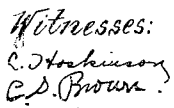


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Patented May 20, 1913.

2 SHEETS--SHEET 1.



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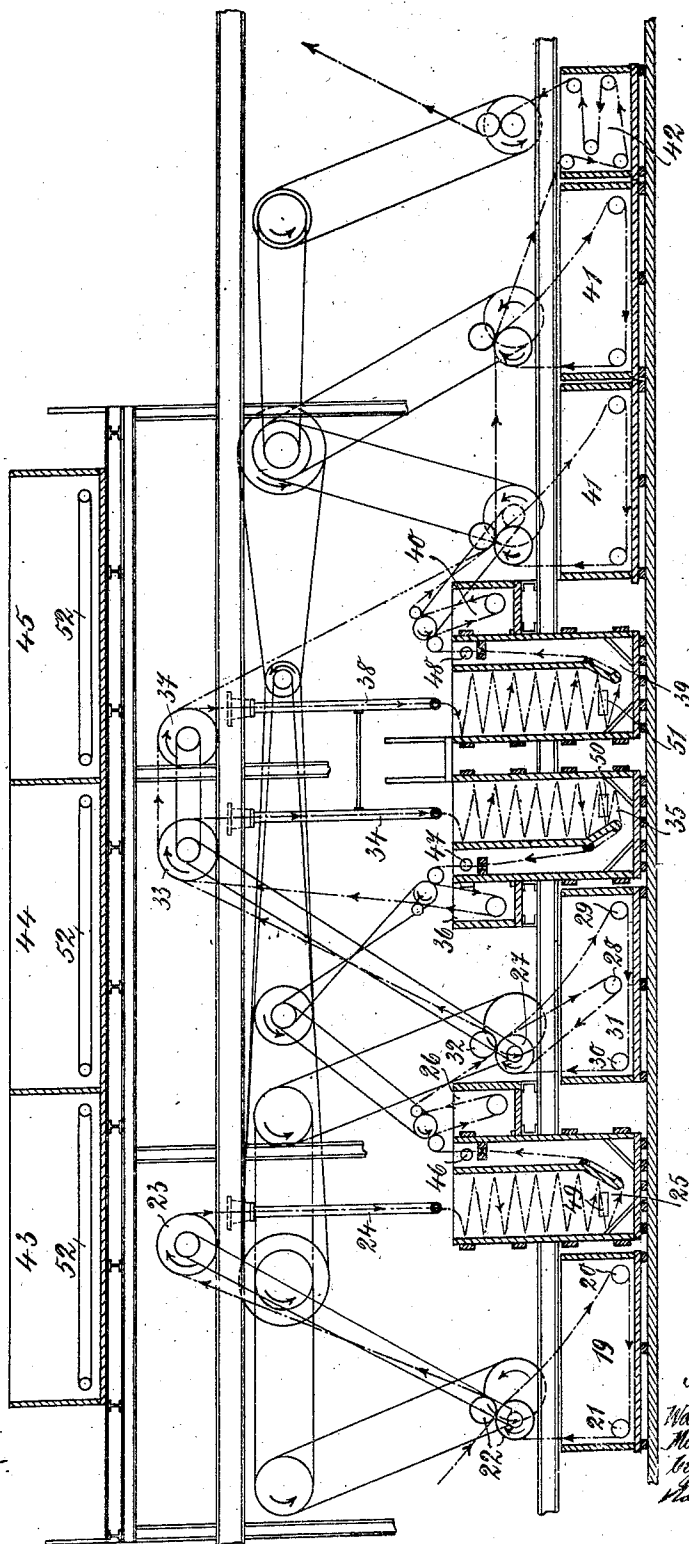
W. MATHESIUS & M. FREIBERGER.
 APPARATUS FOR TREATING FABRIC WITH LIQUIDS.
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1,062,245.

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2 SHEETS-SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

WALTHER MATHESIUS AND MORITZ FREIBERGER, OF CHARLOTTENBURG,
GERMANY.

APPARATUS FOR TREATING FABRIC WITH LIQUIDS.

1,062,245.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed December 28, 1911. Serial No. 669,315.

To all whom it may concern:

Be it known that we, WALTHER MATHESIUS, a subject of the King of Prussia, and resident of 10 Carmerstrasse, Charlottenburg, near Berlin, German Empire, and MORITZ FREIBERGER, a subject of the Emperor of Austria-Hungary, and resident of 1 Trendelenburgstrasse, Charlottenburg, near Berlin, Germany, have jointly invented a new and Improved Apparatus for Treating Fabric with Liquids, and Particularly for Bleaching the Same, of which the following is a specification.

This invention relates to an improved apparatus for treating fabric in rope form to the action of liquids and our invention particularly consists in an apparatus for treating the fabric to the action of chlorid and acid solutions for the purpose of bleaching the same.

In order that the invention may be more clearly understood, reference will be hereinafter made to the accompanying drawings whereon we have shown by way of example the preferred construction of bleaching apparatus.

