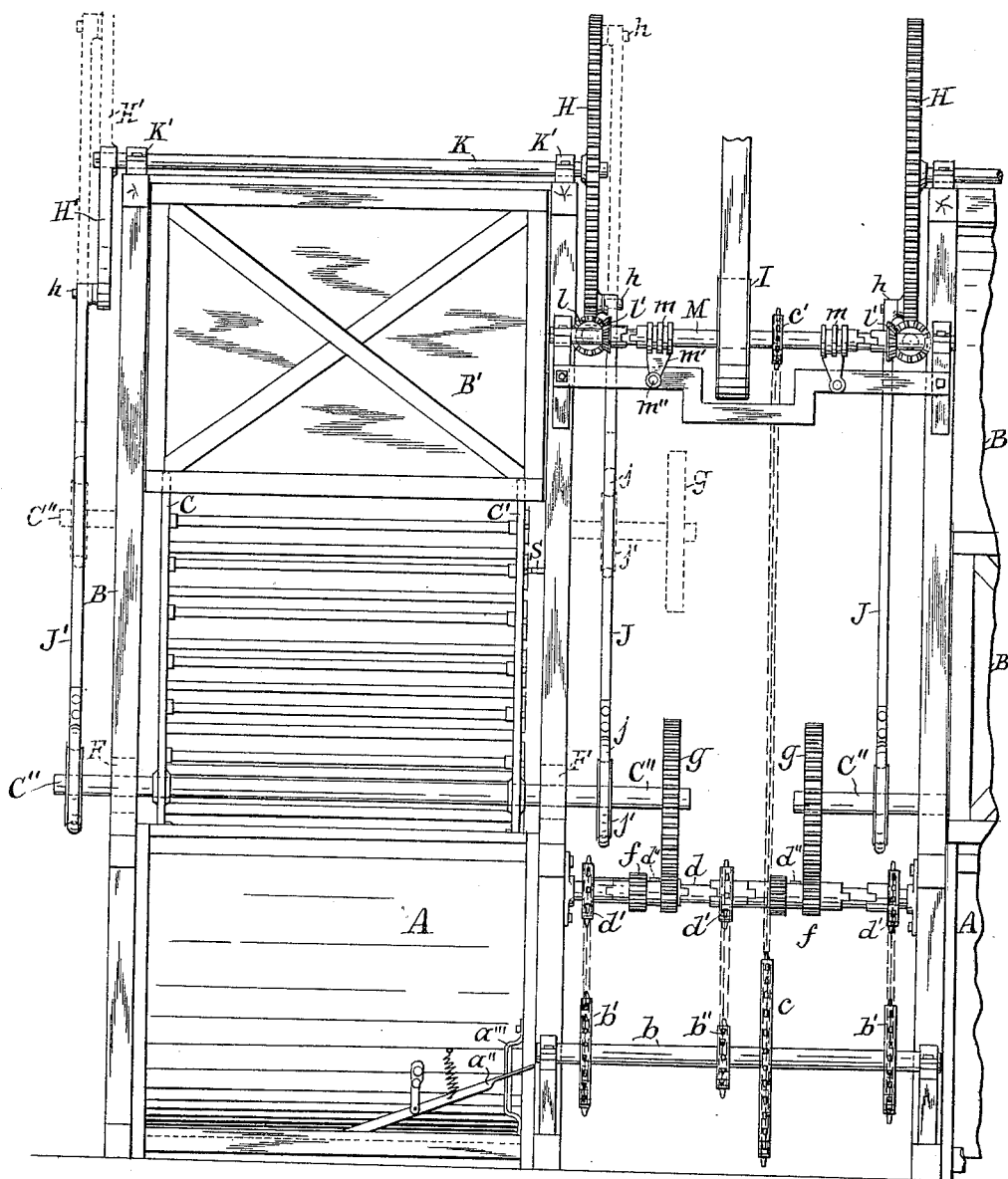


Fig. 1.

Witnesses.

R. D. Dwyer
H. M. Seaman

Inventor.

Leonard Weldon
By *C. H. Duell*

his Attorney.

(No Model.)

4 Sheets—Sheet 2.

L. WELDON.
DYEING APPARATUS.

No. 566,258.

Patented Aug. 18, 1896.

