J. M. PAYNE.

DYEING MACHINE.

APPLICATION FILED DEC. 12, 1912.

1,067,132.

Patented July 8, 1913.

3 SHEETS—SHEET 1.

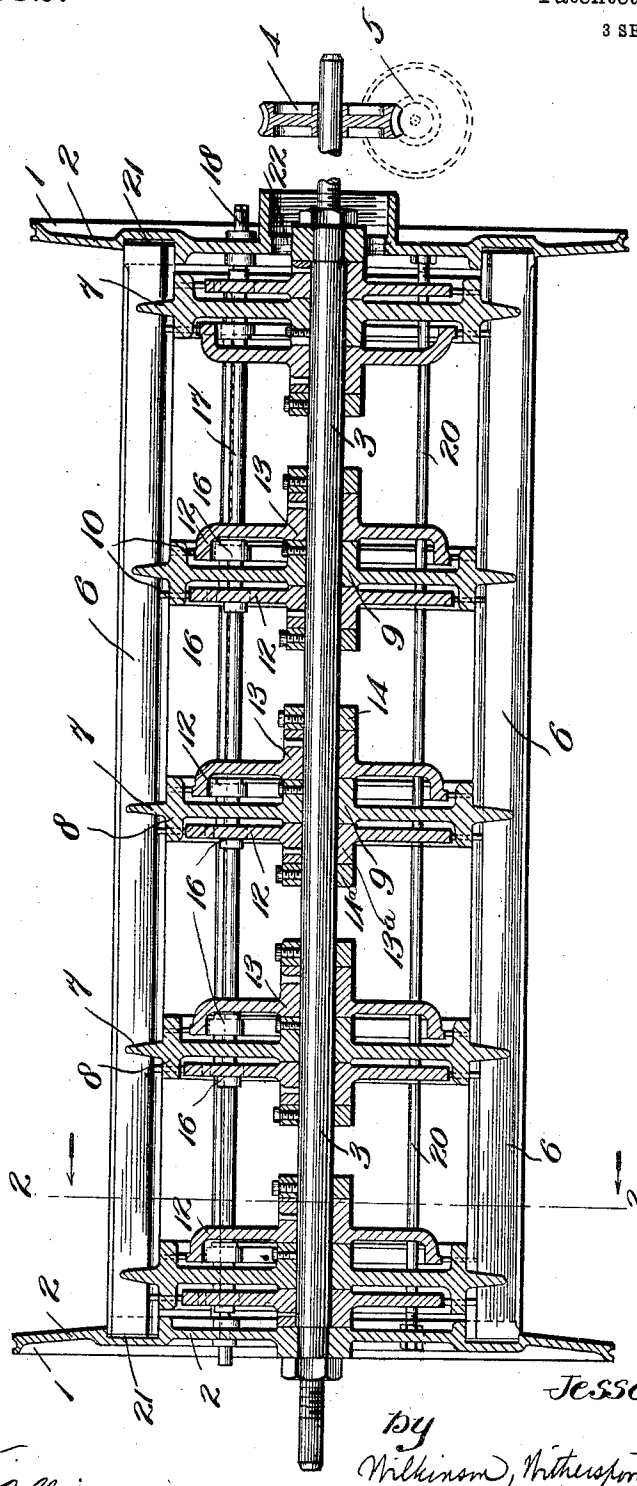


Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

