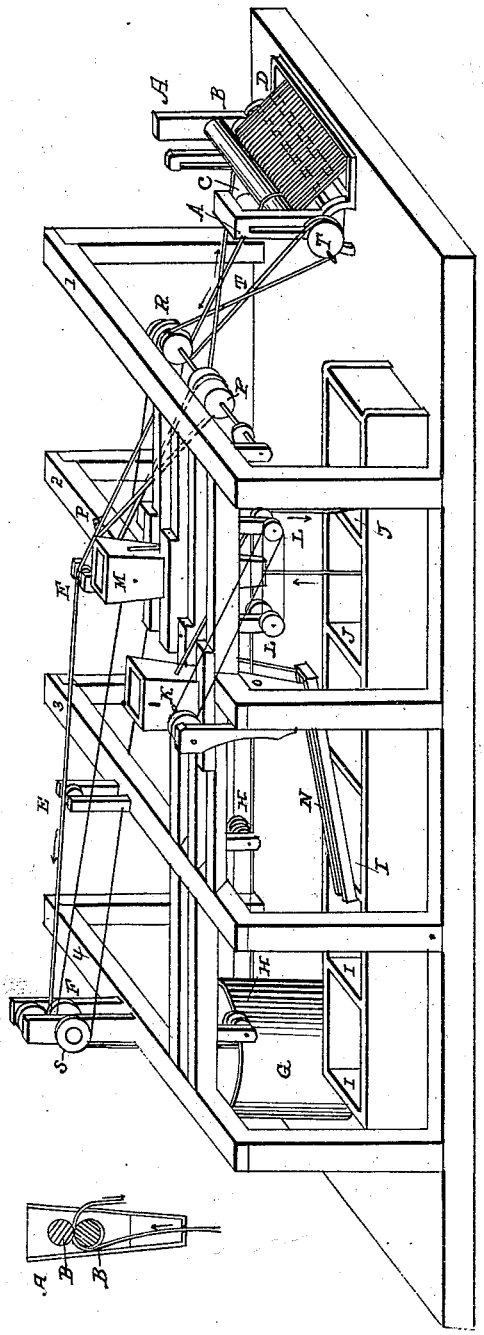
M. PIERCE.

Bleaching Apparatus.

No. 4,257. Patented Nov. 8, 1845.



UNITED STATES PATENT OFFICE.

MOSES PIERCE, OF NORWICH, CONNECTICUT.

BLEACHING APPARATUS.

Specification of Letters Patent No. 4,257, dated November 8, 1845.

To all whom it may concern:

Be it known that I, MOSES PIERCE, of Norwich, in New London county and State of Connecticut, and a citizen of said State, have invented and brought into successful operation an Improvement in Apparatus and Machinery for Bleaching Cotton and Linen Fabrics in the Piece.

Heretofore the cloth, when being bleached, has been passed from the washing machine to the tubs and keir, and from the one to the other by hand.

My invention and improvement consists, in performing this operation by machinery, by which it is done in a better manner, and at less expense; by the introduction of pulleys and bands, properly arranged and connected with the other bleaching apparatus; and the improvement contemplated has been carried into successful operation.

The following, with the drawings referred to, is a full, clear, and accurate description of the machine and improvements claimed, and of the method of using and applying the same.

To prepare the cloth for the operation of bleaching, I attach together, at the ends, by sewing or otherwise, as many pieces as are commonly put into the works at one soaking or bucking, making one continuous piece. The operation is commenced by passing the cloth through a washing machine, commonly known as the French washing machine, referred to in the drawing, commonly made with two wood rollers about 12 feet long and 14 inches in diameter, each placed in a frame made like a common calender frame for supporting the rollers for calendering cloth; with this addition that on the end of the rollers, where the cloth leaves the machine, the frame has a projection in this form  projecting lengthwise of the rollers, for supporting and keeping in place a roller about 14 inches long and 12 inches diameter; which squeezes the water from the cloth after it is washed. Back of these rollers about two feet, and about three feet below, these is placed in a water box about 10 in. deep 18 in. wide, and 12 feet long in the clear. In this box is a wooden roller, about 12 feet long and 5 inches diameter; which is in a line parallel with the two rollers above named. Between the water box and two rollers last referred to, elevated about half the distance on a line from the water box, to the center of the two rollers before named, is a guide rail with pins through it to guide the cloth from the two rollers to the roller in the water box and back to the two rollers alternately, till the cloth has passed through the whole machine. The ends of this guide rail are made fast to the frame supporting the large rollers. To wash cloth in this machine the end of the cloth is passed between the long 14 inch rollers, down around the rollers in the water box, up through and between the 14 inch rollers again, and so continually passing between the two 14 inch rollers, and down around the roller in the water box, until it winds the whole length of the washing machine to the squeezing roller thereby squeezing the cloth dry enough to go directly into the bleaching liquor in the tubs or to the keir for boiling.