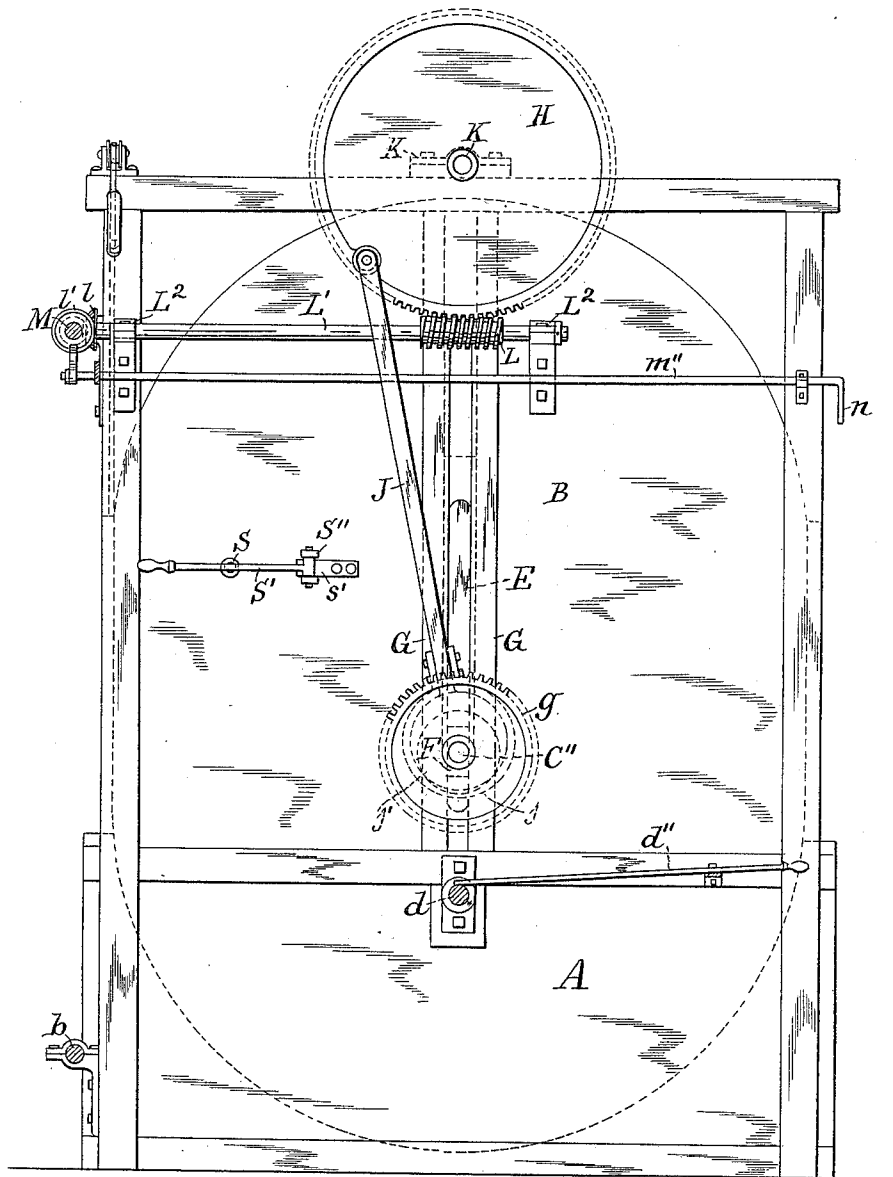


Fig. 2.

Witnesses.

R. T. Serrey
H. M. Scammon

Inventor.

Leonard Weldon
By C. H. Duell
his Attorney.

(No Model.)

4 Sheets—Sheet 3.

L. WELDON.
DYEING APPARATUS.

No. 566,258.

Patented Aug. 18, 1896.