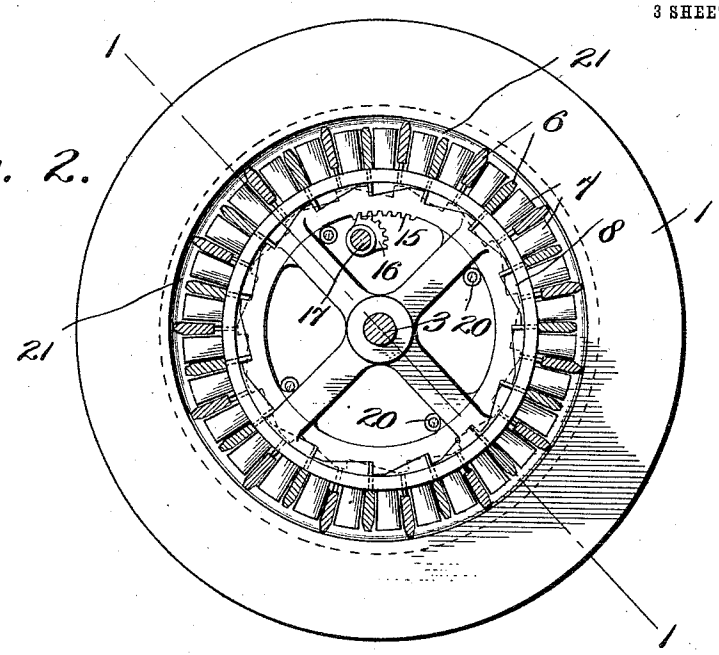


Fig. 3.

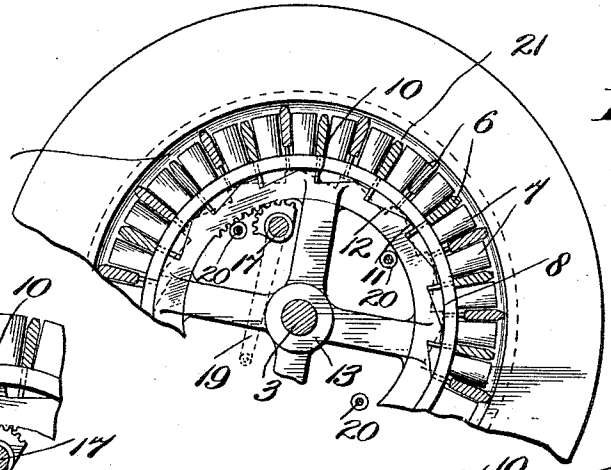


Fig. 4.

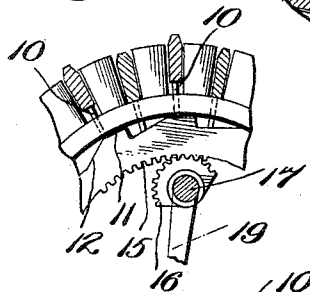
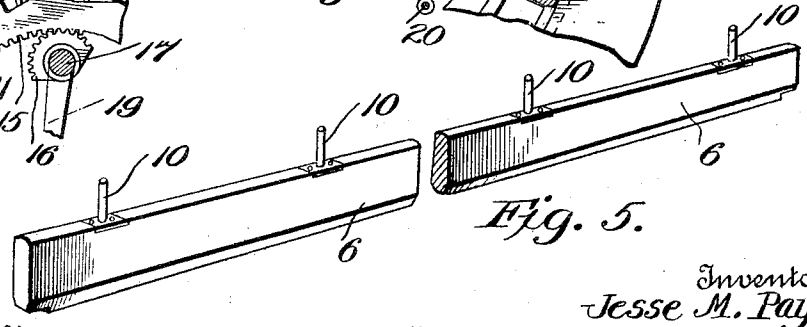


