

(No Model.)

F. W. LEE & J. G. BRADSHAW.

APPARATUS FOR DYEING.

No. 386,835.

Patented July 31, 1888.

Fig. 3.

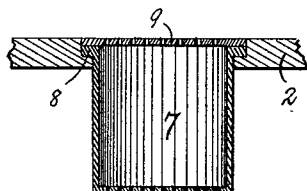


Fig. 2.

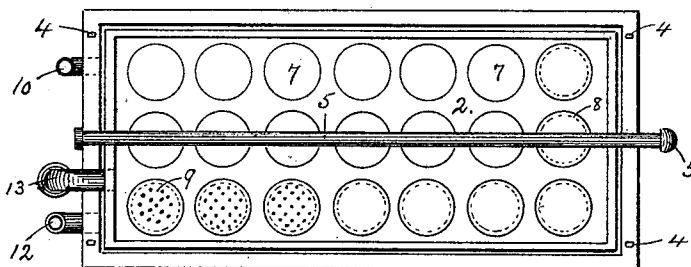
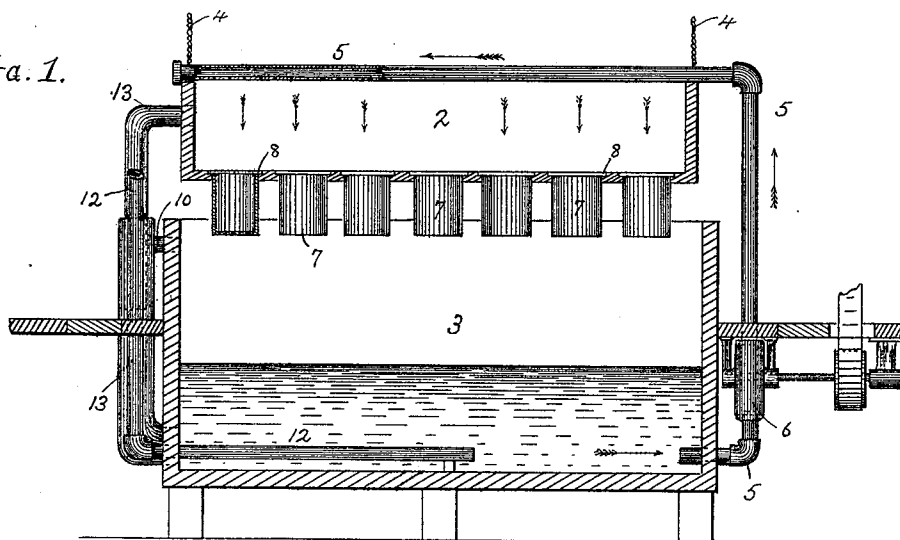


Fig. 1.



Witnesses.

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FRANK WM. LEE AND JOHN G. BRADSHAW, OF LAWRENCE, MASSACHUSETTS.

APPARATUS FOR DYEING.

SPECIFICATION forming part of Letters Patent No. 386,835, dated July 31, 1888.

Application filed April 14, 1888. Serial No. 270,615. (No model.)

To all whom it may concern:

Be it known that we, FRANK WM. LEE and JOHN G. BRADSHAW, subjects of the Queen of Great Britain, residing at Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Dyeing; and we 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to apparatus for dyeing; and it consists in a novel arrangement and operation of the several component parts, whereby the material in process can not only be more easily handled, but access thereto is readily obtained in order to ascertain and watch until the requisite color desired in the material in process is produced.

This apparatus embodies some novel features over those hitherto employed in which the material to be dyed is continually agitated in the bath. In our invention the coloring-fluid is allowed to permeate and pass by gravity through the fibrous material, which remains in a stationary undisturbed position. Several important advantages accrue therefrom: first, the original shape in balls of the "combed tops," so called, is preserved, this apparatus being especially adapted for this purpose; secondly, no felting occurs, which now happens when the material is agitated in the bath, and, thirdly, avoidance of waste, as here explained. In this apparatus for dyeing, the material can be dyed in the form of combed tops or balls, and the wool hitherto colored, is now obtained in the white, since the latter is extracted prior and not subsequent to the dyeing process; hence the wool is increased in value, since it may be introduced and employed where formerly it was rejected, due to its being colored.

The drawings represent in Figure 1 a sectional elevation, and Fig. 2 a plan, of an apparatus for dyeing embodying our invention. Fig. 3 is a vertical section diametrically of one of the vessels to receive and hold the fibrous material in process.