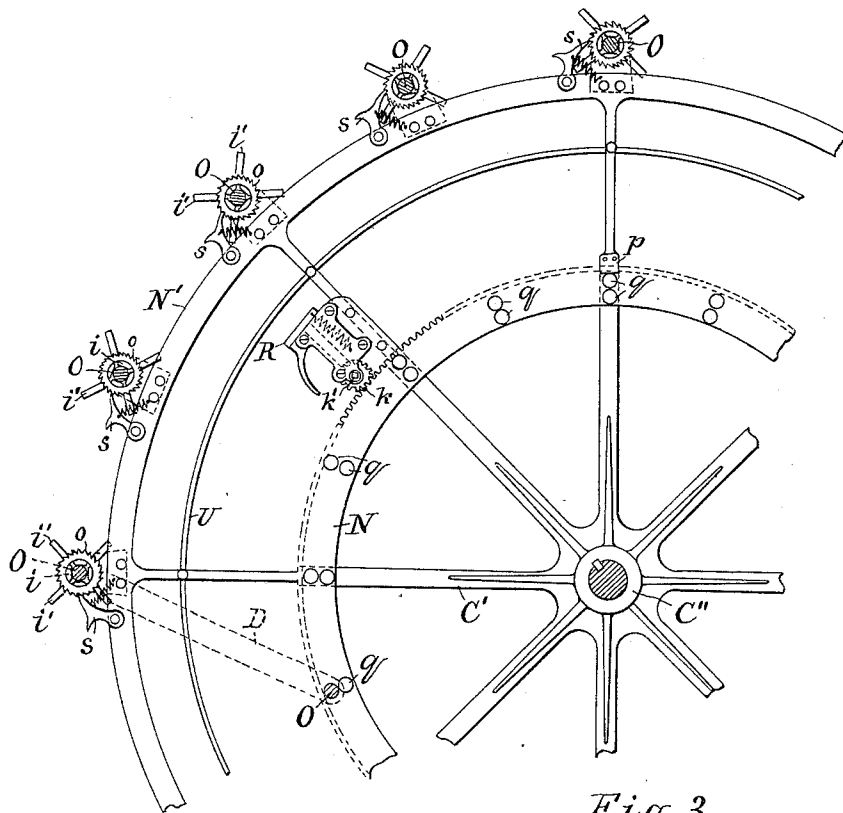


Fig. 3.

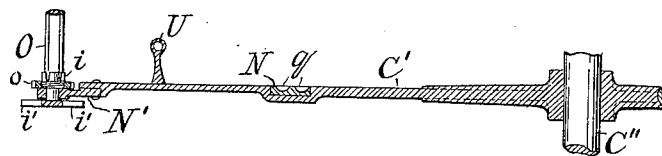


Fig. 4.

Witnesses.

R. D. Grey
H. M. Seaman

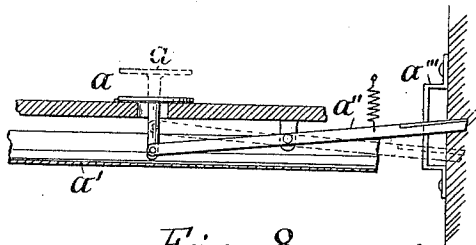
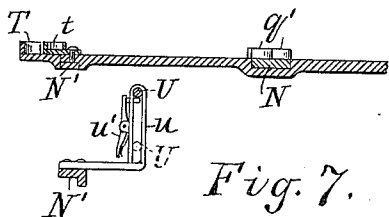
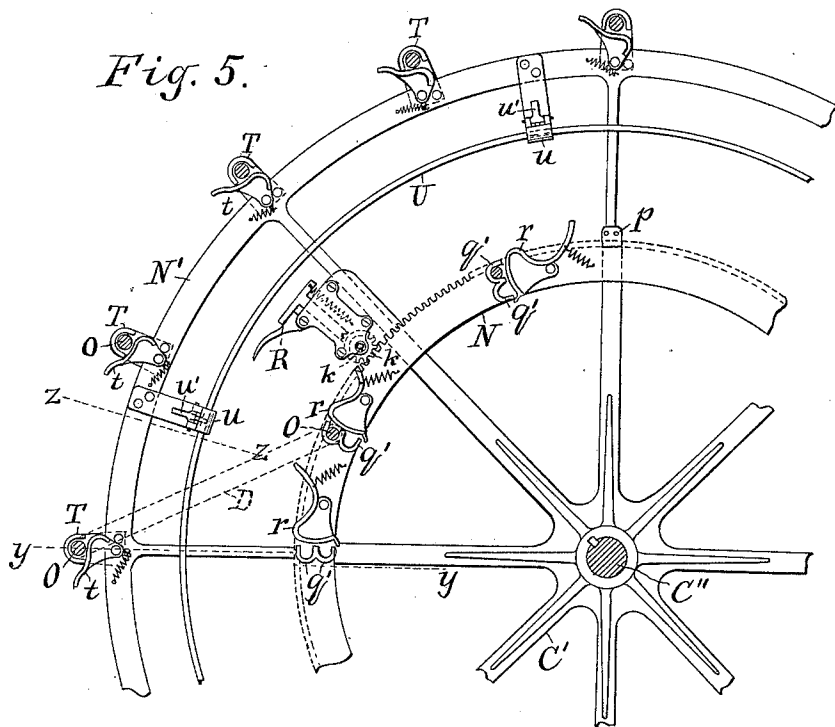
Inventor.

