

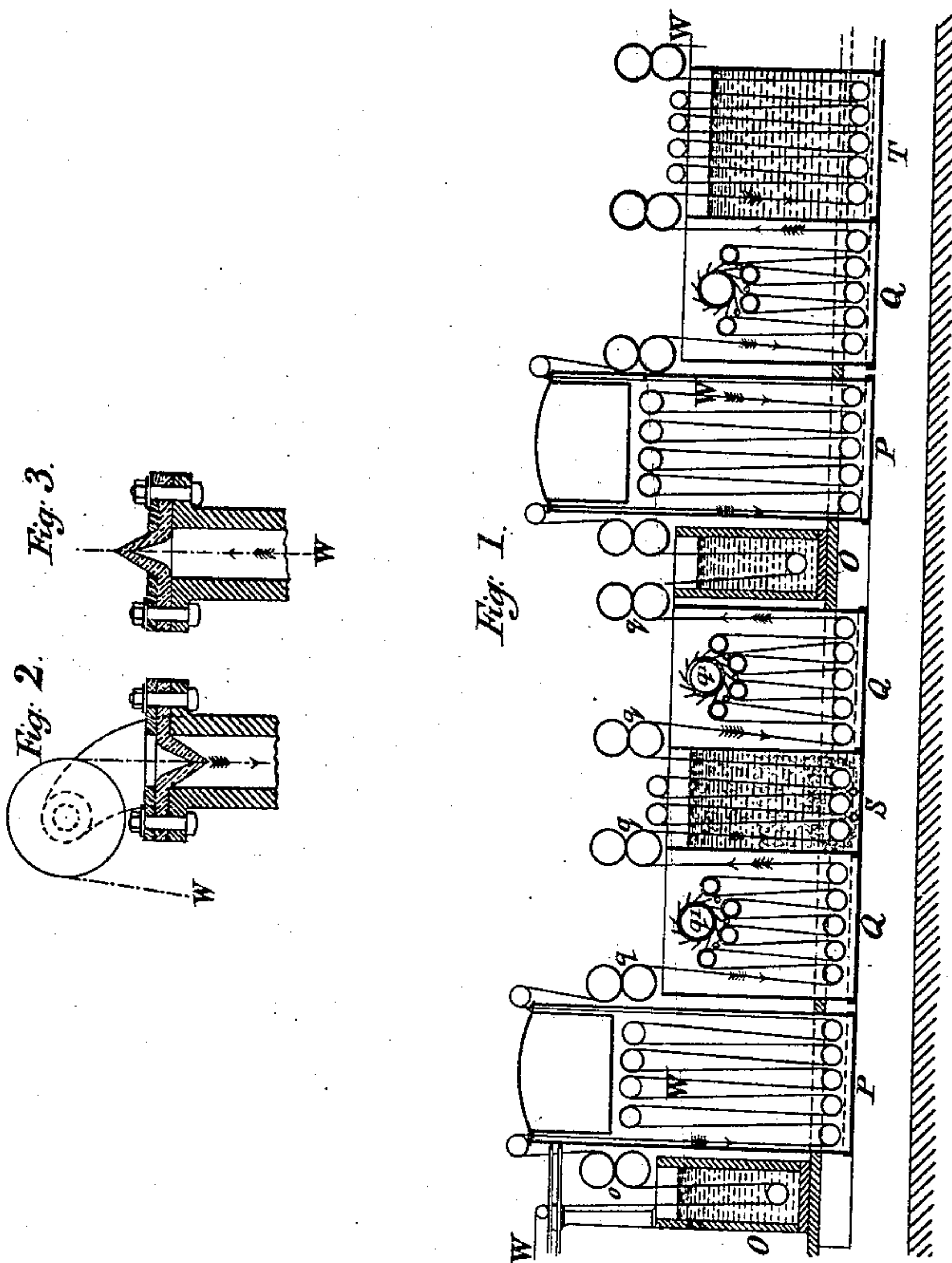
(No Model.)

W. MATHER.

APPARATUS FOR CONTINUOUS BLEACHING.

No. 324,137.

Patented Aug. 11, 1885.



Witnesses

Chas. H. Smith
J. Stail

Inventor

William Mather
per Lemuel W. Terrell
att.

UNITED STATES PATENT OFFICE.

WILLIAM MATHER, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

APPARATUS FOR CONTINUOUS BLEACHING.

SPECIFICATION forming part of Letters Patent No. 324,137, dated August 11, 1885.

Application filed March 13, 1885. (No model.) Patented in England May 19, 1884, No. 7,909.

To all whom it may concern:

Be it known that I, WILLIAM MATHER, a subject of the Queen of Great Britain and Ireland, residing at Manchester, in the county of Lancaster, England, engineer, have invented new and useful Apparatus for Continuous Bleaching, of which the following is a specification.

For bleaching vegetable fabrics and yarns a number of different operations have been applied as individual steps of various processes. For example, the material to be bleached has been subjected to preliminary treatment by boiling it with alkaline liquor, with or without the addition of sulphites, or by saturating it with solutions of alkalis or of alkaline sulphites, or both combined, and then steaming it for various periods. After such preliminary operations the material has been treated with chlorine bleaching-liquor and then exposed to the action of carbonic-acid gas, or it has been treated with alkali and then exposed to the action of chlorine, or sometimes it has been treated with permanganate of potash and then exposed to the action of sulphurous acid. These operations, either by themselves or combined with repeated washings and squeezings, have been conducted more or less separately and discontinuously in such a manner as to occupy considerable time and to require much manipulation and transport of the material.