Our apparatus for the purpose of dyeing

yarn or other fibrous materials consists of the independent open vats or kettles vertically disposed one above the other, the upper being designated at 2, the lower one at 3. The upper is suspended over the lower, and is capable of being raised or lowered by chains 4 4, or otherwise suitably operated. The lower vat is used for the mixing of the coloring-fluid or bath, and receives the coloring-mixture after it has gravitated through the material in process. A continuous flow of coloring-mixture is produced by means of the pipe 5 communicating with the upper dyeing and the lower or mixing vat, 3, being entered at the bottom of the latter, and connecting with a forcing apparatus, preferably a centrifugal pump, 6, or steam-injector.

Our object is to permit the coloring-mixture to flow through the material to be dyed by means of capillary action aided by gravity, since a more even tint is thereby produced; hence to effect this result we have arranged a series of metallic vessels, 7, preferably of copper, in the bottom of the upper dyeing-vat, 2. Said vessels are removably disposed, and are provided with a flanged rim or lip, 8, by which they are held suspended from the bottom of the vat 2 and exteriorly thereof. Furthermore, said vessels are supplied with a perforated bottom and a removable perforated cap or cover, 9. The latter is positioned flush or even with the bottom of the upper vat, while the vessels project below. (See Fig. 1.)

A water-supply pipe is shown at 10, by means of which the dyeing-fluid is given the requisite strength. The steam-heating pipe to raise the bath to the proper degree of heat prior to the commencement of the dyeing process is shown at 12, while the overflow-pipe is indicated at 13 as composed of two pieces. One attached to the upper vat is adapted to slide within the fixed lower portion communicating with the lower vat, 3. This overflow-pipe is intended to convey away the excess of dyeing-mixture supplied by the pump 6, and which does not escape by passing through the perforated vessels 7. Said vessels are to contain the combed tops or balls, which are previously inserted in bags or coverings, whereby they can be more readily handled and the form of the balls is better preserved.

The operation of our improved apparatus

is as follows: The upper vat, 2, is first raised, and the attendant thereby gains access to the lower vat, 3, in which the coloring-mixture is prepared and properly heated. The combed
 5 tops or balls 14 are now inserted in the perforated vessels 7, one or more in each. The upper vat, 2, having been lowered previous to this operation, the covers 9 are then set in place and the forcing apparatus 6 started. A
 10 continuous flow of dyeing-fluid now finds its way into the upper vat from the lower one, and thence flows by gravity into the vessels, permeating the balls of fibrous material, and passes down, escaping through the aper-
 15 tures in the bottom of said vessels, and again joins the mixture in the lower vat. Any excess of fluid above what is sufficient to cover the bottom of the upper vat is permitted to escape through the pipe 10, and overflow and
 20 loss of coloring-mixture from said vat are prevented. By the arrangement of the loose caps or covers 9 the degree of color obtained can be readily ascertained by stopping the forcing apparatus 6, allowing the mixture to pass off
 25 when one or more of the covers are raised. If the desired tint is not obtained, the process is repeated and continued until the material is properly dyed. Furthermore, by making the two vats open, moreover separate and distinct,
 30 the lower vat can be employed as the mixing-kettle, while the upper or dyeing vat by its construction readily permits the operator to watch the process of coloring, and more even tints can be produced.

What we desire to claim is—

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1. An apparatus for dyeing yarn or other fibrous material, consisting of two open vats separate one from the other, each vat as un-
 covered and with the upper vat having de-
 pending vessels with a perforated top and bot-
 40 tom located in the upper exteriorly thereof, and liquid-forcing apparatus, as specified, by which the coloring-mixture supplied from the lower vat is permitted by gravity to permeate the material in process, substantially as herein
 45 set forth.

2. In apparatus for dyeing yarn or other fibrous material, the open mixing-vat 3, the open dyeing-vat 2, disposed above and adjust-
 able with respect thereto, combined with the
 50 vessels 7, communicating with the mixing-vat and the supply-pipe 5, and forcing apparatus 6, substantially as herein described.

3. The combination, with a fixed mixing-
 vat, 3, the supply-pipe 10, steam-pipe 12, de-
 55 liver-pipe 5, and forcing apparatus 6, of the open dyeing-vat 2, vertically adjustable, its overflow 13, and the removable vessels 7, per-
 forated at the top and bottom, located exteri-
 60 orly of the dyeing-vat, and communicating with the mixing-vat, substantially as stated.

In testimony whereof we affix our signatures in presence of two witnesses.

FRANK WM. LEE.

JOHN G. BRADSHAW.

Witnesses:

HENRY TONGUE,

JOHN S. CROSS.