Leonard Weldon
By *C. H. Duell*
his Attorney.

L. WELDON.
DYEING APPARATUS.

No. 566,258.

Patented Aug. 18, 1896.



Witnesses.

R. D. Smith
H. W. Seaman

Fig. 8.

Inventor.
Leonard Weldon
By *C. H. Duell*
his Attorney.

UNITED STATES PATENT OFFICE.

LEONARD WELDON, OF AMSTERDAM, NEW YORK.

DYEING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 566,258, dated August 18, 1896.

Application filed April 21, 1896. Serial No. 588,525. (No model.)

To all whom it may concern:

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

My invention relates to a machine for dyeing yarns in skeins, and comprises an improvement in the reel whereby the same can be adjusted to accommodate skeins of different lengths and an improvement whereby the reel can be raised entirely out of the dyeing liquor or dye-bath to facilitate the filling and the emptying of the reel and to allow of testing the color while the skeins are out of the liquor.

To this end my invention consists in the combination, with the dye-vat, of a reel constituted by a pair of spiders or wheels fixed on a rotatable shaft and carrying the removable sticks and rotatable adjustable rings for the inner sticks; and my invention consists in certain other combinations of parts hereinafter described, and specifically set forth in the claims.

In the drawings hereto annexed and forming a part of this specification, Figure 1 is a front elevation of the machine with the reel in the lowered position, as when dyeing, the door being open to show the reel. Fig. 2 is a side elevation, but showing the reel-shaft partly raised. Fig. 3 shows the inside of one of the spiders of the reel. Fig. 4 is a sectional view of the same. Fig. 5 is an inside view of the opposite spider of the reel. Fig. 6 is a sectional view of a portion thereof, taken on line *yy*. Fig. 7 is a sectional view taken on line *zz* of Fig. 5; and Fig. 8 shows the outlet-valve for the vat, together with its operating means.

Referring specifically to the drawings, A A are dye vats or tubs.

B B are boxes or covers with sliding balanced doors B', which can be raised when required to allow of filling and emptying the reel.

C and C' are two spiders fixed on a shaft C'' and constituting the reel by which the skeins of yarn D) indicated by broken lines in the drawings) to be dyed are passed through

the dyeing liquor. A vertical opening or slot E is formed in each side of the cover B, through which the ends of the shaft C' project. The shaft is journaled in bearing-blocks F F, that are capable of sliding up and down between suitable guides G G, secured to the side of the box or cover. The guides may have V-shaped faces that project into V-shaped grooves in the sides of the blocks F or be otherwise suitably formed.

H is a worm-wheel fixed on one end of a shaft K, journaled in bearings K' at the top of the box or cover B, a crank H' being mounted on the other end. The worm-wheel H gears with a worm L, fixed on a horizontal shaft L', journaled in bearings L² at the side of the cover B, and driven by a pulley I on a horizontal shaft M, extending at right angles to the shaft L'. Small mitered gears l' connect the said shafts together, the gear-wheel l' being loose on the shaft M and secured to it by a sliding clutch member *m*. This clutch member is operated by means of an arm *m'*, rigidly secured to one end of a rod *m''*, adapted to oscillate in suitable bearings by means of a handle *n* at the opposite end of the shaft.

The worm-wheel H carries a crank-pin *h*, that is connected by a rod J, having a ring or stirrup *j*, secured at its lower end, with a pulley *j'*, loosely mounted on the reel-shaft, and the crank H' at the other side of the machine is similarly connected by a rod J' with the opposite end of the reel-shaft C'.

It will be apparent that by rotating the shaft L' the reel-shaft C' will be raised and lowered as required. The gear for driving the shaft K is put into action by means of the clutch when it is required to raise the yarn out of the dyeing liquor or to lower the same thereinto and is thrown out of action by operating the handle *n* to throw the clutch on the shaft out of engagement with the mitered gear-wheel l' when the dyeing is going on, and when the reel is raised out of the liquor either for filling or emptying the same or for testing the yarn, or when the machine is stopped, or for any other purpose.

