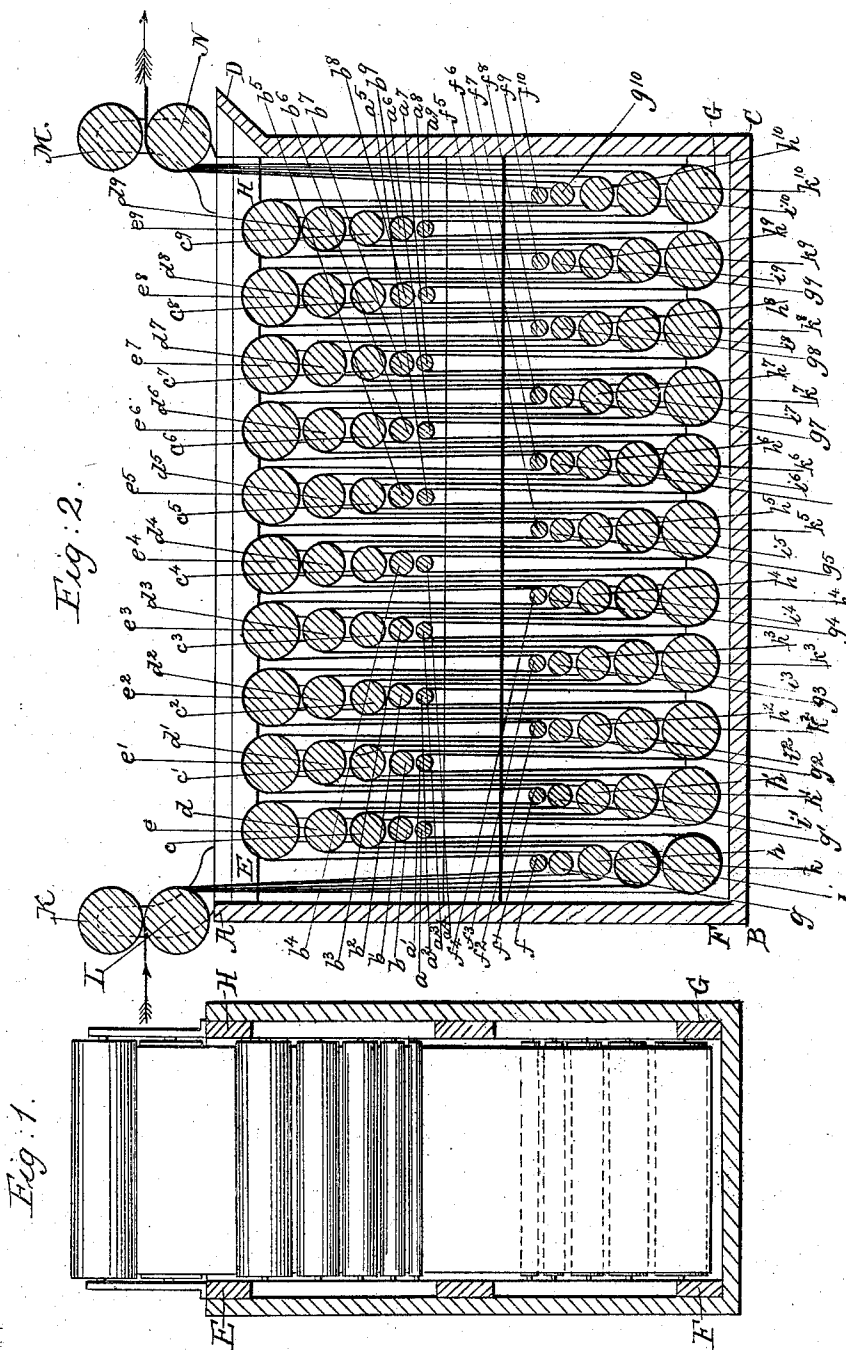


ROTH & LEA. Bleaching Apparatus.

No. 10,894.

Patented May 9, 1854.



Inventors.
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UNITED STATES PATENT OFFICE.

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BLEACHING APPARATUS.

Specification of Letters Patent No. 10,894, dated May 9, 1854.

To all whom it may concern:

Be it known that we, J. AUGUSTUS ROTH and JOSEPH LEA, of the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in the Construction of Vats for Treating Woven Fabrics During the Boiling and Bleaching Process; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, in which—

Figure 1 represents a transverse vertical section of our improved vat and Fig. 2 represents a longitudinal vertical section of the same.

Similar letters of reference indicate corresponding parts in each of the several figures.

In boiling and bleaching fabrics it is the common practice to pass the fabric through the vats in single pieces these pieces being doubled up into the shape of a rope.

The nature of our improvement consists in so arranging a series of rollers in a vat that a considerable number of continuous strips or sheets of cotton or linen fabric may be simultaneously drawn through the vat said fabrics being fully spread out.

The advantage of the improvement is that the fabric may be thoroughly acted upon by the bleaching or boiling solutions with a great saving in time and expense over the ordinary method.

In order to enable others skilled in the art to make and use our improvement we proceed to describe its construction and operation.

