(No Model.)

J. W. STEELBROOKE.

CLOTH SCOURING, RINSING, AND PURIFYING MACHINE.

No. 446,937. Patented Feb. 24, 1891.

Fig. 1.

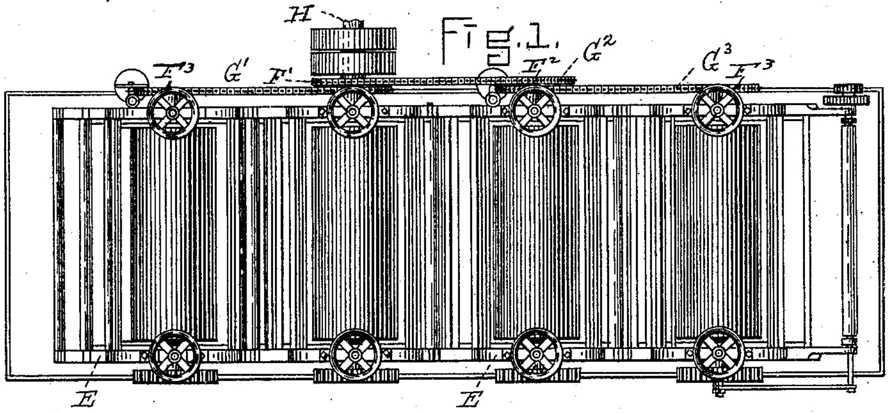


Fig. 2.

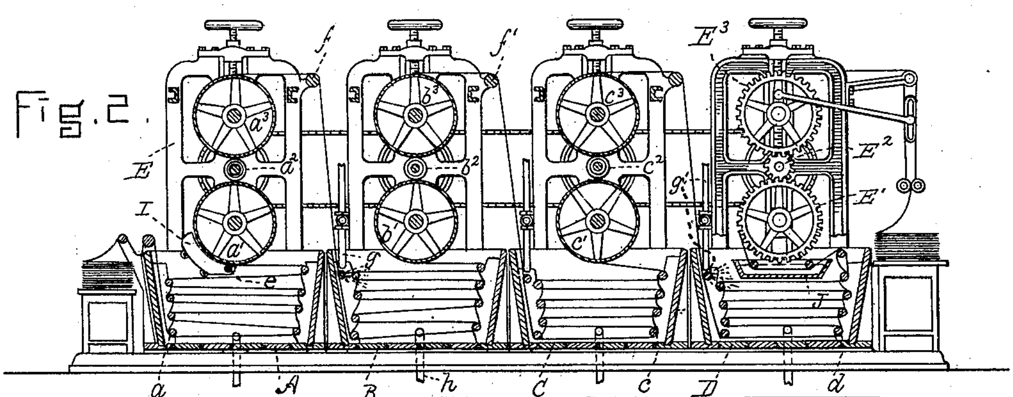


Fig. 4.

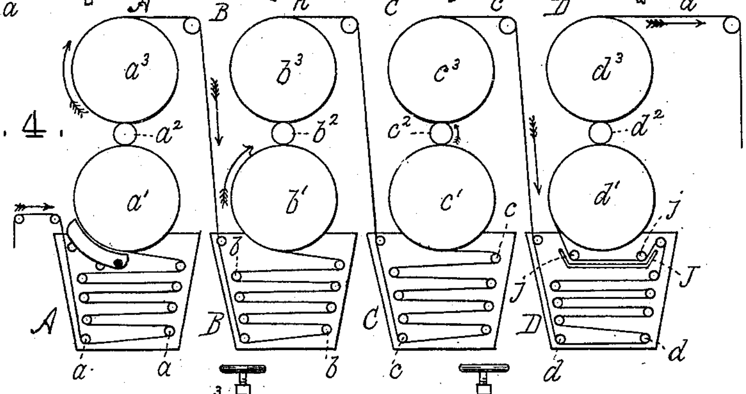
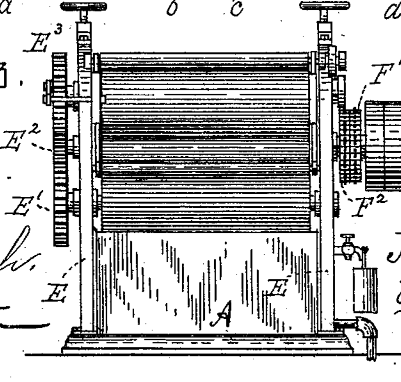


Fig. 3.



