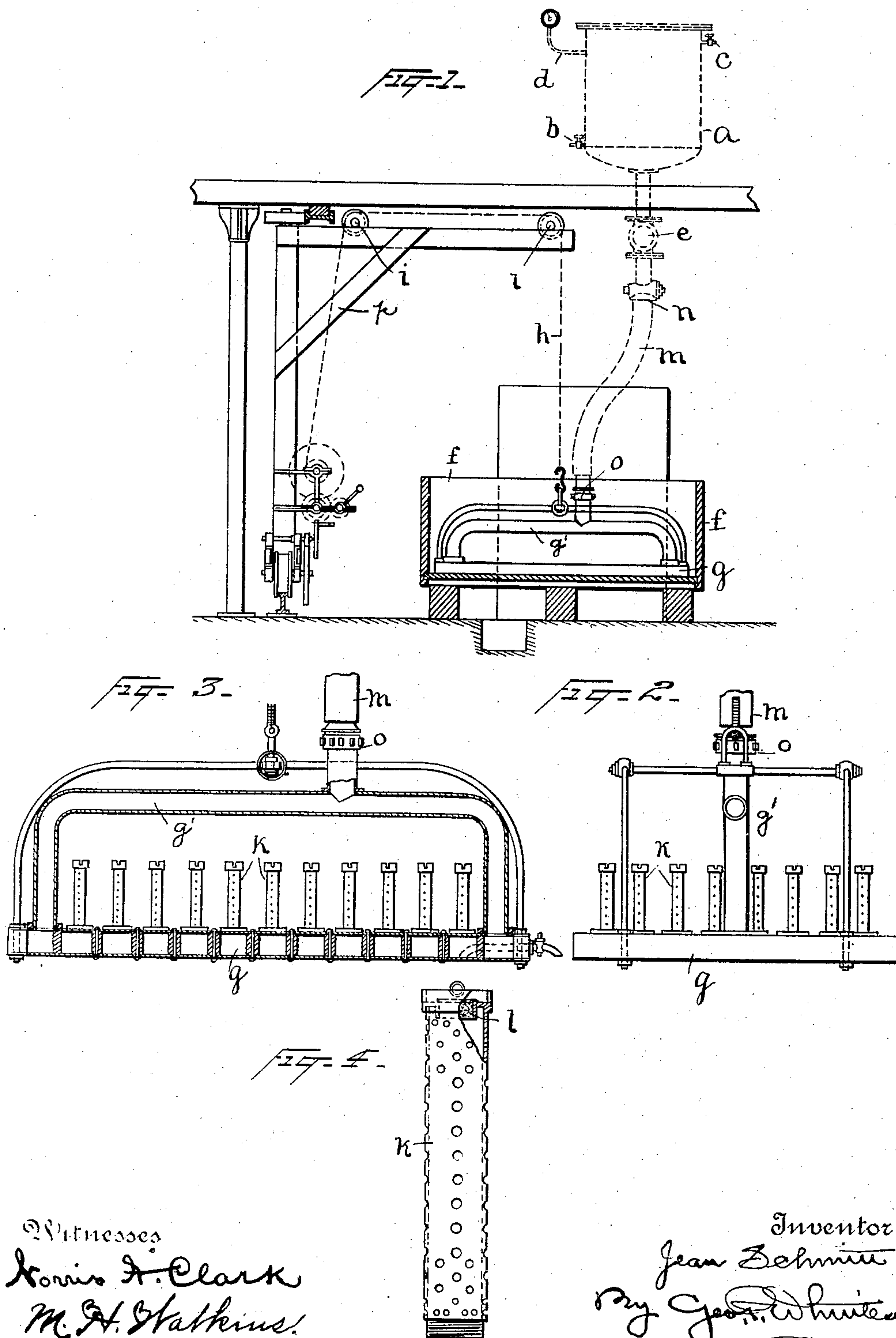


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J. SCHMITT.  
APPARATUS FOR DYEING, &c.  
APPLICATION FILED APR. 26, 1901.

NO MODEL.



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## UNITED STATES PATENT OFFICE.

JEAN SCHMITT, OF DANJOUTIN-BELFORT, FRANCE.

## APPARATUS FOR DYEING, &amp;c.

SPECIFICATION forming part of Letters Patent No. 764,825, dated July 12, 1904.

Application filed April 26, 1901. Serial No. 57,545. (No model.)

*To all whom it may concern:*

Be it known that I, JEAN SCHMITT, engineer, a citizen of the Republic of France, residing at Danjoutin-Belfort, Territory of Belfort, France, have invented certain new and useful Improvements in Apparatus for Dyeing Cotton Slubbings and Rovings When Wound upon Bobbins or Tubes; 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improved apparatus for dyeing, mordanting, bleaching, or otherwise treating textile rovings and slubbings with circulating liquids.