The operation of washing with this machine is this: The box attached to the washing machine is continually supplied with a stream of clean water, through which the cloth is made to pass. The cloth is received after passing under the squeezing roller, upon carrier pulleys or drums with flanges to guide the cloth to a larger pair of pulleys one running over and bearing upon the other, and driven by a band or shaft from the washing machine, so that it will stop and start with the machine. The cloth is passed between the pulleys last named by which means it is drawn to the keir or cistern used by bleachers for boiling cloth. This pair of pulleys being over the keir they conduct the cloth into it. The cloth is laid in the keir by a man with a stick and as each layer of 3 inches or more of cloth are laid in the keir they are lined over with the milk of lime in the usual manner. After boiling from 4 to 20 hours, according to the size of the bucking, the band or shaft is disengaged from the pulleys over the keir and they are used for carrier pulleys to conduct the cloth back to the washing machine, by the use of the same carrier pulleys used to conduct the cloth to the keir. The cloth is then again conducted through the washing machine in the same way as before, washing out the lime and other matter. It is then passed over the carrier pul-

leys driven by the washing machine and conducted into the tubs containing the bleaching liquor, until the tub is sufficiently full. There is a carrier pulley over each tub so that when one tub is full the cloth is separated at a seam and the end passed over another carrier pulley, and another tub is filled in the same manner, until all the tubs containing bleaching liquor are filled and the cloth all in the tubs.

The cloth, after remaining in the bleaching liquor from 3 to 6 hours, is passed up over a roller in the end of a wooden trough, one end of which rests on the side of the tub, the other end is elevated and attached by hook or otherwise to a spout which surround a pair of squeezers made in the usual manner. There is a pair of squeezing rollers made of wood or other material, which will not rust, 14 inches diameter and 10 inches long, weighted by lever or springs, and driven by power from the washing machine. If two pair of squeezers are used, the pair to squeeze out the bleaching liquor are driven by power disconnected from the washing machine. One pair driven by the washing machine may be made to answer the purpose of squeezing out the bleaching liquor and also the acids.

The cloth is passed up the whole length of the trough to and up the spout, between the squeezing rollers which squeezes out most of the bleaching liquor. This liquor passes down the spout into the trough before named, and down that into the tub from which the cloth is passing. The cloth from the squeezers is in a fit state to pass into the sour tubs or cistern, containing a solution of sulfuric acid, to which the cloth is conducted by carrier pulleys driven by power from the squeezers, so as to start and stop with them. From a carrier pulley the cloth drops into the sour tub, until the tub is full. A carrier pulley is placed over each sour tub, and they are all filled in the same way. The cloth having remained in the sour tub a sufficient length of time, the end of the cloth is passed up through a trough and spout to another pair of squeezers, made in the same manner about the same size, passing through the squeezers, squeezing the sour out of the cloth which is conducted back to the tub in the same way as the bleaching liquor, before described. From the squeezers the cloth passes again to the washing machine, and through it, in the same way as before; washing out all the acid. This last pair of squeezers is driven by power from the washing machine. The speed of this pair of squeezers is regulated by a pair of cones so that in running various kinds of cloth the squeezers will pass it with sufficient rapidity to prevent undue tension of the cloth between the squeezers, and washing machine; also to prevent the cloth from accumulating between the squeezers and washing machine. The cloth from the washing machine is prepared to go again into the keir, over the same carrier pulleys in the same way as before conducted into the keir. After the cloth has been all liquored, soured and washed as before described, and passed into the keir it is boiled in alkalis.

The seams that were separated when the tubs were filled are again connected when they pass out of the sour tubs, so that; when the cloth is passed into the keir it is again one continuous piece of cloth. After boiling, the cloth is passed out of the keir over the carrier pulleys through the washing machine, washing out the alkalis, and squeezing it dry enough to go into the bleaching liquor again, and passing over carrier pulleys into the bleaching liquor, and from the bleaching liquor through the squeezers into the sour, and from the sours, through the squeezers to the washing machine, and through the washing machine; thereby washing out the acid in the same manner as before described. If the cloth is intended for bleached market goods they are ready to fold and starch.