WITNESSES.

L. Henry Marsh.

E. K. Boynton

INVENTOR.

Joseph W. Steelbrooke.

by H. E. Lodge Atty.

UNITED STATES PATENT OFFICE.

JOSEPH W. STEELBROOKE, OF WOONSOCKET, RHODE ISLAND.

CLOTH SCOURING, RINSING, AND PURIFYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 446,937, dated February 24, 1891.

Application filed November 13, 1890. Serial No. 371,342. (No model.).

To all whom it may concern:

Be it known that I, JOSEPH W. STEELBROOKE, a citizen of the United States, residing at Woonsocket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Cloth Scouring, Rinsing, and Purifying Machines; and I 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.

My invention relates to apparatus for the treatment of piece goods prior to fulling or dyeing.

My improvements relate to certain structural arrangements in the apparatus by which the several steps of scouring, rinsing, resoaping, and purifying the cloth can be done more quickly, cheaply, and with a smaller amount of material. One feature consists in conducting the cloth over spread-rolls and in a flat or distended position to prevent wrinkles, and, further, to allow even and thorough distribution of the material with which it is to be treated, and, moreover, in causing the cloth to pass successively through a series of vats which shall contain the several ingredients necessary to effect the several steps to produce certain desired results. This is accomplished by providing a series of rolls in each vat by which the cloth is compelled to remain in the liquor a certain predetermined time, but dependent somewhat upon the speed of the machine.

A still further feature is to reduce the expense in material used, and to prevent the solution, as in the first or soaping vat, from becoming rapidly spent a trough or receiver is provided, which is to catch all the liquid or oily suds squeezed from the cloth and convey it away, and thus prevent its return to the vat, where the foreign matter which it contains would mix with and rapidly deteriorate the bath.

Other details of construction and the advantageous results effected will hereinafter be fully set forth and explained.

In the accompanying drawings, Figure 1 is a plan view of an apparatus embodying my invention. Fig. 2 is a sectional side elevation, and Fig. 3 an end elevation thereof. Fig. 4 is a diagrammatic view to show the arrangement of the rolls and vats.

In said drawings, A B C D represent a series of vats through which piece cloth is to be continuously passed and successively treated, the movement of the cloth being such as to permit proper action to take place in order to secure certain desired results.

Within each vat are arranged a series of rolls $a\ a\ b\ b\ c\ c\ d\ d$, set loosely in bearings that they may turn easily and not create friction or drag upon the web of cloth in process. These rolls are to vary in number and in this manner determine the length of time during which the cloth is to be subjected to the liquor in the respective vats for a predetermined rate of speed.

Vertically at the ends of each vat are erected twin housings or standards E E, in which are journaled pressure or squeeze rolls $a'\ a^2\ a^3\ b'\ b^2\ b^3$, preferably two large rolls with a small one between, in order to obtain greater pressure. These rolls are all operated to move in unison, the center rolls serving as the drivers and operate by the train of gears $E'\ E^2\ E^3$ the other and co-operating rolls in each series. Further sprocket-wheels $F'\ F^2\ F^3$ and chains $G'\ G^2\ G^3$, actuated by the main shaft H, serve to rotate the rolls $a^2\ b^2\ c^2\ d^2$. Thus the rolls are all positively interconnected with each other and move in unison.

A prominent feature in the vat A is a trough or receiver I, which extends lengthwise of the vat and situated beneath the lowermost squeeze-roll, in order that all the liquid extracted from the cloth after leaving this vat may be caught therein and passed off through a discharge-pipe *e*. The purpose of this trough is as follows: The vat A is where the soaping occurs. The oily matter in the cloth when it enters the vat is to be cut by the alkali in the liquor contained in this vat. As the cloth emerges from the vat and passes to the squeeze-rolls the suds, with the oily particles freed by the action of the liquor, is extracted and flows down about the roll, thence dropping into the trough, where it is conveyed away, and subsequently subjected to a chemical process in order to extract the oil. By thus preventing this impure matter and oily suds from returning to the vat, where it commingles with the liquor, (otherwise quickly spent and deteriorated,) the life of the liquor

is much prolonged; hence does not require renewing as frequently.

The second step consists in conducting the cloth from the first vat A over the spread-roll f to the second vat B. The latter is similar in general construction to that of vat A, the cloth traveling several times across the vat, passing about the series of rolls $b\ b\ b$, at the same time being subjected to the effects of a shower-pipe g, whence the water under pressure serves to rinse and remove the soap, the cloth emerging and passing between squeeze-rolls $b'\ b^2\ b^3$. An outlet h serves to prevent overflow of the vat.