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

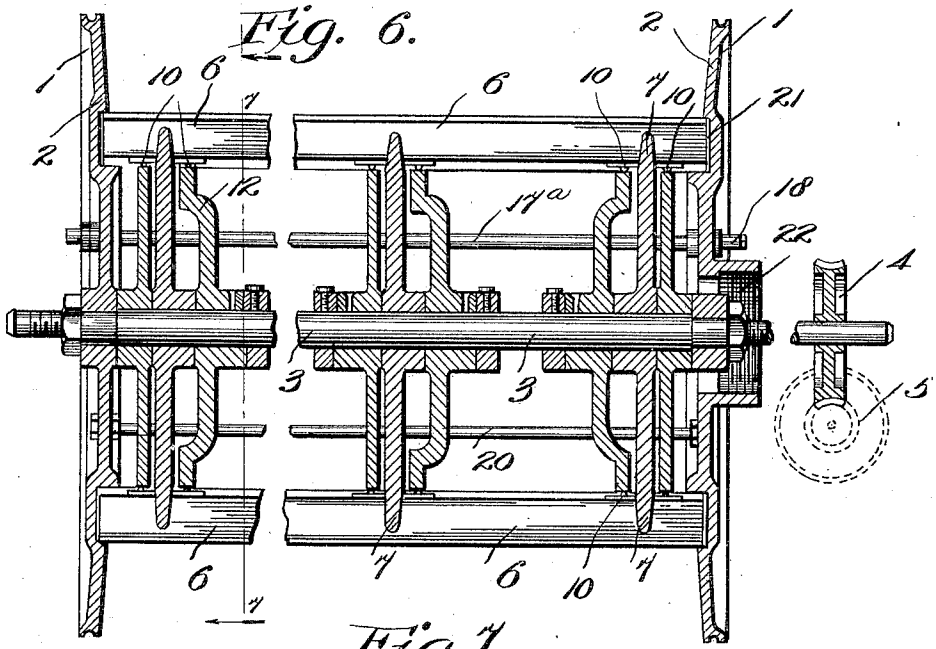
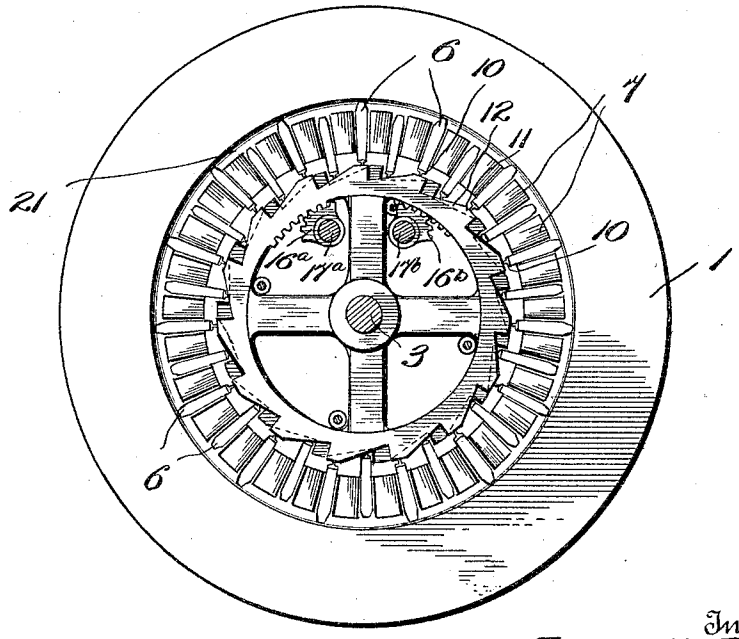


Fig. 7.



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UNITED STATES PATENT OFFICE.

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DYEING-MACHINE.

1,067,132. Specification of Letters Patent. Patented July 8, 1913.

Application filed December 12, 1912. Serial No. 736,388.

To all whom it may concern:

Be it known that I, JESSE M. PAYNE, a citizen of the United States, residing at Summerville, in the county of Lee and State of Alabama, have invented certain new and useful Improvements in Dyeing-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.

My present invention relates to improvements in apparatus for dyeing and drying yarns of cotton or other textile material, and relates more especially to an improved construction of hollow warper beam on which the yarn is wound, and upon which said yarn is dyed, washed, and dried, without necessitating the removal thereof from said warper beam.

The invention relates more especially to providing an improved means for reciprocating the adjacent slats on which the yarn is found outwardly and inwardly in reverse directions, whereby during the treatment of the yarn while on the beam, the dye liquor and washing fluid have free access to the yarn immediately contiguous to the slats, and whereby any streaky effect, due to continuous contact of the yarn with the slats, incident to the dyeing, washing, or other treatment of the yarn, is avoided.

My invention relates especially to improvements in the apparatus shown in the patent of Jesse M. Payne and George G. Wallace, entitled "Improvements in dyeing apparatus," No. 1,053,063, granted February 11, 1913; and it also relates to improvements in the apparatus illustrated and described in the application of said Payne and Wallace entitled "Improvements in dyeing machines," filed February 20, 1911, and serially numbered 609,794; and it also relates to improvements in the apparatus described in the Payne and Wallace patent granted May 12, 1908, No. 887,511, and entitled "Improvements in dyeing machines."

My invention will be understood by reference to the accompanying drawings, in which the same parts are indicated by the same numerals throughout the several views.