Each spider C and C' carries a ring N, supported in notches or grooves formed in the arms of the spider and retained therein by small plates *p* or other suitable means se-

cured to the said arms. The said rings N carry the inner circle of dye-sticks on which the skeins of yarn are placed. One ring is furnished with holes or cavities *q* to receive
 5 and support the ends of the sticks, and the other ring has bearing-blocks *q'*, secured to its inner face, each of said bearing-blocks having notches or recesses in one edge to receive the other ends of the dye-sticks O.
 10 Spring-controlled catches or arms *r* are provided to retain the sticks in place when they have been inserted in the notches in the said bearing-blocks *q'*. The rings N can be turned for a limited distance with relation to the
 15 spiders C and C', and can be locked in any position to which they may be set by spring-catches R, secured to the spiders and engaging with the teeth of a small cog-wheel *k*, meshing with the teeth in the periphery of
 20 the rings. When the spring-catch is withdrawn from the cog-wheel, the latter may be rotated to revolve the ring by means of a suitable key introduced into a square cavity *k'* in the wheel. The skeins are carried in
 25 the well-known manner by the inner series or circle of sticks extending between the rings N and an outer series or circle of sticks extending across between the spiders.

It will be obvious that by simply turning
 30 the rings N through a suitable angle relatively to the spiders the slack, if any, in the skeins, or as much of it as may be desired, can be taken up; the reel thereby being adapted for skeins of different lengths.

35 The outer rings N' are preferably stationary or integral with the arms of the spider. One of said rings is provided with radial projections in which are fulcrumed short shafts *i*, containing sockets in one end for the outer
 40 series of sticks. These shafts are each provided with four arms *i'*, by which the shafts are rotated to shift the skeins successively as the reel is revolved. Ratchet-wheels *o* on the shafts *i* engage spring-catches *s*, pivoted
 45 to the ring to prevent back motion. Any suitable and well-known device may be employed to engage these arms *i'* to turn the shafts *i*; but I have shown a projection S entering through one side of the box, which is
 50 mounted on a lever S', pivoted in a bracket S'' and having a handle on its opposite end. This lever may be operated to carry the projection in the path of the arms or remove it from said path. A springs', bearing upon the
 55 pivoted end of the lever, retains it in either position against displacement. The outer ring of the opposite spider is provided with notched bearing-blocks T and spring-catches or arms *t* to hold and retain the opposite
 60 ends of the sticks. By swinging the catches *t* on the pivots the sticks may be easily removed.

Each spider is provided upon its inner side with a skein-guide consisting of a ring or
 65 hoop U, somewhat smaller than and concentric with the outer ring. These guards pre-

vent the skeins from working against the faces of the spiders. To facilitate in the removal of the skeins from the sticks and placing other skeins thereon, one of these hoops is
 70 supported in guides *u*, which allow the hoop to be moved toward the face of the spider. These guides are shown clearly in Figs. 5 and 7 of the drawings. A spring-catch *u'*, pivoted to each guide, carries a small bolt on one end,
 75 which passes through the guide to retain the hoop or guard in its position remote from the face of the spider.

a is a valve in the bottom of the tub to allow the dye liquor to flow out into a conduit *a'*
 80 below. The spindle of the valve projects downward through the outlet and is pivoted to one end of a lever *a''*, which is provided with a spring to retain the valve in its closed position and a bracket *a'''*, with notches
 85 therein to engage the free end of the lever to hold the valve open.

b is a horizontal shaft adapted to turn in suitable bearings near the bottom of the tub. This shaft is provided with several sprocket-
 90 wheels differing in size. The largest sprocket-wheel *c* is geared by a chain to a small sprocket-wheel *c'* on the shaft M. The other sprocket-wheels *b'* *b''* are geared by chains to small sprocket-wheels *d'* *d''* on another shaft
 95 *d*, directly below and parallel with the reel-shaft. The sprockets *d'* *d''* are loose on the shaft and are provided with clutch members to engage with clutch members on a pair of
 100 pinions *f* *f*, secured together and secured to the shaft by a spline and groove, so that they may be connected to either sprocket *d'*. The pair of pinions are moved on the shaft by means of a lever *d'''*, extending therefrom to one side of the box B. In either position of
 105 these pinions one of them will mesh with a large cog-wheel *g* on the end of the reel-shaft when said shaft is in its lowest position.