The third step advances the cloth over the spread-roll f' to the vat C, where it is to be subjected to a second soaping mixture in said vat, thence about the rolls therein and between the squeeze-rolls $c'\ c^2\ c^3$, and finally to the last vat D, whence the outgoing cloth, after traveling about the rolls d and being rinsed by shower-pipe g' prior to its passage between the rollers $d'\ d^2\ d^3$, is conducted into a pan or bath-holder J. This open pan is placed longitudinally beneath the lower squeeze-roll and extends its entire length. This pan is to contain two or more guide-rolls $j\ j$, in order to direct the cloth through the bath of ammonia-water or other chemical used in other machines to sweeten, cleanse, or brighten colors. This pan has no outlet, since the excess of liquid absorbed by the cloth is again returned by the passage of the cloth between the rolls $d'\ d^2\ d^3$. In this way I claim the cloth can be treated in a much more expeditious manner, more effectively, and by the aid of less material in the bath.

In lieu of employing four vats, as shown in Fig. 1, my improved apparatus may employ but three, and in this way perform the duties of a "soaping-machine," so called, in which the goods are soaped prior to their being fulled. The cloth in piece is conducted through the first machine A, where it is cleansed; but since it is necessary, in order to obtain fine felt, to remove all oily matter, the cloth is therefore passed to the vat B, where it is rinsed, as before described, with warm water to remove all oil or suds that may remain from the vat A. Finally it is conducted to the third machine, which is supplied with a clean soap of any amount of body, the cloth being permitted to leave the machine with as much soap as may be desired for the fulling process. This amount is regulated by the screws which regulate the pressure between the squeeze-rolls. By this process the soap is applied uniformly throughout the cloth, and hence when passed to the fulling-mill the result is uniform and even and the goods are prevented from becoming stiff or hard, causing them to break, which result is well known as "mill-burst" and due to uneven soaping.

One important advantage obtained in my apparatus is that goods so treated and after being fulled are ready to be rinsed off with water and do not require any more soap, whereas goods fulled in the usual manner contain grease and must be subjected to a scouring process to remove such oily matter as has been fulled into them.

As before stated, the pressure of the squeeze-rolls is obtained by screw movement; but to render this pressure yielding a rubber block or metallic spring (not shown) is applied between the journal and the end of the adjusting-screw. This enables the seam, or where two pieces of cloth are temporarily sewed together, to pass between the rolls without injury to the material.

What I claim is—

1. In a cloth-cleansing machine, the combination, with a series of vats, each of which is provided with a series of guide-rolls, of three pressure or squeezing rolls arranged above each vat, a driving-shaft H, and positive interconnections between said shaft and all of said squeezing-rolls, whereby the latter are caused to rotate in unison, the first vat of the trough having a discharge-pipe, and the last vat of the said series having a shower-pipe discharging into said vat and a non-discharging open-topped bath-holder, substantially as described.

2. In a cloth-cleansing machine, the combination, with the vat A, provided with the open trough or receiver I, having a pipe e, which discharges outside of the said vat, the vat D, having the shower-pipe g', and the non-discharging open-topped bath-holder J, having guide-rolls j, and the intermediate vats B and C, all of said vats being provided internally with guide-rolls, of a series of three pressure or squeezing rolls—two large ones and an intermediate small one—arranged above each vat, said intermediate rolls being the driving-rolls and being geared to the others, the driving-shaft H, and positive interconnections to cause all of the said squeezing-rolls to rotate in unison, substantially as set forth.

3. In a cloth-cleansing machine, the combination, with the vat A, provided with the open trough or receiver I, having a pipe e, which discharges outside of said vat, the vat D, having the shower-pipe g', and the non-discharging open-topped bath-holder J, having guide-rolls j, and the intermediate vats B and C, all of said vats being provided internally with guide-rolls, of a series of three pressure or squeezing rolls—two large ones and an intermediate small one—arranged above each vat, said intermediate rolls being the driving-rolls and being geared to the others, the driving-shaft H, the sprocket-wheels F', F^2, and F^3 on the shafts of the said driving-rolls, and the driving-chains G', G^2, and G^3, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH W. STEELBROOKE.

Witnesses:
GEO. F. HIGGINS,
THOMAS Z. LEE.