

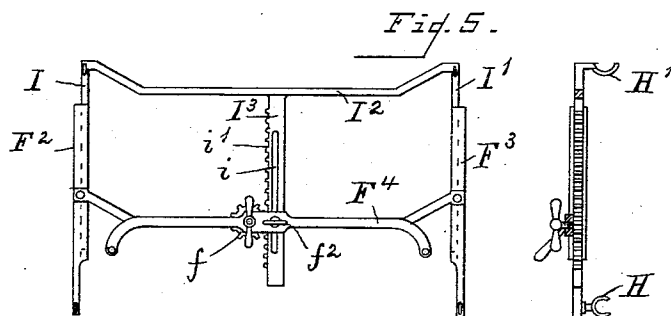
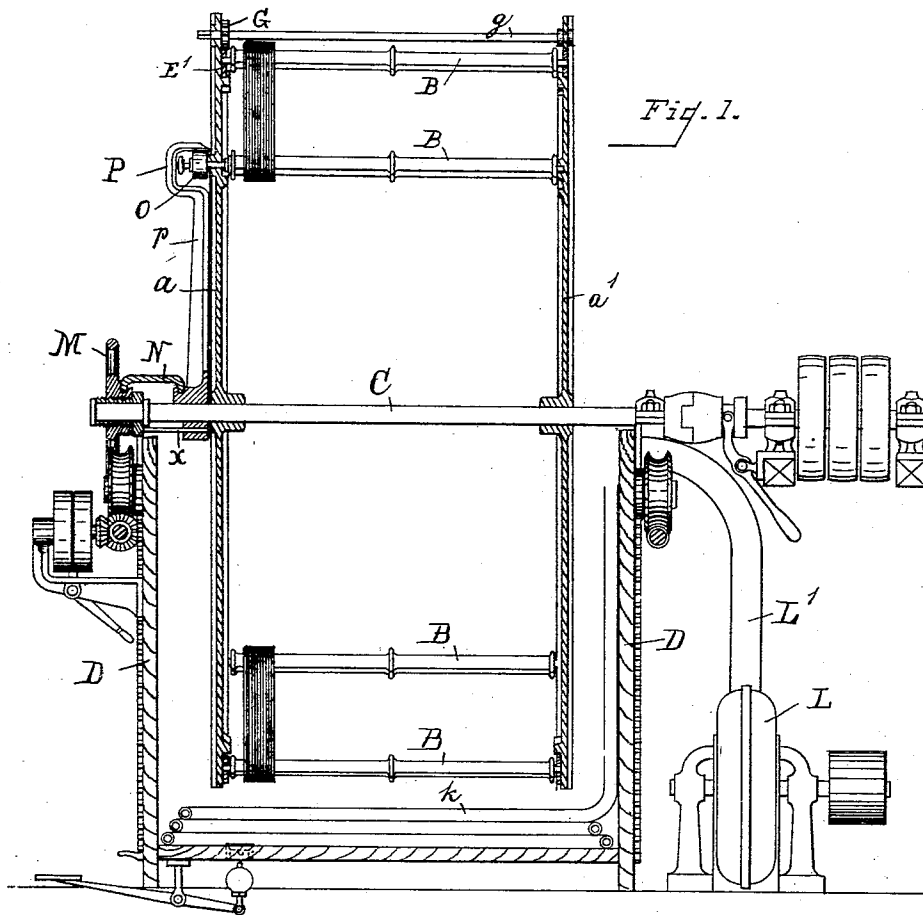
(No Model.)

2 Sheets—Sheet 1.

J. BERGER.
APPARATUS FOR DYEING.

No. 573,755.

Patented Dec. 22, 1896.