By the above means the reel is revolved at either of two rates of speed. The speed is
 110 changed by simply shifting the pinions *f* *f* to one side or the other.

In order to save gearing, I extend the shafts M, *d*, and *b* between two dyeing-machines, which are placed side by side and a suitable
 115 distance apart, as indicated in Fig. 1 of the drawings. By simply duplicating a few of the parts mounted on said shafts I am able to operate the second dyeing-machine independently of the other. The said gearing
 120 being described above it will be unnecessary to repeat the description of the gearing for the second machine.

I do not desire to be limited to the precise construction shown and described herein, as
 125 it will be obvious that said construction may be changed without departing from my invention.

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

1. The combination with the dye-vat, of a

reel, comprising a revoluble shaft and a pair of spiders fixed thereon, two series of removable sticks between the spiders, and revoluble adjustable rings for one series of sticks, as set forth.

2. The combination with the dye-vat, of a reel, comprising a revoluble shaft and a pair of spiders fixed thereon, an outer and inner series of sticks between the spiders, and revoluble adjustable rings on the spiders for the inner series of sticks, as set forth.

3. The combination with the dye-vat, of a reel, comprising a revoluble shaft and a pair of spiders fixed thereon, an outer and inner series of sticks between the spiders, revoluble adjustable rings for the inner series of sticks, teeth on the rings, cog-wheels engaging the teeth, and catches to engage the cog-wheels, substantially as described.

4. The combination with the dye-vat, of a reel, comprising a revoluble shaft and a pair of spiders fixed thereon, an outer and inner series of sticks between the spiders, revoluble adjustable rings for the inner series of sticks, teeth on a portion of the periphery of the rings, cog-wheels fulcrumed on the spiders and engaging the teeth, means to rotate the said wheels, spring-bolts to lock the cog-wheels, and means to raise the bolts and hold them in their raised positions, as set forth.

5. In a dyeing-machine, the combination with the spiders of the reel, of circular guards mounted on said spiders remote from the inner faces thereof, and means to allow one of said guards to be moved toward its spider, as and for the purpose set forth.

6. In a dyeing-machine, the combination with the spiders of the reel, of circular guards mounted on said spiders remote from the inner faces thereof, guides on one of said spiders for the guard to move in, and means to lock the guard in position at one end of the guides, as set forth.

7. In a dyeing-machine, the combination with the dye-tub, the reel having spiders and sticks for holding the skeins, a shaft above the reel-shaft provided with cranks at its ends, connections between the cranks and the reel-shaft, a worm-wheel on the crank-shaft, a worm engaging the worm-wheel, and

suitable means to rotate the reel-shaft when in its lowest position, as set forth.

8. In a dyeing-machine, the combination with the dye-tub, the reel for holding the skeins, a shaft above the reel-shaft provided with cranks at its ends, connections between the cranks and the reel-shaft, a worm-wheel on the crank-shaft, a worm engaging the worm-wheel, a shaft for the said worm having a mitered gear-wheel, a shaft at right angles to the worm-shaft having a loose gear-wheel in mesh with the mitered wheel, a sliding clutch on the latter shaft, means to operate the clutch, a driving-pulley on the same shaft, and intermediate gearing between said shaft and the reel-shaft, to rotate the same, as set forth.

9. In a dyeing-machine, the combination with the dye-tub, the reel for holding the skeins, a shaft above the reel-shaft provided with cranks at its ends, connections between the cranks and the reel-shaft, a worm-wheel on the crank-shaft, a worm engaging the worm-wheel, a shaft for the said worm having a mitered gear-wheel, a shaft at right angles to the worm-shaft having a loose gear-wheel in mesh with the mitered wheel, a sliding clutch on the latter shaft, means to operate the clutch, a driving-pulley on the same shaft, and intermediate gearing between said shaft and the reel-shaft to rotate the same when in its lowest position at different rates of speed, as set forth.

10. In a dyeing apparatus, a pair of tubs, with their covers arranged side by side, a distance apart, skein-reels in the tubs having their shafts in line, means to rotate said shafts independently of each other when in their lowest position, shafts provided with cranks connected to the reel-shafts to raise the same independently of each other, guides for the reel-shafts, and shafts and gearing between the two machines common to both, as and for the purpose described.

In testimony whereof I have hereunto signed my name.

LEONARD WELDON. [L. S.]

Witnesses:

LESLIE J. SCHUYLER,
HOWARD PUTNAM.