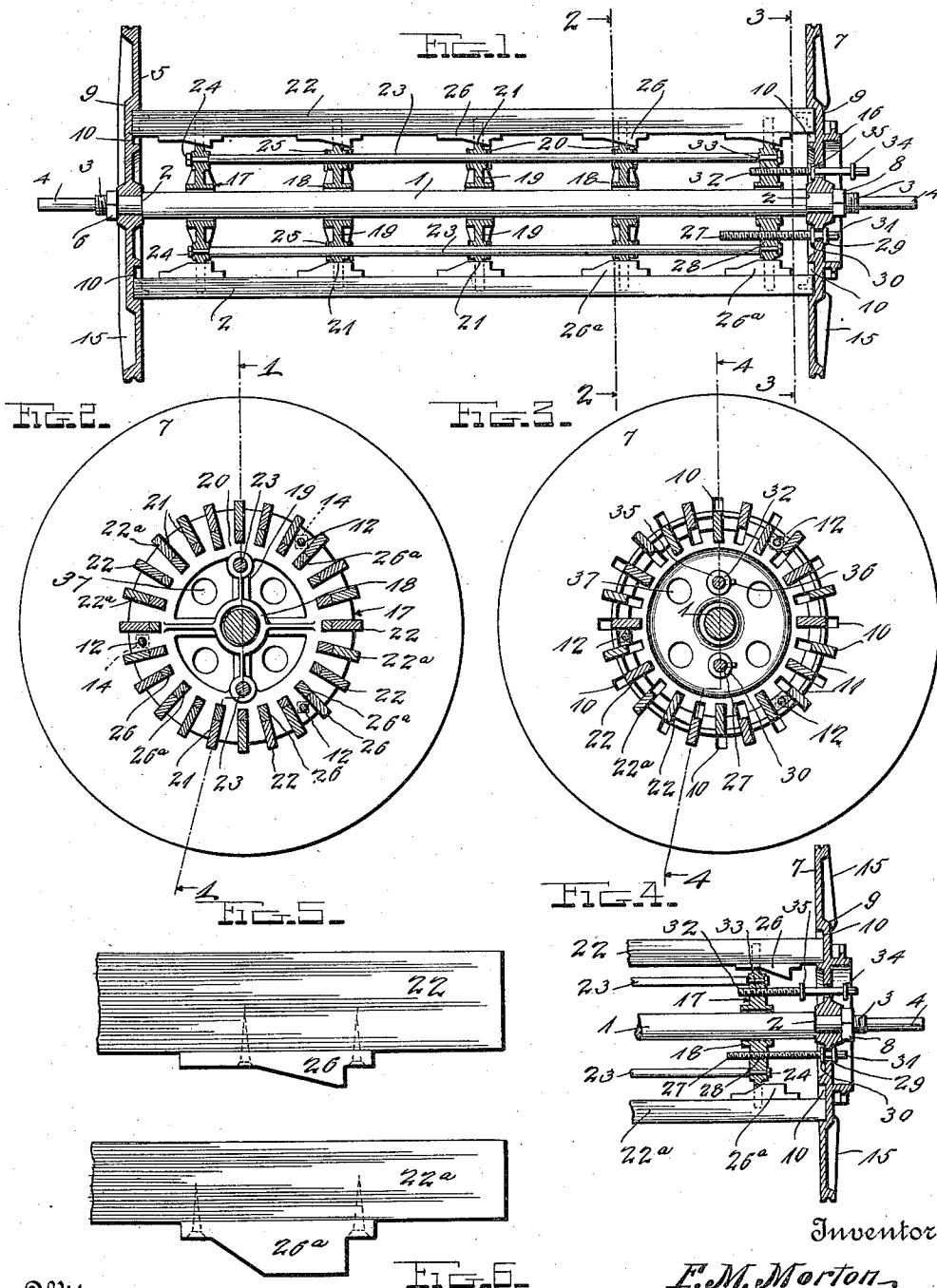


F. M. MORTON.
 REVOLVING COLLAPSIBLE DYEING BEAM FOR DYEING MACHINES.
 APPLICATION FILED MAY 6, 1912.

1,059,900.