Figure 1 is a section through a single bleaching vessel constructed according to our invention. Fig. 2 is a side-view partly in section, showing the contiguous arrangement of three such apparatus.

Referring to Fig. 1 of the drawings: The bleaching vessel comprises a preferably wooden box 1 separated into two compartments A and B by a more or less vertical partition 2, which does not extend entirely to the bottom of the vessel, the partition 2 having an inclined part 2' inclined toward the compartment A.

Two pieces of fabric are preferably treated simultaneously, each piece being separately wound into rope form and the two ropes then passed together into the compartment A and laid in folds therein by any suitable means, but preferably by means of the pendulating feed-tube described in the specification of German Patent No. 209457 the fabric being supported below by the inclined part 2' of the partition 2. The compartment B is preferably smaller than the compartment A and serves to receive the fabric as it passes through the opening C in the lower part of the compartment A. The liquid is allowed to enter the space A in considerable quantity and simultaneously with the lay-

ing of the fabric therein and in order to prevent compression of the fabric at the bottom of the compartment A at C and consequent entanglement on passing out therefrom, liquid is auxiliarily supplied to the compartment B by way of an inlet pipe 3, the liquid in the vessel 1 overflowing through the overflow openings 4 in the compartment A which are so arranged that the level of the liquid in the compartment B exceeds that of the liquid in the compartment A, so as to create a difference in the hydrostatic pressure in the two compartments. By this means the fabric is caused to more or less float in the liquid in the compartment A and compression at the lower outlet opening C thus avoided while at the same time the liquid is capable of uniformly percolating through the fabric. The liquid in the compartment A flows out through the slots or openings 4 surrounding the same into a tube 61 which returns the liquid to the reservoir 64 and which may be controlled by a cock 62. The liquid in the reservoir 64 is pumped upwardly by means of a pump 63 to the supply pipe 3 and to a pipe 66 supplying liquid to the feed-tube 70. The level of the liquid in the compartments A and B is regulated by opening the cock 62 while the action of the pump 63 remains unaltered. The difference in the level of the liquid in the two compartments is occasioned by the resistance of the fabric to the flow of the liquid.

The liquid can be heated either by supplying steam to the reservoir 64 or by causing the liquid to traverse a heating element on its way from the pump 63.

In order to properly effect the starting of the apparatus, the lower part of the compartment A is provided with a perforated movable bottom 67 hinged at 68 and held in raised position by a tappet on the tappet shaft 69. To set the apparatus in operation, the movable bottom 67 is located in its raised position while the compartments A and B are empty. The fabric is then laid in the compartment A and liquid simultaneously supplied to said compartment to fill the same. Thereupon the pump 63 is set in operation, so that the flow of the circulating liquid maintains the fabric in the compartment A while the bottom 67 can be lowered. During the operation, the fabric is drawn out from the compartment B at the same rate as it is fed into the compartment A

while the flow of the liquid holds the fabric in a more or less floating condition and prevents the same falling onto the bottom 67. The fabric on leaving the opening C is taken from the compartment B between guides 5 and a pair of rollers 6 which feed the fabric still in rope form between a pair of pressure rollers 7 and 8 which express the greater part of the liquid in the fabric which may be returned to the compartment B by means of an inclined board 9. The fabric after being expressed between the rollers 7 and 8 passes downwardly into a rinsing tank 10 and over a roller 11 therein and upward again around the pressure roller 8, the fabric being wound a few times around the rollers 8 and 11. The two ropes of fabric are now separated by rakes 60 and the fabric sprayed on its way into the tank 10 by water jets issuing from a water pipe 12, the excess water being thereupon expressed between the rollers 8 and 12.

The pressure roller 8 is preferably stationary mounted in position and constructed of wood while the pressure rollers 7 and 12 which are preferably constructed of cotton or jute are mounted on oscillating arms 14 and 15 respectively, the arm 14 being capable of oscillating about a fixed pivot 16 while the arm 15 is capable of oscillating about a fixed pivot 17. The rollers 7 and 12 are maintained in contact with the central roller 8 by means of an adjustable spring 18 connected at each end to the oscillating arms 14 and 15 respectively.

On leaving the rollers 8 and 12 the fabric may, if desired, pass to a second similar apparatus, as illustrated in Fig. 2, which apparatus enables a successive chlorid and acid bleaching process to be carried out inasmuch as the tank 10 serves only to partly remove the chlorid solution.

