

No. 858,068.

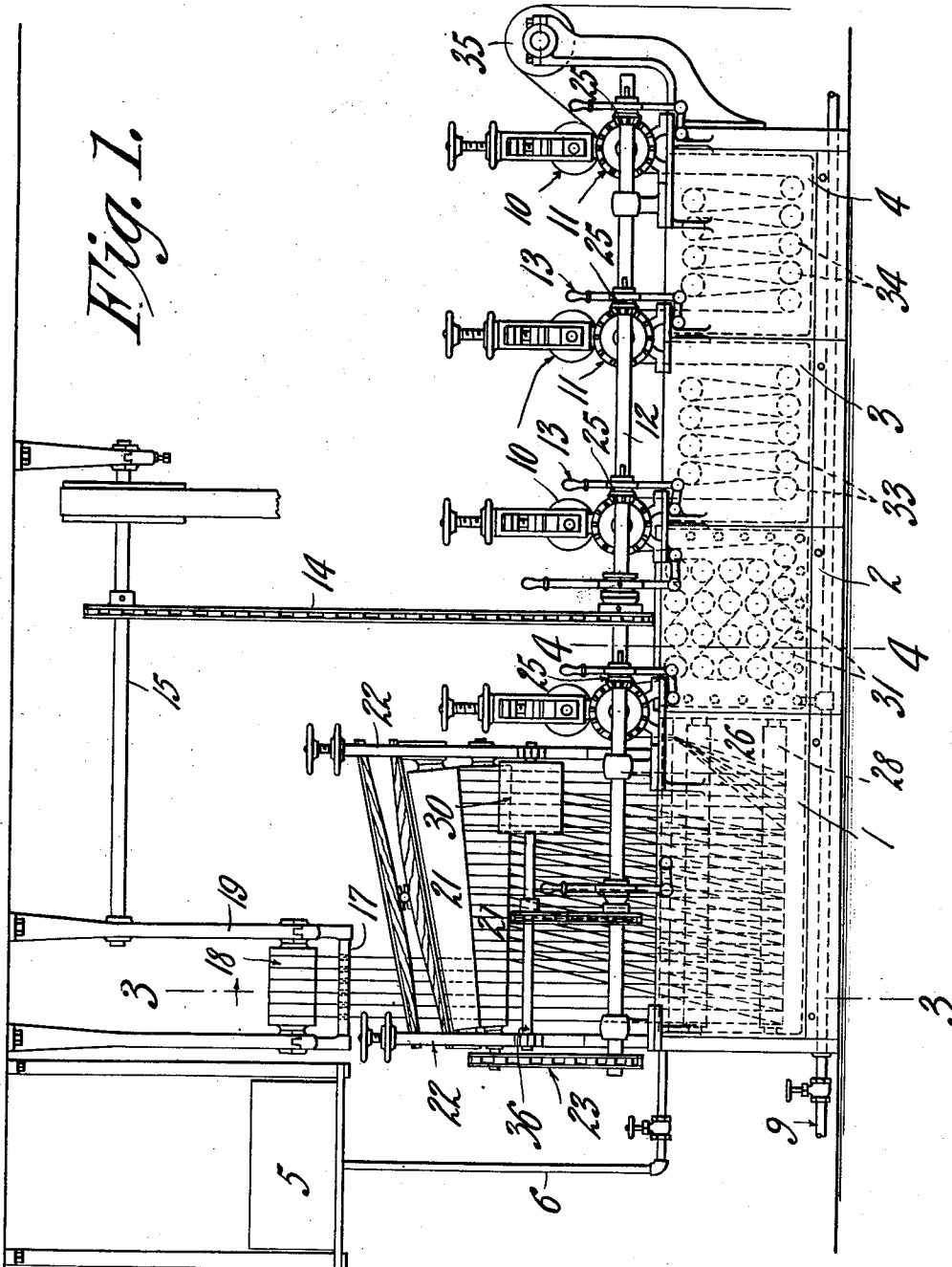
PATENTED JUNE 25, 1907.

J. HARTLEY.

APPARATUS FOR DYEING, BLEACHING, AND SIZING COTTON WARPS.

APPLICATION FILED JAN. 22, 1907.