Witnesses
H. N. Jenkins
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Inventor
Jules Berger
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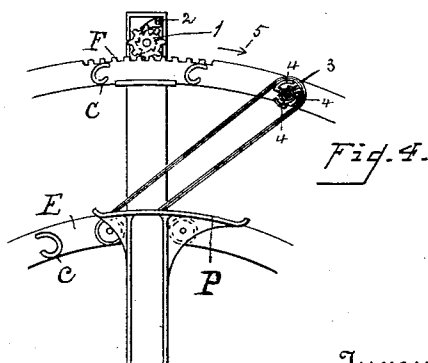
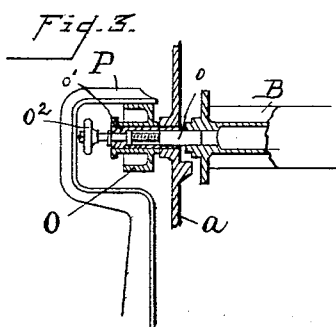
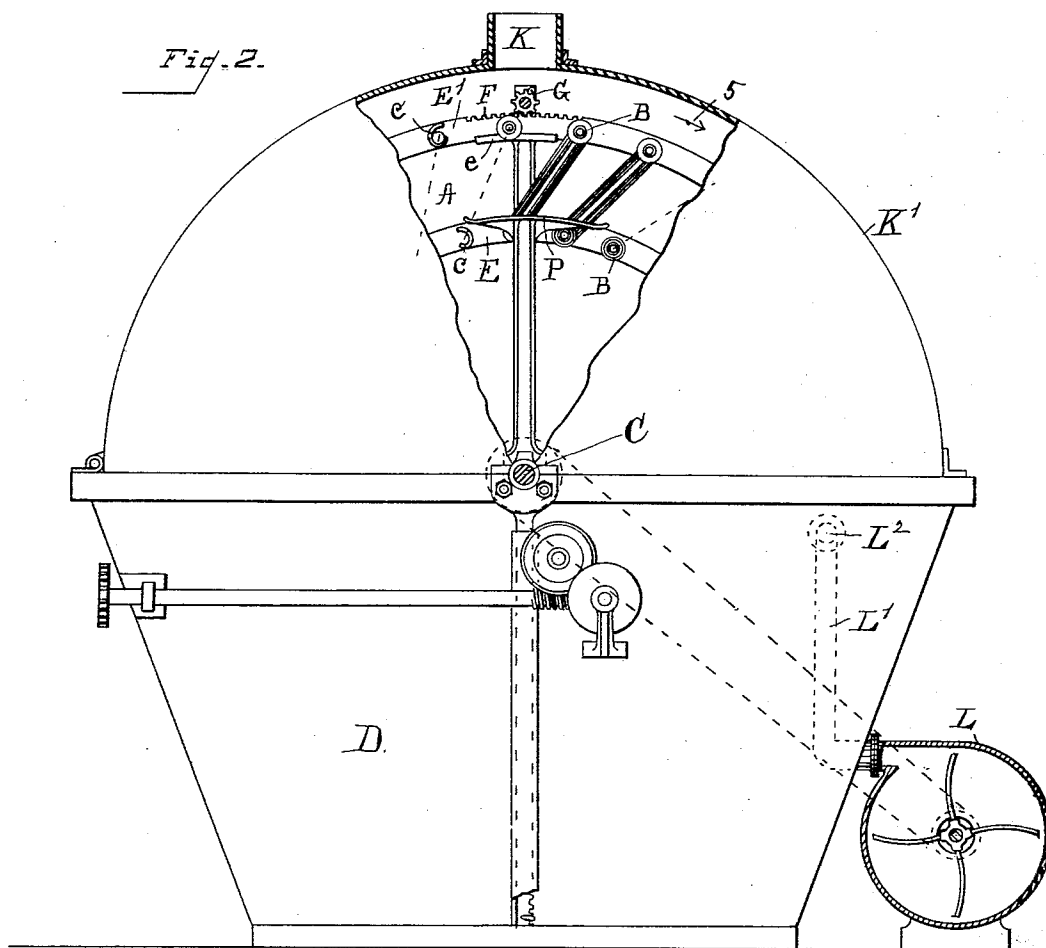
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2 Sheets—Sheet 2.

J. BERGER.
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Witnesses
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UNITED STATES PATENT OFFICE.

JULES BERGER, OF PARIS, FRANCE.

APPARATUS FOR DYEING.

SPECIFICATION forming part of Letters Patent No. 573,755, dated December 22, 1896.

Application filed March 9, 1896. Serial No. 582,343. (No model.) Patented in France June 9, 1894, No. 239,169.

