W. F. HASKELL.

WARP DYEING MACHINE.

APPLICATION FILED OCT. 11, 1918. RENEWED JUNE 16, 1921.

1,402,765. Patented Jan. 10, 1922.

Fig. 1.

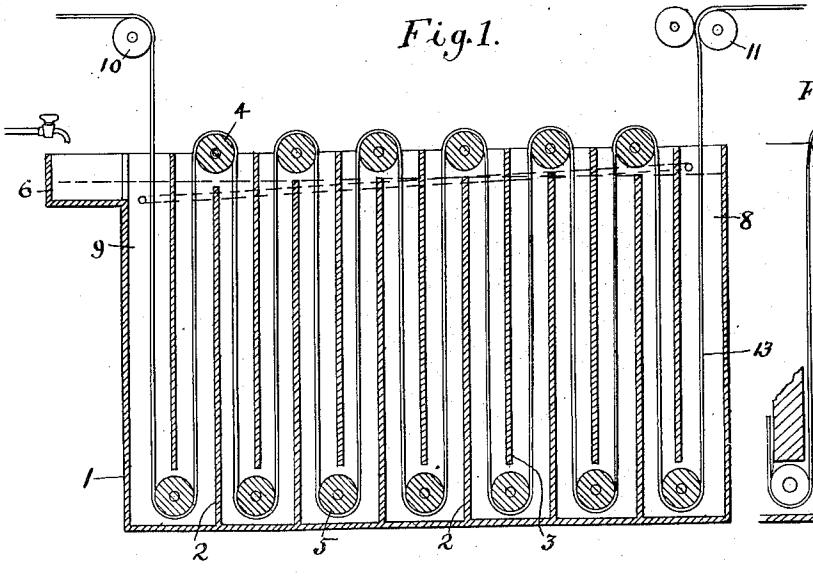


Fig. 3.

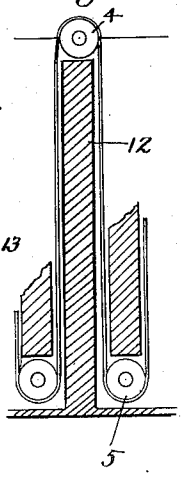
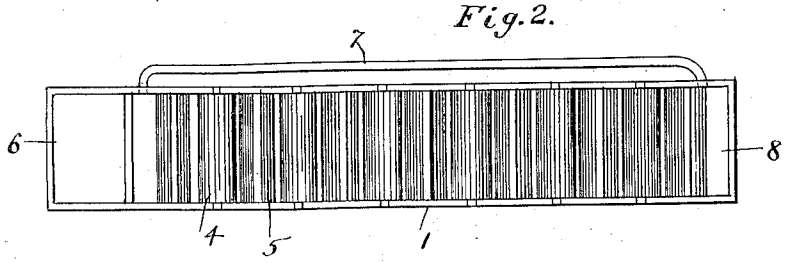


Fig. 2.



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UNITED STATES PATENT OFFICE.

WALTER F. HASKELL, OF PORTLAND, MAINE.

WARP-DYEING MACHINE.

1,402,765. Specification of Letters Patent. Patented Jan. 10, 1922.

Application filed October 11, 1918, Serial No. 257,687. Renewed June 16, 1921. Serial No. 478,213.

To all whom it may concern:

Be it known that I, WALTER F. HASKELL, a citizen of the United States, residing at Westbrook, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Warp-Dyeing Machines, of which the following is a specification.

My invention relates to machines for dyeing warps and other like material and it relates particularly to an improved construction of a machine or apparatus shown in my Letters Patent No. 1,029,866 dated June 18, 1912.

In the machine described in said patent, as illustrating the invention, I make use of a coil of pipes vertically disposed and connected by hollow heads in which are located guide rolls.

The heads and pipes were so arranged that the warp would pass through the coil extending down through one pipe up through the next in order and so on, passing over the several rolls which were journalled in the hollow heads.

The object of the invention was to confine the dye in narrow channels so that it was necessary to use only a relatively small quantity and to convey back to the point where the dye was supplied to the coil the partially spent dye as it arrived at a point where the warp left the machine.

In my present invention, while I have made use of the same general principles, I have devised a much simpler construction than that which was illustrated in my prior patent.

While my invention was not limited in this respect, I soon found that the cross-section of the pipes would be better oblong than round as the warp strand which was made up of a large number of individual threads tended to flatten out so that it would fit better and with less waste room than in a round pipe.