Referring to Fig. 2 of the drawings: The fabric either before or after leaving the scouring tank arrives in the form of separate ropes in the washing machine 19, which may also, if desired, serve as an acidifying tank. The fabric, indicated in broken lines in Fig. 1, passes around rollers 20 and 21 in the washing tank 19 and then upwardly between pressure rollers 22 to and over a winding device 23 where it is wound into a single rope and supplied to any suitable type of feeding device, in the drawings a pendulating feed-tube 24 being illustrated. By this means the fabric is laid in folds in the acidifying vessel 25 which is of substantially the same construction as the apparatus illustrated in Fig. 1. The fabric is subjected herein for a period of about 25 minutes to the action of an acid preferably at a temperature of about 40 to 50° C. After leaving the rinsing tank 26 the fabric then passes over rollers 27 and 28 where the ropes are separated and in this separated form pass

around the rollers 29 and 30, in a second washing tank 31. From thence the fabric is expressed between the roller 27 and the pressure roller 32 and passes from thence over a winding device 33 either direct to the washing tank 41 when not previously scoured, or otherwise to a second feeding tube 34, which lays the fabric in a second apparatus 35 similar to that described with reference to Fig. 1 and in which the fabric is subjected to the action of an alkaline chlorid solution, such as calcium or sodium hypochlorite. The fabric passes from thence through a rinsing tank 36 and with part of the chlorid solution still remaining thereon, it is separated by the winding device 33 into individual ropes which are again united by means of a winding device 37 which supplies the fabric to a third feeding tube 38 delivering the fabric to a third vessel 39 similar to that described in Fig. 1 in which the fabric is subjected to the action of an acid. Thereupon the fabric passes through a third rinsing tank 40 and in a similar manner to that hereinbefore described through one or more washing machines 41 and from thence to an expressing device 42. The acid and chlorid solutions are supplied to the vessels 25, 35 and 39 from a series of reservoirs 43, 44 and 45 mounted above the machine and which are adapted to supply the liquid to the feeding tubes 24, 34 and 38 and to the inlet pipes 46, 47 and 48 of the vessels 25, 35 and 39 respectively, the liquid in the vessels overflowing through overflow openings 49, 50 and 51 and being from thence returned to the reservoirs 43, 44 and 45 respectively by means of suitable pumps not shown on the drawings. To gently heat the liquid in the reservoirs 43, 44 and 45 in order to accelerate the bleaching operation we have indicated a series of water pipes 52 which may be supplied with warm water from any suitable source.

We claim:—

1. The improved apparatus for subjecting textile fabric in rope form to the action of liquid comprising the combination with a vessel having a substantially vertical partition not extending entirely to the bottom thereof, whereby said vessel is divided into a fabric storage compartment and a fabric withdrawal compartment communicating with each other beneath said partition, and means for passing the fabric successively through said compartments; of means for supplying liquid to said withdrawal compartment and an overflow outlet for the liquid in said storage compartment, whereby a liquid current is created in a direction through said compartments opposite to the movement of the fabric therethrough.

2. The improved apparatus for bleaching cotton and like fabric in rope form, comprising, in combination, a plurality of contiguous

ous vessels each having a substantially vertical partition not extending entirely to the bottom thereof, whereby each vessel is divided into a fabric storage compartment and a fabric withdrawal compartment communicating with each other beneath said partition, means for passing the fabric successively through the several compartments of said vessels, means for supplying bleaching solutions to the withdrawal compartments of said vessels, and overflow outlets in the storage compartments of said vessels.

3. The improved apparatus for bleaching cotton and like fabric in rope form, comprising in combination a plurality of contiguous vessels, each having a substantially vertical partition not extending entirely to the bottom thereof, whereby each vessel is divided into a fabric storage compartment and a fabric withdrawal compartment communicating with each other beneath said partition, means for passing the fabric successively through the several compartments of said vessels, a washer intermediate the first and second vessels through which the fabric is also passed, means for supplying bleaching solutions to the withdrawal compartments of said vessels, and overflow outlets in the storage compartments of said vessels.

4. The improved apparatus for subjecting textile fabric in rope form to the action of liquid, comprising the combination with a vessel having a substantially vertical partition not extending entirely to the bottom thereof, whereby said vessel is divided into a fabric storage compartment and a fabric withdrawal compartment communicating with each other beneath said partition, and means for passing the fabric successively through said compartments, of means for supplying liquid to said withdrawal compartment, an overflow outlet for the liquid in said storage compartment whereby a liquid current is created in a direction through said compartments opposite to the movement

of the fabric therethrough, a liquid reservoir and a heating element therein.

5. The improved apparatus for bleaching cotton and like fabric in rope form, comprising, in combination, a plurality of contiguous vessels, each having a substantially vertical partition not extending entirely to the bottom thereof, whereby each vessel is divided into a fabric storage compartment and a fabric withdrawal compartment communicating with each other beneath said partition, means for passing the fabric successively through the several compartments of said vessels, means for supplying bleaching solutions to the withdrawal compartments of said vessels, overflow outlets in the storage compartments of said vessels, reservoirs for said solutions and heating elements therein.

6. The improved apparatus for bleaching cotton and like fabric in rope form, comprising in combination, a plurality of contiguous vessels, each having a substantially vertical partition not extending entirely to the bottom thereof, whereby each vessel is divided into a fabric storage compartment and a fabric withdrawal compartment communicating with each other beneath said partition, means for passing the fabric successively through the several compartments of said vessels, a washer intermediate the first and second vessels through which the fabric is also passed, means for supplying bleaching solutions to the withdrawal compartments of said vessels, overflow outlets in the storage compartments of said vessels, reservoirs for said solutions and heating elements therein.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

WALTHER MATHESIUS.
MORITZ FREIBERGER.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.