To all whom it may concern:

Be it known that I, JULES BERGER, a citizen of the French Republic, residing at Paris, France, have invented certain new and useful Improvements in Apparatus for Dyeing Skeins of Silk, Cotton, and other Similar Material, (for which I have obtained a patent in France, dated June 9, 1894, No. 239,169;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in apparatus for dyeing, washing, drying, stretching, and imparting luster to yarns or skeins of silk, cotton, wools, and other sewing and weaving material.

The construction of my apparatus is such that all the operations connected with the dyeing of silk, &c., from the extraction of the oil or gummy matter contained therein to the stretching and lustering of the material are accomplished in the one machine.

The machine is provided with means whereby the lengthening of the silk or other material is gradually accomplished without detriment to its quality, and all tendency to again contract to its original length is entirely obviated. Thus a single machine is made to perform work heretofore requiring six different machines to accomplish—viz., a smoothing, washing, drying, shaking, stretching, and lustering machine.

My invention is clearly illustrated in the accompanying drawings, whereon like letters and numerals indicate corresponding parts.

Figure 1 is a transverse sectional view of the machine, and Fig. 2 a side elevation with part of the vat-cover broken away, so as to show the operating mechanism therein. Figs. 3, 4, 5, and 6 are detail views of different parts of the invention, all of which are hereinafter fully explained.

Referring to the drawings, the letter A designates a drum composed of a pair of wheels *a a'* and a central shaft C, supported in suitable journal-boxes at the top of the sides of the vat D.

The inner surface of each wheel *a a'* is provided, as hereinafter described, with two rings E E' of different diameter, each having a series of inside bearings to carry two circles of rollers B. The rollers are intended for use

in pairs, one inner roller and one outer roller constituting each pair, around which the silk or yarn is wound into skeins, as shown in Figs 1, 2, and 4.

The rings E, which support the inner row of rollers B, are joined to the arms of the wheels *a a'*, while the rings E', which support the outer row of rollers, are connected with the arms of wheels *a a'* in such manner that they may be readily adjusted or removed as occasion may require. To permit of this adjustment and removal, the wheel-arms are provided with inwardly-projecting lugs *e*, (see Fig. 2,) forming bearings for the inner edge of the rings E' and on which the said rings are adapted to slide, the sliding movement being regulated by a pinion G, which engages teeth cut for a limited distance across the outer edge of the rings E, as best shown in Figs. 2 and 4.

Two adjusting-pinions G are designed to be employed, one for each wheel-ring E', the said pinions being mounted on a shaft *g*, the ends of which are journaled in outwardly-projecting lugs. One end of the aforesaid shaft *g* is adapted to receive a crank for turning same, and the shaft is also provided with a ratchet-wheel, 1 (shown in dotted lines in Fig. 4,) the teeth of which are designed to be engaged by a pawl 2, and thus the ring E is securely locked after the yarn has been sufficiently tightened on the rollers B.

Rollers B carry on one of their extremities a sleeve O, having a square cavity in the center thereof to receive the square extremity of a rod *o*, the outer end of which is provided with a screw-threaded socket to receive the screw-threaded end of a spindle *o'*, to which is secured an operating-wheel, as shown at *o''*, the turning of which will either advance or withdraw the square rod *o*, and thus the roller is secured or released, as desired.

A projection *b* is formed on the inner face of the wheel *a* to serve as a rest for the end of roller B during the engagement or disengagement of the rod *o*. The other ends of the rollers B are supported in ears C, which in their respective rings incline one way; but the ears of one ring are inclined in an opposite direction to that of the other, as indicated in Figs. 2 and 4, in order that the stretching of the skeins by movement of ring E will not displace the roller-journals.

During the rotation of the drum A the sleeves O come in frictional contact with the upper inner surface of a yoke P. This frictional surface is of sufficient length to engage the sleeves of at least three rollers at one time, and thus cause same to revolve during the said limited period.