The slubbings or rovings are wound upon perforated tubes which are stopped at one end and mounted by their other open end in the upper plate of a closed chamber which may be immersed with its tubes in a vat containing the dyeing, bleaching, mordanting, or other bath and may be connected to a device for imparting a circulation to the said bath through the textile material wound upon the hollow perforated tubes. On the part of the said hollow perforated tubes comprised between the bases of the coned parts of the rovings or slubbings the perforations are made at equal distances apart, while on the parts of the said tubes extending from the said bases to the apices of the terminal cones of the rovings or slubbings these perforations are made step by step smaller in proportion as the textile layers diminish in thickness.

The accompanying drawings illustrate in what manner the said invention may be performed and will be hereinafter referred to.

Figure 1 is a side view, partly in section, of a whole installation. Fig. 2 is an end view, partly in section, of the chamber with empty bobbins thereon. Fig. 3 is a side view, partly in section, of the same. Fig. 4 shows an elevation of one of the bobbins with part broken away to show the stopper partly in section.

As is shown by the drawings, the reservoir *a* can be put into connection with a vacuum-

producing apparatus, which for the sake of clearness is not shown, through the nozzle and cock *b*. In the upper part of the reservoir there are the air-cock *c* and the vacuum-gage *d*. The bottom of the reservoir is fitted with a flux and reflux pipe controlled by the valve *e*, which is situated above the vat *f*. From *e* there are as many branch pipes as there are vats, each being controlled by a separate valve *n*. The chamber *g* is hermetically closed except for the holes in its upper plate, in which the perforated tubes *k* are fitted when the apparatus is in use, and for the breeches-pipe *g'* in communication with the valve *e*.

The apparatus is shown to be supported by a rope or chain *h*, which passes over the grooved pulleys *i i* to the traveling jib-crane *p*, by means of which the apparatus may be lowered into and be lifted out of the vat *f*. This vat may be fitted with inlet and discharge pipes (not shown in the drawings) in the usual or any convenient manner.

In Fig. 1 only one apparatus is shown; but it will be obvious that as many as may be required may be employed in series or otherwise.

Instead of being in wood, as at the ordinary, the perforated tubes *k* are constructed of iron, copper, or other suitable material which will not be acted on by the bath. In the perforated tubes shown one end is flanged and notched, and the other end is lightly screw-threaded to permit it to be screwed into the tapped holes in the perforated top plate of the chamber *g*. Thus the perforated tubes are inserted on the plate. By means of an india-rubber or other suitable stopper *l* the upper end of each perforated tube is closed.

The communication between the breeches-pipe *g'* and the valve *n* may be through a metallic tube; but it will generally be more convenient to make it through a reinforced india-rubber tube *m*, which may be connected at *n* and *o* by unions or screwed couplings.

The cotton rovings or slubbings are wound upon the perforated tubes in such a manner that coned ends are formed. Consequently, while the central part is cylindrical the coned part has a constantly diminished thickness of cotton from the cylindrical part to the end,



and normally this would militate against even dyeing in these parts of the bobbins. It is therefore necessary to provide means which will insure that the impregnation by the liquid shall be in direct relation with the thickness of the cotton layers. With this object in view a particular perforation of the tubes of the bobbins is employed. At the part of the perforated tubes *k* comprised within or between the bases of the coned parts of the bobbins the holes are made at equal distances apart and of the diameter calculated to be necessary. From these bases toward the apices of the cones these holes are made step by step smaller and more numerous in proportion as the cotton layers diminish in thickness. This particular modification in the perforations is of the greatest importance and is illustrated by Fig. 4. By its adoption very even dyeing and mordanting is easily effected.

The wound tubes *k* having been arranged upon the apparatus and the latter having been lowered into the bath in the vat *f*, a vacuum is produced in the reservoir *a* and the valves *e* and *n* are opened. Immediately, acted upon by full atmospheric pressure, the dye-liquor passes through the cotton-perforated bobbins and by way of the breeches-pipe *g'* to the reservoir *a*. The passage thus of the dye-liquor through the cotton dyes it more or less completely. All or sufficient of the bath having thus been drawn through the cotton, the air-valve *c* is opened. The liquor instantly commences to descend and returns by gravity through the cotton to the vat *f*, which is thus again refilled. This operation may be repeated as frequently as may be required for the production of the desired shade.