2 SHEETS—SHEET 1.



Witnesses:
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R. M. Mowry

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Jonathan Hartley.
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attorney

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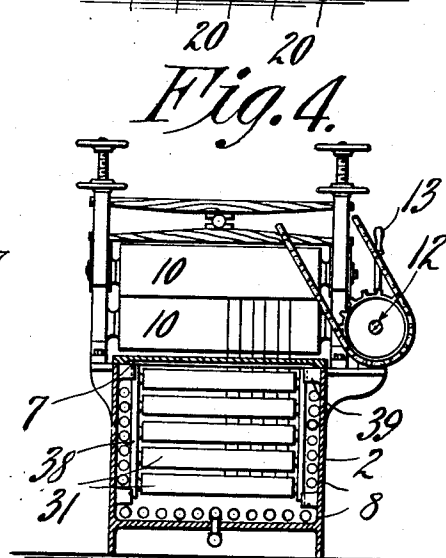
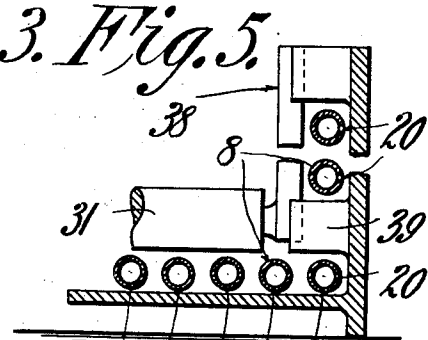
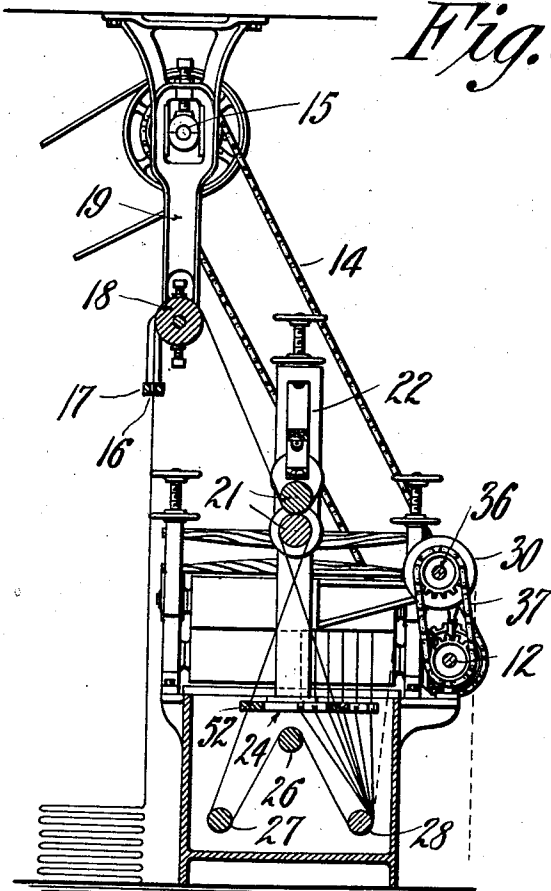
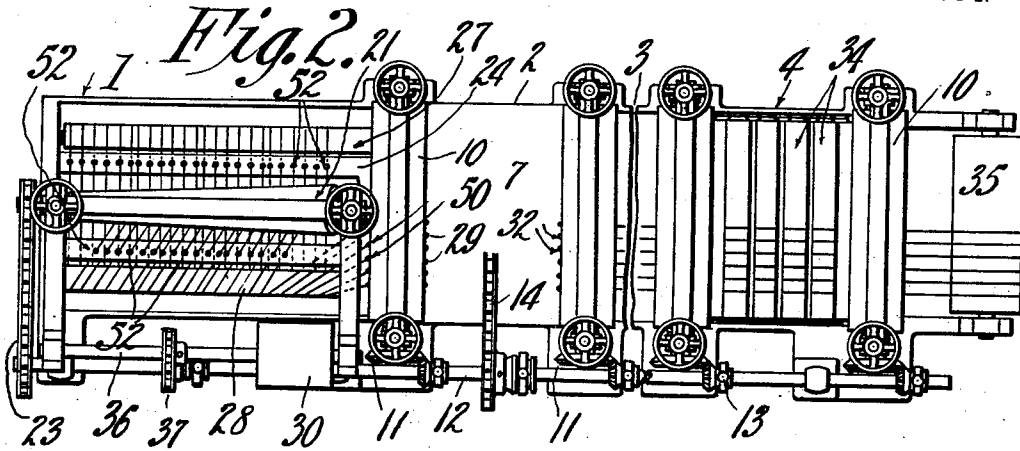
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UNITED STATES PATENT OFFICE.