The lower end or boss of the yoke-arm P is loosely fitted on the shaft C, and a pin *x*, the latter projecting inwardly from the adjacent journal-bearing, serves to keep the aforesaid arm in a vertical position. The lower end of the yoke-arm P is provided with a clamp N, the outer end of which is adapted to rest in a groove formed around the boss of a crank M, the eye of which is screw-threaded to operate on the threaded projection of the shaft-bearing, so that the yoke-arm moves either inwardly or outwardly, as desired. Thus the yoke can be brought in the line of travel of the sleeve O, and the said sleeves and their rollers B rotated during the operation of the machine as required.

A device termed a "loader" (see Fig. 5) is employed for the introduction of each pair of rollers into their relative positions in the drum A, the said rollers being first provided with the skeins to be operated upon and which are preferably straightened out and arranged in said loader previous to being transferred to the machine.

The loader consists of a frame composed of two parallel hollow or inwardly-grooved bars F^2 F^3 , and a connecting brace-rod F^4 , and a second frame composed of parallel rods I I', adapted to operate in the bars F^2 F^3 .

The rods I I' are connected at their upper ends by a brace-rod I^2 , having a central depending bar I^3 , which is provided with a central slot *i* and a side rack *i'*. The teeth of this rack are adapted to engage with those of a pinion f' , fixed to a pin journaled in the brace-rod F^4 .

A bolt provided with a thumb-nut f^2 is inserted through the slot *i* of the depending bar I^3 and through a central perforation in the brace-rod F^4 to clamp the said parts and thus securely lock together the two main sections of the loader when necessary.

The lower ends of the bars F^2 F^3 and upper ends of rods I I' are each provided with a journal-bearing, as at II H', for receiving a pair of rollers after the said rollers have been provided throughout their length with skeins of the material to be treated. The frame is then extended, through the instrumentality of the pinion f' and rack *i'*, until the skeins have been straightened and somewhat stretched, when it is secured in said position by means of the bolt and thumb-nut f^2 . The rollers are next transferred from the frame to their respective bearings in the rings EE', after which the loader is disengaged to receive another pair of skein-covered rollers. When all the rollers of the drum have been placed in position, the outer ring E' is moved by its pinion G in the direction of the arrow 5 (see Fig. 2)

until the skeins have received sufficient tension, when it is secured by the ratchet-wheel 1 and pawl 2.

The rollers B are each provided with a central cylinder 3, around the periphery of which are longitudinally secured several curved elastic pieces 4, as shown in Fig. 4, forming an outer yielding surface for the roller, whereby the material of the skeins is secured against breakage.

The bottom of the vat D is provided with a pipe-coil *k*, which is fed with steam or hot water to produce the necessary temperature for the dye-bath and a still higher temperature during the drying and stretching process, at which time the bath is removed and the apparatus closed by placing the cover K' over the top of the vat thereof, as shown in Fig. 2.

In order to facilitate and quicken the evaporation during the drying process, I provide a ventilating-fan L and connect same by a pipe L' with the upper part of the vat, as shown in dotted lines at L². The top of the cover K' is provided with a chimney K, through which the air is allowed to escape during the working of the apparatus.

The employment of my apparatus insures absolute incontractibility of the silk after the stretching, lustering, and cooling of same. It also insures an increased length to the material by reason of the gradual manner in which the stretching is accomplished.

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

1. In apparatus for dyeing yarns, the combination with the vat, of a drum having skein-roller-supporting rings connected with the inner surface of its sides, as described, the rings provided with ears for receiving the journals of the rollers, and the ears of the outer ring inclined in an opposite direction to that of the inner ring, substantially as and for the purpose set forth.

2. In apparatus for dyeing yarns, the combination with the vat, and a drum having skein-roller supports at each side thereof, with rollers having a square cavity in one end, a square rod to fit therein, a screw-stem in the outer end of the square rod, and a sleeve adapted to rotate around the said stem and rod the screw-stem provided with a wheel for operating same, substantially as set forth.

3. In apparatus for dyeing yarns, the combination, with a vat, and a drum having skein-supporting rollers, a sleeve connected with an outer end of each roller and a yoke, the said yoke adapted to be moved inward or outward by means of a crank and a clamp connecting same with the yoke-arm, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JULES BERGER.

Witnesses:

CLYDE SHROPSHIRE,
DAVID I. L. FULLER.