The operation having been completed, the pipe *m* is removed. The apparatus is lifted out of the vat by the crane *p*, which latter is then operated to bring the apparatus over a second vat, which, by way of example, may contain a fixing or washing bath in and in connection with which the treatment of the cotton may be repeated.

As it is frequently necessary to employ three baths in dyeing, it will be convenient to have three vats or a multiple of three vats in an installation. Nevertheless, it is to be understood that as many vats are employed as may be required.

What I claim is—

1. In an apparatus for treating textile slubbings and rovings with a circulating liquid, a tube on which the textile material is adapted to be wound, said tube having a plurality of perforations, the perforations in its central portion being of uniform size and the perforations toward each end gradually diminishing in size.

2. In an apparatus for treating textile slubbings and rovings with a circulating liquid, a tube on which the textile material is adapted to be wound, said tube having a plurality of

perforations, the perforations in its central portion being of uniform size and uniformly spaced, and the perforations toward each end gradually diminishing in size and gradually increasing in number.

3. In an apparatus for treating textile slubbings and rovings with a circulating liquid, a cop-tube on which the material is adapted to be wound in a cylindrical body with tapering ends, said tube having a plurality of longitudinal rows of perforations of uniform size disposed oppositely the cylindrical winding, and a plurality of perforations gradually diminishing in size arranged at each end of the longitudinal rows opposite the taperingly-wound portions.

4. In an apparatus for treating textile slubbings and rovings with a circulating liquid, a tube on which the textile material is adapted to be wound, said tube having one end threaded and the other end flanged and notched, and having a plurality of perforations, the perforations in its central portion being of uniform size and the perforations toward each end gradually diminishing in size.

5. In an apparatus for treating textile slubbings and rovings with a circulating liquid, a cylindrical tube on which the slubbings and rovings are adapted to be wound, said tube having a plurality of round holes, the holes in the central portion being of uniform size and uniformly spaced, and the holes toward each end gradually diminishing in size and increasing in number.

6. In an apparatus for treating textile slubbings and rovings with a circulating liquid, the combination with perforated tube on which the slubbings and rovings are adapted to be wound cylindrically with tapering ends, the perforations in the portions of the tubes covered by the cylindrical winding being of uniform size, and gradually diminishing in size toward the ends of the tubes, of means to support the tubes and means to force the liquid into the tubes and out through the perforations.

7. In an apparatus for treating textile slubbings and rovings with a circulating liquid, the combination with perforated tubes closed at one end and open at the other, of means to support the tubes and means to force the circulating liquid into the open ends of the tubes, the perforations in the central portion of the tubes being of uniform size and uniformly spaced, and the perforations toward the ends of the tubes gradually diminishing in size and increasing in number.

8. In an apparatus for treating textile slubbings and rovings with a circulating liquid, the combination with a suitable vat, of perforated tubes having one end closed and the other end open, the perforations in the central portion of the tubes being of uniform size and those at each end gradually diminishing in size, a closed hollow shell supporting the



tubes and in communication therewith, and means for causing the liquid to circulate through the tubes in alternating directions.

5 9. In an apparatus for treating textile slubbings and rovings with a circulating liquid, the combination with a suitable vat, of a metallic shell forming a closed chamber, perforated tubes, closed at one end, detachably connected to and communicating with said chamber, the perforations in the central portion of  
10 the tubes being of uniform size and the perforations at each end gradually diminishing in size, pipes communicating with the closed chamber, a supply-pipe for said pipes, and  
15 means for causing an alternating circulation of the liquid.

10 10. In an apparatus for treating textile slubbings and rovings with a circulating liquid, the combination with a suitable vat for receiving the liquid, of a metallic shell forming  
20 an inclosing chamber adapted to be set in the vat, perforated tubes on which the slubbings and rovings are adapted to be wound, said tubes being closed at one end and in communication with the chamber, the perforations  
25 in the central portions of the tubes being of

uniform size and the perforations at the ends gradually diminishing in size, and means for forcing the liquid alternately from the vat through the slubbings and into the tubes and  
30 out through the open ends of the tubes and then into the open ends and out through the perforations and the slubbings into the vat.

11. In an apparatus for treating textile slubbings and rovings with a circulating liquid,  
35 the combination with a suitable vat, of a closed metallic shell provided with perforated tubes in communication with the interior of the shell, the perforations in the central portions of the tubes being of uniform size and those  
40 at the ends gradually diminishing in size, a branch pipe communicating with the closed shell, a reservoir and valve connection between the branch pipe and the reservoir, whereby the circulation of the liquid may be  
45 accomplished in alternating directions.

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

JEAN SCHMITT.

Witnesses:

GEORGE GIFFORD,

JOHN G. PLATNER.