Figure 1 shows a central vertical section through the apparatus, said section being along the line 1—1 of Fig. 2. Fig. 2 shows a cross-section along the line 2—2 of Fig. 1, and looking in the direction of the arrows. Fig. 3 shows a similar view to that shown in Fig. 2; but in Fig. 2, one set of alternate slats is forced outward, and the other set is in the withdrawn position, while in Fig. 3, the position of the slats is reversed. Fig. 4 is a detail showing the cam arrangement for forcing the slats outward, and permitting the same to be pressed inward by the pressure of the yarn. Fig. 5 is a detail showing in perspective one of the slats on a larger scale. Fig. 6 is a similar view to Fig. 1, showing the use of two separate operating shafts; and Fig. 7 shows a cross section of the device shown in Fig. 6.

The warper beam consists of a skeleton frame, having two heads 1 preferably provided with beveled flanges beyond the slats, as at 2, which heads are mounted on the shaft 3, which shaft is journaled in the containing vessel, as fully described in the applications aforesaid, and is driven in any convenient way, as by means of the worm wheel 4 and the worm 5, shown in dotted lines in Figs. 1 and 6.

Referring now to the form of device shown in Figs. 1 to 5, the slats 6, preferably made of wood with tapered outer edges, extend between the heads 1, and pass through guide-ways between the wedge-shaped lugs 7 of the rings 8, which rings are carried on spiders 9, shown most clearly in Figs. 1 and 6, which spiders are fast to the shaft 3 and rotate therewith. Each slat is provided with a series of metal pins 10 secured on the side of the slat next the shaft 3; and these pins project through radial holes in the rings 8, and permit the slats to have a radial movement relative to said rings.

Loosely mounted on each side of the spiders 9 are spiders 13 and 13ª, which are revolubly held between the set collars 14 and 14ª and said spiders 9. Each of these spiders 13 and 13ª has its periphery provided with a series of cam teeth, having the circular outer portion 11 and the wedge faces 12; and these spiders are also provided with segmental racks 15, engaging segmental pinions 16, mounted on the shaft 17, whose end 18 may be squared to receive the hand crank 19.

By turning the hand crank in one direction, it will be noted that one set of pins is caused to ride up on the curved portions 11 of the cam teeth, and the other adjacent set

of pins will be free to project into the grooves between the cam teeth. The tension of the yarn wound on the warper beam would normally tend to press the teeth inward, so that they will readily move inward when released from engagement with the cam teeth.

In Fig. 2, I have shown one set of slats forced outward, and the adjacent set forced inward; while in Figs. 3 and 4, the parts are shown in the reverse position from that shown in Fig. 2.

Projecting between the arms of the various spiders, I may provide tie rods 20 to secure the heads together, and these should be so arranged as not to interfere with the requisite rotary motion of the spiders 13 and 13ª, as shown in Figs. 2 and 3.

It will be noted that by a small angular movement of the hand crank 19, all of the cam teeth on each pair of spiders will be caused either to force outward, or to release, the pins of adjacent pairs of slats, and thus the shifting of the position of the slats may be very quickly and conveniently accomplished.

In the form of device shown in Figs. 1 to 4, a single operating shaft 17 is used, having a series of pairs of cams mounted thereon, which cams operate in the reverse directions for wedging one or the other of the alternate series of slats outward, the tension of the yarn itself causing the slats to move inward.

In the form of device shown in Figs. 6 and 7, instead of having a single operating shaft with reversely acting cams thereon, I use two operating shafts 17ª and 17ᵇ, each having a series of cams operating on one only of the wedging wheels. Each of these shafts has a squared end 18 adapted to fit a hand crank 19, as shown in Fig. 4. The shaft 17ª carries a cam 16ª adapted to rotate one of each pair of spiders; while the shaft 17ᵇ has a cam 16ᵇ adapted to operate the other one of each pair of spiders. By this arrangement, the alternate slats are operated by one spider, and the other series of alternate slats are operated by the other spider; and it is convenient to wedge the withdrawn slats outward into the engaging position before permitting the other slats to be released under the tension of the yarn, thereby facilitating the operation of the slats and insuring that the second series of slats will be in engagement with the yarn before the first series of slats is released. Moreover, the slats may be adjusted and regulated in any manner which in practice might be desirable. By this arrangement, the pins 10 may be shortened, and the projecting flange 8 (see Fig. 1) may be done away with.