JONATHAN HARTLEY, OF SPRINGFIELD, MASSACHUSETTS.

APPARATUS FOR DYEING, BLEACHING, AND SIZING COTTON WARPS.

No. 858,068.

Specification of Letters Patent.

Patented June 25, 1907.

Application filed January 22, 1907. Serial No. 353,471.

To all whom it may concern:

Be it known that I, JONATHAN HARTLEY, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Dyeing, Bleaching, and Sizing Cotton Warps, of which the following is a full, clear, and exact description:

This invention relates to the art of dyeing, and more particularly to apparatus for dyeing warp threads.

The object is to provide a machine which will be capable of handling a large amount of material at one time and which will permit of either a succession of treatments or a single treatment.

Among the objects that may be mentioned specially are to provide for taking up slack in the threads as they elongate during passage through the apparatus, and to provide for ready access to, and adjustment of, the threads in event of a tangle.

The invention will be more particularly described in the following specification and defined in the appended claims, reference now being had to the drawings accompanying the specification, in which:

Figure 1 is a side elevation of the machine; Fig. 2 is a plan view; Fig. 3 is a vertical section on the line 3—3, Fig. 1; Fig. 4 is a section on the line 4—4, same view; and Fig. 5 is a detail sectional view through a portion of the steam chest.

In these views, 1, 2, 3, 4, indicate a series of tanks or vats, preferably formed by inserting vertical partitions at intervals in an elongated tank member.

1 is the dye vat; and is shown as being conveniently supplied with dye liquor from the reservoir 5, by means of the pipe 6.

2 is a steam chest, being furnished with a cover 7, to prevent undue escape of steam, and having, preferably around its sides and bottom, perforated steam pipes 8, these being supplied with steam from the external pipe 9.

3 is a washing or fixing tank; and 4 may contain suitable sizing.

Pairs of suitable squeezing or nipping rolls 10 are disposed over the partitions between the several tanks and at the outer end of the sizing vat. The lower roll of each pair is

conveniently furnished with a bevel gear 11, designed to mesh with a bevel gear 25 splined on the longitudinal shaft 12. Levers 13 afford means whereby any or all of the gears 25 may be disengaged from the gears 11. The shaft 12 is suitably driven by a chain 14 from counter shaft 15.

The threads are first guided up through eyes 16 in a bar 17 and over a roll 18, both bar and roll being supported over the rear of the dye vat by means of the hanger 19. The threads next pass forward and downward between the small ends of two conical squeeze and guide rolls 21, these rolls constituting one of the leading features of my invention. They are disposed with their taper extending in the same direction, and are journaled in standards 22 in a central longitudinal position over the dye vat. A chain 23 passing over sprockets on the end of the shaft 12 and the shaft end of the lower roll 21 affords suitable means for driving the two conical rolls. The threads next pass downward and rearward through eyes 52 formed in the rear side of a rectangular frame 24 located within the top of the vat, and thence beneath a guide roll 27 submerged in the liquor in the tank and at the rear thereof. From here, the threads pass up and over a central guide roll 26, also within the tank, and then down beneath a forward guide roll 28, which is a companion to roll 27. The threads now pass up through eyes 52 at the front of the frame 24 over the lower conical roll 21. The passage of the threads between the rolls 21 and over the rolls 26, 27 and 28 is repeated for a plurality of operations, the threads being led at each operation over a portion of the roll 21 of greater diameter, and therefore greater peripheral speed, than the last. The threads may now be led up through eyes 50 at the front of the frame 24, and between the first pair of squeeze rolls 10, whence they pass downward through eyes 29 in the adjacent edge of the cover 7 of the steam chest. Within the latter, they are disposed in a circuitous manner about a plurality of horizontal series of rolls 31, alternately under and over the rolls of the top series, then under and over the rolls of the series next below, and so on to the bottom series, and finally up between the second pair of squeeze rolls 10, passing for this purpose

through other eyes 32 in the edge of the cover 7 remote from the eyes 29. The threads are next found moving down and up over vertically spaced rolls 33 in the tank 3, between the third pair of squeeze rolls 10, over rolls 34 similar as to arrangement to rolls 33 but located in tank 4, and finally between the last pair of squeeze rolls 10 and over the delivery roll 35 desirably disposed at the end of the machine.