A B C D Fig. 2 represents a longitudinal vertical section of a vat made of wood. Inside of this vat a wooden frame E F G H is inserted extending the whole length of the vat. To this frame two series of transverse rollers are attached. These rollers are hollow metallic or wooden rollers and are shown at $a' a'' a''' a^{iv}$, &c., $b' b'' b''' b^{iv}$, &c., $c' c'' c''' c^{iv}$, &c., are arranged transversely across the vat A B C D. These rollers have metallic gudgeons and are so placed in the frame as to revolve freely. They are of different diameters the upper row of rollers $a' a'' a''' a^{iv}$ being about one foot in diameter and the next row of rollers $b' b'' b''' b^{iv}$ being about ten inches in diameter—the rollers $c' c'' c''' c^{iv}$ about eight inches in diameter— $d' d''$

$d''' d^{iv}$ about six inches and the lower roller $e' e'' e''' e^{iv}$ about four inches in diameter. The upper row of rollers $f' f'' f''' f^{iv}$ of the lower series are four inches in diameter and from this they regularly increase, the lowermost rollers $k' k'' k''' k^{iv}$ being about one foot in diameter. The five graduated rollers a, b, c, d, e composing a vertical set of the upper series are so placed as to occupy the intermediate space between the set of the lower series f, g, h, i, k and the set f', g', h', i', k' ,—and the set of rollers $f' g' h' i' k'$ occupy the space intermediate between the rollers a, b, c, d, e and the rollers $a' b' c' d' e'$ —and so on throughout the whole length of the vat, each vertical set of rollers belonging to the upper series occupying a space alternate to the vertical set of rollers of the lower series and vice versa.

K, L and M, N are drawing and squeezing rollers. Five layers of cloth spread out across the rollers smoothly are drawn in between K and L. The lower layer of cloth passes down around the lower roller K under the roller K and then ascends over the top of the small roller e then descends and passes under the roller k' and so on through the whole series alternately passing over the largest rollers $k' k'' k''' k^{iv}$, &c., of the lower series and the smallest rollers $e' e'' e''' e^{iv}$ of the upper series. The second layer of cloth passes under roller i and over roller d and so on alternately passing under $i' i'' i''' i^{iv}$, &c., and over $d' d'' d''' d^{iv}$, &c. The third layer of cloth passes alternately under $k' k'' k''' k^{iv}$, &c., and over $c' c'' c''' c^{iv}$, &c. The fourth layer passes alternately under $g' g'' g''' g^{iv}$ and over $b' b'' b''' b^{iv}$, &c.; and the fifth or innermost layer of cloth passes alternately under $f' f'' f''' f^{iv}$ and over $a' a'' a''' a^{iv}$, &c., as shown in Fig. 2 by the blue lines. Finally all five layers emerge together from the rollers $f g h i k$ at the end of the vat and pass between the squeezing and drawing rollers M N. By this arrangement of graduated rollers the sum of the circumferences of the corresponding rollers k and e, i and d and e, g and b and f and a are equal; and consequently each layer of fabric passes over precisely the same distance in traversing the length of the vat. Thus the five layers of cloth travel at a uniform rate while passing through the vat, are smoothly extended and

each layer of fabric is separately exposed to the action of the chemical solution contained in the vat. The single pair of drawing and squeezing rollers draw the whole five layers 5 through the vat simultaneously and squeeze them at one and the same time. Several layers of cloth when passed between the squeezing rollers will be more thoroughly squeezed than a single layer will be 10 squeezed in passing through and hence there is also that advantage in causing the whole five thicknesses to pass between the squeezing rollers M N.

15 The operation of this improved arrangement of rollers is as follows. The fabric in a series of continuous sheets is drawn by the drawing rollers K and L into the vat A B C D. This vat may be filled with a solution of alkaline lye kept boiling by steam pipes 20 in the bottom of it or it may be filled with sulfuric acid and water or chlorid of lime or other bleaching or boiling solutions. The series of parallel layers of fabric being drawn in by K and L pass down around 25 their respective rollers in the lower of series and over those in the upper series thus traversing the vat with a regular and equal velocity—both sides of each sheet of fabric being thoroughly exposed to the action of 30 the chemical solution. After thus passing through the vat A B C D and the squeeze rollers M and N the sheets of fabric emerge and may then enter into and pass through a second vat arranged in the same manner 35 containing another chemical solution. By this means the entire process of bleaching woven fabrics through all its stages may be carried on as a continuous series of treat-

ments of the fabric in parallel extended sheets instead of in single ropes. 40

Instead of having five series in the upper series and five in the lower series arranged so as to compensate each other and allow the layers of cloth to be kept separate, that number might be reduced to two without changing the principle of my invention provided 45 they be graduated in diameter and arranged as hereinbefore described.

When it is desired to expose the fabrics to the action of the atmosphere the frame E F 50 G H may be extended above the top of the vat and the upper series of rollers *a b c d e*, *a' b' c' d' e'*, &c., may be placed some distance above the surface of the fluid and thus the layers of fabric will be continually exposed 55 partly to the action of the bleaching solution and partly to the action of the atmosphere.

We do not desire to claim as our invention the arrangement of rollers in a vat generally, 60 but

What we claim and desire to secure by Letters Patent is—

The arrangement of the series of graduated and compensating upper and lower rollers in combination with the vat for the 65 purpose of treating simultaneously a series of parallel layers of woven fabrics—in the manner and for the purpose substantially as hereinbefore described.

J. A. ROTH.
JOS. LEA.

Witnesses:

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