It will be noted that in either form of construction alternate series of slats are wedged outward, while in the first form of construction the alternate series are forced inward by the tension of the yarn. In the latter form of construction the alternate slats may be independently released whenever desired. In each case, the two heads are provided with an annular groove 21, to receive the ends of the slats; and one of the heads is perforated, as at 22, shown to the right of Figs. 1 and 6, to permit the passage of the dye liquor, washing fluid, or compressed air, into the interior of the warper beam, as fully described in the patent and applications aforesaid.

It will be obvious that various modifications might be made in the herein described apparatus, and in the combination and arrangement of parts, which could be used without departing from the spirit of my invention.

I do not mean to limit myself to any specific details of construction, or to any specific arrangement for operating the herein described apparatus, except such as will be hereinafter set forth in the claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:—

1. The combination in a hollow warper beam of a plurality of slats forming the periphery of said warper beam and mounted to move radially away from the axis thereof, and means for reciprocating alternately adjacent slats outwardly and inwardly away from or toward the axis of said warper beam, said means comprising a series of spiders provided with cam teeth on their peripheries, and projections from said slats engaging said cam teeth, with means for partially rotating said spiders, substantially as described.

2. The combination in a hollow warper beam of a plurality of slats forming the periphery of said warper beam, and mounted to move radially away from the axis thereof, and means for simultaneously moving the alternate slats in groups away from or toward the axis of said warper beam, said means comprising a series of spiders provided with cam teeth on their peripheries, and projections from said slats engaging said cam teeth, with means for partially rotating said spiders, substantially as described.

3. In a revolving collapsible dyeing beam, suitably mounted series of yarn supporting slats, and means whereby one series of said slats are adapted to be collapsed independently of and at a different time from the other series, said means comprising a series of spiders provided with cam teeth on their peripheries, and projections from said slats engaging said cam teeth, with means for partially rotating said spiders, substantially as described.

4. In a revolving collapsible dyeing beam, a supporting shaft, heads fixed thereon, a plurality of partly rotatable slat expanding rings loosely mounted on said shaft, a series of radially movable slats supported and expanded by said rings when moved in one direction, said slats being permitted to retract when said rings are moved in the opposite direction, and pins on said slats engaging said slat expanding rings, whereby one series thereof is expanded and permitted to retract independently of and at a different time from the other series.

5. The combination in a hollow warper beam of a central shaft therefor, a plurality of slats forming the periphery of said warper beam, and mounted to move radially away from the axis thereof, and means for reciprocating alternately adjacent slats outwardly and inwardly away from or toward the axis of said warper beam, said means comprising a series of spiders loosely mounted on said shaft, and having cam teeth arranged about their peripheries, pins projecting inwardly from said slats, and means for simultaneously rotating said spiders through the desired angle, substantially as described.

6. The combination in a hollow warper beam of a central shaft therefor, a plurality of slats forming the periphery of said warper beam, and mounted to move radially away from the axis thereof, and means for simultaneously moving the alternate slats in groups away from or toward the axis of said warper beam, said means comprising a series of spiders loosely mounted on said shaft, and having cam teeth arranged about their peripheries, pins projecting inwardly from said slats, and means for simultaneously rotating said spiders through the desired angle, substantially as described.

7. The combination in a hollow warper beam of a central shaft, and a pair of heads mounted thereon, and provided with recesses in the inner sides thereof, a plurality of slats forming the periphery of said warper beam, and mounted to move radially away from the axis thereof, said slats having their ends loosely fitting in said recesses in the heads, and means for moving a series of alternate slats in groups away from or toward the axis of said warper beam, said means comprising a series of spiders loosely mounted on said shaft, and having cam teeth arranged about their peripheries, pins projecting inwardly from said slats, and means for simultaneously rotating said spiders through the desired angle, substantially as described.

8. The combination in a hollow warper beam of a central shaft, and a pair of heads mounted thereon, and provided with recesses in the inner sides thereof, a plurality of slats forming the periphery of said warper beam, and mounted to move radially away from the axis thereof, said slats having their ends loosely fitting in said recesses in the heads, and means for simultaneously moving the alternate slats in groups away from or toward the axis of said warper beam, said means comprising a series of spiders loosely mounted on said shaft, and having cam teeth arranged about their peripheries, pins projecting inwardly from said slats, and means for simultaneously rotating said spiders through the desired angle, substantially as described.

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

JESSE M. PAYNE.

Witnesses:
H. H. SWIFT,
S. L. NEILL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."