For indigo dyeing, it is not necessary that the threads pass through the tanks 2, 3 and 4, but may be conducted directly out of the dye tank. To facilitate this operation, I provide a leading-out roll 30 at the front of the vat and adjacent the large ends of the rolls 21, this roll being carried by a short shaft 36. Convenient means for driving the leading-out roll is furnished by a chain 37 engaging sprockets on the shafts 36 and 12; and the lower sprocket may be actuated at will by means of a cone-clutch and lever.

A feature of importance is connected with the steam vat. Here the threads are passed horizontally and in close proximity, and there is more or less danger of their becoming tangled. In order to provide for ready access to the threads at this stage of their progress, therefore, all the rolls 31 are journaled in a frame 38 slidably removable from the chest, guides 39 being provided for this purpose.

Another feature of importance associated with the steam chest is the manner of permitting entrance of the steam thereto. This is accomplished by pipes, as already noted; and these pipes are perforated at 20, not in such manner as to direct the steam against the threads, but rather against the walls and floor of the chest. It will be seen that by these general arrangements, I provide for the most thorough and efficient action of the steam upon the threads, and at the same time provide for the ready adjustment thereof and avoid the injury that might be occasioned by the direct contact of the jets of steam with the warps.

From the foregoing it will be appreciated that I have devised a most efficient machine for the purposes for which it is intended. While the machine may act upon but a single thread, it is designed to treat a plurality at one time, as shown, six. Great importance is attached to the conical rolls 21, as already indicated their function being to take up slack in the warps as they lengthen during passage through the dye vat, the increasing peripheral speed of the rolls from their small to their large ends effecting this result of taking up slack. Of course, it will be obvious that equivalents of these conical rolls might be employed, as series of rolls of increasing diameter mounted on common

shafts; but conical rolls are the simplest in practice. However, I wish to reserve to myself to employ any equivalent of these rolls capable of producing like results.

To aid in the construction of the following claims, I may note that I regard the conical rolls 21, or rather the lower roll, as broadly an embodiment of means for preventing the formation of slack in the warp threads during their passage through the treating liquid; and, of course, this preposition "through," and the expression "during their passage" must not be taken too literally. More specifically, the conical roll is an embodiment of means for accelerating the speed of each portion of the threads progressively during its passage, that is the speed of the whole thread does not receive one acceleration, but the successive portions are accelerated individually and the acceleration of each portion is progressive. Presumably, every portion of each thread passing any one point in the path of the thread will have the same speed, and the speeds increase from point to point on the path.

What is claimed as new is:

1. In apparatus for dyeing warp threads, means for holding liquid, means for causing the warp threads to pass through such liquid, and single means for progressively accelerating the speed of the successive portions of said threads during their passage.

2. In apparatus for dyeing warp threads, means for holding liquid, means for causing the warp threads to pass through such liquid, and rotatable means mounted on a single shaft for progressively accelerating the speed of the successive portions of said threads during their passage.

3. In apparatus for dyeing warp threads, means for holding liquid, means for causing the warp threads to pass through such liquid, and a single rotatable member about which the threads are designed to pass repeatedly during such passage and constructed to progressively accelerate the speed of the successive portions of said threads.

4. In apparatus for dyeing warp threads, means for holding liquid, means for causing the warp threads to pass repeatedly through such liquid, and a rotatable member disposed to be out of contact with said liquid and to receive the successive portions of the threads between individual immersions, and constructed to cause said successive portions to travel with progressively increased speeds.

5. In apparatus for dyeing warp threads, means for holding liquid, means for causing the warp threads to pass repeatedly through such liquid, and a conical roll over which the successive portions of the threads are designed to pass between individual immersion.

6. In apparatus for dyeing warp threads,

means for holding liquid, means for causing
the warp threads to pass repeatedly through
such liquid, and a pair of contacting squeeze
and guide rolls tapering in the same direction
5 and between which the successive portions
of the threads are designed to pass between
individual immersions.

7. In apparatus for dyeing warp threads,
means for holding liquid, and a pair of con-

ical contacting squeeze and guide rolls taper-
ing in the same direction.

Signed by me at Springfield, Mass., in
presence of two subscribing witnesses.

JONATHAN HARTLEY.

Witnesses:

WM. S. BELLOWS,
G. R. DRISCOLL.