I also found that the machine could be made useful in dyeing piece goods and that several warps could be run through at the same time and I found further that it was not necessary to have the warp entirely submerged in the dye at all times as it might be exposed to the air without damage for a short time where it passed over the upper rolls. The form of the machine illustrated in the patent was also expensive to build and it was thus desirable to cheapen the construction.

The above considerations led me to improve the form of my machine in the direction of simplicity and cheapness of construction.

In the improved form of my machine, I make use of a tank which is preferably long and narrow in plan with considerable vertical height.

The interior of the tank is divided by vertical partitions extending from side to side of the tank and dividing the interior into a series of elongated passages alternately connecting at the upper and lower ends so that a continuous passage for the warp will be formed between the partitions.

The guide rolls for the warp are journalled at the points above and below the partitions where the passages come together and are designed to hold the warp in the central portion of each passage.

In the accompanying drawing, I have illustrated a warp dyeing machine built according to my present invention in which Fig. 1 is a central longitudinal section,

Fig. 2 is a plan view and Fig. 3 a section similar to Fig. 1 of a small portion of the tank showing enlarged partitions for the purpose of narrowing the cross-section of the passages.

In the drawing, 1 represents a rectangular tank of considerable height and relatively narrow in proportion to its length. The tank is divided into a series of passages by means of a series of cross partitions 2 and 3 spaced apart uniformly. Each of the partitions 2 extends from the bottom of the tank to a point somewhat below the top, and each of the partitions 3 extend from the top to a point a short distance above the bottom of the tank.

There is thus formed in the tank a continuous duct or passage extending from end to end, the several passages connecting at their upper and lower ends.

A portion of the guide rolls 4 are journalled at the top of the tank and as here shown they extend entirely across from one side to the other.

The lower guide rolls 5 are journalled at a short distance above the bottom of the tank and the rolls each connect the adjacent passages.

The warp strand 13 composed of many

individual warps, or the strand made up of piece goods or any other material dyed in this machine, passes down through the end passage, thence over the rolls and through the several passages in succession and out at the other end of the machine, all the dye used being confined in this continuous passage.

A feeding basin 6 is shown as being provided at the end of the tank where the fresh dye is supplied to the machine and a suitable duct 7 connects the upper portion of the last passage 8 with the first passage 9.

Thus the spent dye which, through the motion of the warp, is constantly arriving at the upper end of the passage 8 with its more readily absorbable portion extracted, is constantly being delivered through the duct 7 to the passage 9 at the opposite end of the tank where the operation begins.

The top of the tank may be left open as shown or provided with suitable cover.

Since the passages through which the warp passes are relatively flat in cross-section, several strands of warp may be passed through or piece goods or other fabric which may make a wide flat strand may be used.

The cross-section of the connecting passages may be regulated by the thickness of the partition and in Fig. 3, I show a small section of a tank wherein the partitions 12 are considerably expanded and the passages consequently narrowed up.

It is evident that the smaller the cross-section of the passages the less will be the amount of dye required to operate the machine.

Guide rolls 10 are provided for guiding the warp to the machine, and squeezing rolls 11 are located at the outlet of the machine to squeeze out the surplus dye.

Apparatus for washing and otherwise treating the dye, not necessary to show in this application, may be used after or before the dye passes through this machine.

The machine may be used as a single dyeing device or it may be used as a unit in a battery of similar machines.

The duct 7 instead of conveying the spent dye to the inlet of this device may convey the dye to another unit or otherwise dispose of it.

I claim:

1. In a machine for dyeing warps or other like material, the combination of a tank having a series of transverse partitions arranged to form a continuous passage for dye liquor through the tank, guide rolls journalled in line with said partitions for retaining the warp strand in said passage and means for supplying liquor to the inlet of said passage.

2. In a machine for dyeing warp or other like materials, the combination of a tank having a series of transverse partitions, the alternate partitions extending from the top down to a point above the bottom and from the bottom to a point below the top to form a continuous passage through the tank, guide rolls journalled in line with said partitions for guiding the warp through said passage and a duct for conveying the spent liquor from the outlet to the inlet end of said tank.

3. In a machine for dyeing warp or other like materials, the combination of a tank having a series of transverse partitions arranged to form a continuous passage through the tank, and guide rolls journalled in line with said partitions for retaining the warp strand in said passage and a duct for conveying the spent liquor from the outlet to the inlet end of said tank.

In testimony whereof I affix my signature.

WALTER F. HASKELL.