The foregoing is a general description of the machine and of its operations. The following is a more particular description of the parts of the machine, and of their position, size and operation, by references and explanations of the drawings accompanying this specification.

The large figure represents the interior of the bleaching room.—1, 2, 3, 4, are the beams of the building, about 8 by 8 inches square 40 feet long 10 feet apart.

A, A, are the frame supporting the rollers B, B. In the washing machine C, is the squeezing roller 14 inches long 12 inches diameter placed on one end of the top roller B.

D, is a water box with a wooden roller 5 inches diameter of the same length of rollers B, B.

E E are carrier pulleys over which the cloth passes to the keir G, drawn by pulleys F, driven by a band on pulley S, from pulley R, on a shaft near the washing machine, which is driven by T, a pulley on the end of the washing machine.

H H are carrier pulleys over which the cloth is conducted from the washing machine to the tubs I, I, I, I, containing bleaching liquor driven by a band from pulley V, on the opposite end of the same shaft to pulley R.

N is a trough about 6 inches wide, 4 inches deep, long enough to reach from the spout O on the squeezer K to either tub I, from which the cloth is to be taken. K, is a box containing a pair of squeezers to squeeze the bleaching liquor out of the cloth, the

liquor falls down the spout O, to trough N, down the trough, to tub I, from which the cloth is passing.

L, L, are pulleys to conduct the cloth from squeezer K, to sour tubs J, J. M, is another box containing a pair of squeezers through which the cloth passes from the sour tubs in the manner before described, from the bleaching tubs, P, P, are cones, one on the journal of the lower squeezing roller in squeezer M, the other on the shaft with pulleys R and V driven from washing machine, as before described. The band on these cones drives squeezer M.

In the drawing the cloth is shown by a double line passing up from the right-hand sour tub J, through squeezer M to the washing machine, as shown by the direction of the arrows. The cloth is shown as passing through the washing machine under the squeezing roller C, to the keir G, as shown by two arrows pointing toward pulleys F.

This shows the operation of taking the cloth from the sour tub, squeezing and washing it, and depositing it on the keir. The cloth is also shown passing from squeezer K, having passed from bleaching liquor tub I, through trough N, and spout O, to squeezer K, is now passing over pulley on shafts with right hand pulley L, falling into right hand sour tub J, as shown by the arrow pointing down. This shows the operation of taking the cloth from the tubs containing bleaching liquor, squeezing it, and passing it into the sours.

The small figure at the left hand shows an end view of the squeezers K, and M.

A is one side of the frame supporting the squeezer rollers B, B, also forming ends to spouts O.

The band T′ on T, on the washing machine driving shaft, gives motion to shafts on which is cone P and pulleys R, V.

The advantages to be derived from the use of the above machine and improvements are, that the work is done better and cheaper.

I am aware that the washing machine, the kier for boiling, first in lime and then in an alkali, the "chemics" or vats for containing the chlorin, and the "sours" or vats for containing the acid solutions have all heretofore been used separately, the pieces of fabric being attached together to introduce them to the washing machine, and then separated to transport them by hand to the kier, and then retransported and reattached to rewash them, and the same with reference to the chemics and sours and the washer, the whole of these operations of attaching, detaching conveying and reconveying being done by hand, and therefore I wish it to be distinctly understood that I do not claim as my invention the using of these in succession in the process of bleaching, nor, do I claim the passing of wet fabrics from a tub or vat between rollers to force out the liquid as this combination has heretofore been known and used; but

What I do claim as my invention and desire to secure by Letters Patent, is—

1. Combining the washing machine with the kier by means of carrying rollers or belts provided with a reversed motion so that the fabrics can be conveyed from the washer to the kier, and back from the kier to the washer as herein described.

2. I also claim combining the washer with the several chemics or vats for containing chlorin &c., in the manner described, so that the fabric may be conveyed from the washer to the chemics, and the squeezing rollers, as herein described, and in combination with this last combination the arrangement of the "sours," or vats for containing the acid solution and the set of squeeze rollers which receive the fabrics from the sours after they have been conveyed therein from the first set of squeeze rollers, and reconveying them to the washer, as herein described.

3. And finally, I claim combining together the washing machine, the kier and the chemics, the first set of squeeze rollers the sours and the second set of squeeze rollers in the manner described, by means of which the various operations in the process of bleaching are connected together, so as to convey and reconvey the fabrics from the one to the other in the order required, substantially as herein described.

MOSES PIERCE.

Witnesses:
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