The object of my invention is to abridge the time occupied in bleaching, to avoid manipulation, and economize labor by rendering the process, as far as possible, continuous with the aid of apparatus arranged to effect the successive steps of the process, as I will explain, referring to the accompanying drawings. I may first, however, remark that though the preliminary operation of steaming might be carried on in a continuous manner, I find that it is better effected by treating the material in mass, whereby it is brought into a state fitted for passing continuously through the succeeding stages. For this purpose I employ steaming apparatus of the kind described in another application for Letters Patent filed by me at the same time as this.

The steamed material contained in a truck is run up to the end of the continuous bleach-

ing apparatus, of which Figure 1 is a longitudinal section, and Figs. 2 and 3 showing details, hereinafter referred to.

During the whole of the process about to be described the lines of yarn or the webs travel continuously over and between rollers at a uniform rate without any breach of continuity until they are delivered bleached from the farther end of the apparatus. Webs may be passed through the apparatus in an open, spread-out state at a rapid rate, or several webs in rope form may pass through side by side; but in this case the rate of travel must be slower to allow more time for the agents to penetrate the folds, or agents of greater strength must be employed. In like manner yarns can be rapidly passed through the continuous bleaching when they are well spread out, but must pass more slowly or be more strongly acted on when their strands are massed together.

The first part of the apparatus, shown in Fig. 1, consists of three compartments, O, P, and Q, which occur again at least once, or better twice, as shown in the figure. In these compartments the web W passes over and under guide-rollers, which, in each case, may be varied in number according to the time necessary for exposure of the material. When the exposure need be brief, a single roller, as in O, suffices. When longer exposure is necessary, there are several sets of rollers above and below, as in P and Q. Besides the guide-rollers there are sets of squeezing-rollers, one pair, *o*, above compartment O, and two pairs, *q*, above compartment Q. At the top of the compartment P there are deep passages for the web surmounted by elastic lips, a pair directed downward for the entering web, as shown on an enlarged scale at Fig. 2, and a pair directed upward for the issuing web, as shown at Fig. 3. The purpose of these elastic lips is to press closely against the web passing between them and so to prevent as much as possible escape of gas or vapor from the compartment P. In the compartment Q there is a roller, *q'*, provided with elastic tines or brushes, which as they revolve scrub the surface of the web or yarn as it passes over the adjacent guide-rollers. The compartments O and P are applicable for three modes of

treatment, which I have above referred to—that is to say, first, O may contain bleaching-liquor—such as a solution of chloride of lime—in which case P is supplied with carbonic-acid gas; or, second, O may contain alkaline liquor—such as solution of soda—in which case P is supplied with an atmosphere of chlorine; or, third, O may contain permanganate of potash liquor, in which case P is supplied with an atmosphere of sulphurous acid.

In some cases it is of advantage to supply the lower parts of the compartments P with water or an aqueous solution of the gas employed in the compartment, so that the material may be passed through the liquor by the lower rollers.

Wherever the compartments O and P occur in the apparatus they may be used for any one of those three modes of treatment. With some materials one of the modes only may be used, that being repeated twice or thrice. With other materials it is better to use different modes at different stages. In all cases, whatever the mode used, washing is effected in the compartment Q.

Between the first set of compartments O P Q and the next set there is a compartment, S, for treating the material with a weak alkaline solution, heated to boiling, if necessary, and another washing-compartment, Q. These may be repeated in similar positions throughout the apparatus, if required.

After the last of the series of compartments above described there is a souring-compartment, T, in which the material is treated with a diluted mineral acid, and beyond this washing-compartment—such as Q—are repeated, whence the web passes through squeezing-rollers to be dried, dyed, or otherwise treated, as may be desired.

Many parts of the apparatus—such, for instance, as the washing-compartment Q, or souring-compartment T, with their guide and squeezing-rollers—are of ordinary and well-known construction, and the soaking-compartments O are similar to them.

I wish it to be understood that I do not claim as my invention any of either operations which I have described taken by itself, as these are already known or practiced more or less discontinuously.

I do not claim a continuous bleaching operation, nor a series of compartments set together for that purpose.

I am aware that it is not new to employ rollers with elastic tines in connection with steam-vats in a series of open vats.

I claim as my invention—

1. In an apparatus for bleaching fibers and fabrics continuously, the combination of the liquor-compartments O, the compartments P for gases, the washing-compartment Q, the alkaline-compartment S, and souring compartment T, and the rollers around or between which said fabrics pass in the progressive bleaching process, substantially as specified.

2. In an apparatus for bleaching fibers and fabrics continuously, the combination, with the compartments O P S T, of the washing-compartment Q, the rollers q' , provided with elastic tines or brushes, and the rollers around or between which said fabrics pass in the progressive bleaching process, substantially as specified.

3. In an apparatus for bleaching fibers and fabrics, the combination, with the compartments O Q S T, of the gas compartment P having walls with passages between them for the fabrics, the elastic lips surmounting said walls, one pair of lips being directed downward and one pair upward, said lips acting to press tightly against the fabric and prevent the escape of gas, substantially as specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM MATHER.

Witnesses:

THOS. G. WATSON,
Salford Iron Works, Manchester, Accountant.
ALFRED WILLETT.
Salford Iron Works, Manchester, Clerk.