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REVOLVING COLLAPSIBLE DYEING-BEAM FOR DYEING-MACHINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK MELVIN MORTON, a citizen of the United States, residing at Phoenix city, in the county of Lee and State of Alabama, have invented certain new and useful Improvements in Revolving Collapsible Dyeing-Beams for Dyeing-Machines; and I do 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.

This invention relates to improvements in revolving collapsible dyeing beams for dyeing machines.

One object of the invention is to improve the construction and operation of the beam shown in my pending patent application Serial No. 688,420, filed April 4, 1912, whereby the operation of the same is rendered more effective.

Another object is to provide a dyeing or warper beam having independent series of alternately arranged, radially movable slats with means for successively collapsing the independent series and leaving them all in collapsed position during a portion of the dyeing operation, whereby the tension of the yarn is relieved. This operation takes care of the shrinkage and leaves the tensile strength in the yarn.

With these and other objects in view, the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings; Figure 1 is a central longitudinal section of a dyeing beam constructed in accordance with my invention; Fig. 2 is a cross sectional view of the same taken on the line 2—2 of Fig. 1 showing all of the slats in an expanded position; Fig. 3 is a similar view showing each alternate slat collapsed; Fig. 4 is a detail longitudinal sectional view of a portion of the beam taken on the line 4—4 of Fig. 3 showing one series of the slats collapsed; Fig. 5 is a detail view of a portion of one form of my improved yarn supporting slats; Fig. 6 is a similar view of the other form of the slats.

My improved beam comprises a supporting shaft 1 the ends of which are reduced to form shoulders 2, and said ends are threaded a short distance beyond the shoulders 2 as shown at 3 and are extended a considerable

distance beyond the threaded portions to form journals 4, by means of which the beam is revolvably supported in the dye tank or tub (not shown). Engaged with one end of the shaft 1 is a beam supporting head 5, said head being clamped against the shoulder of this end of the shaft by a clamping nut 6, thereby rigidly securing the head to the shaft. On the opposite end of the shaft is arranged a beam supporting head 7 which is likewise clamped against the shoulder 2 and rigidly fastened to this end of the shaft by a nut 8, said nuts 6 and 8 being screwed onto the threaded portions 3 of the shaft.

The heads 5 and 7 are provided a suitable distance from their outer edges with annular enlargements 9 and the central portions of said heads are offset on their outer sides as shown. The enlargements 9 are concentric with the center of the heads and have therein an annular series of radially disposed sockets or recesses 10 between each of which is formed an outwardly projecting space closing lug 11, said lugs projecting a suitable distance beyond the inner faces of the heads for a purpose hereinafter described. The heads 5 and 7 are connected together and braced by a series of longitudinally disposed tie rods 12, the ends of which project through the heads and are threaded to receive clamping nuts 14 which are screwed into engagement with the outer sides of the heads as shown. The heads are provided on their outer sides with radially disposed bracing ribs 15 and the head 7 has on its outer side a concentric annular flange 16 to receive the tubular beam trunnion. (Not shown.)

Slidably mounted on the shaft 1 are a series of slat supporting and expanding rings 17, each of which comprises a central hub 18, a series of radially projecting spokes 19 and a rim 20. In the rim 20 are formed series of radially disposed slat receiving notches 21 with which are engaged series of yarn supporting slats 22 and 22^a. The series of slats 22 alternate with the slats 22^a, or in other words, one of the slats 22 is arranged between each of the slats 22^a and the slats 22 are of greater width than the slats 22^a. Any number of slat supporting rings 17 may be provided and they are preferably spaced equal distances apart on the shaft 1 and are connected together to move in unison by a pair of connecting rods 23, the ends of which are reduced and threaded to receive clamping nuts 24. The rods 23 ex-

tend through suitable apertures in two of the spokes 19 and are arranged diametrically opposite to each other as shown. The reduced ends of the rods are engaged with the end rings 17 which are clamped against the shoulders formed by said reduced ends, by the nuts 24. The intermediate rings are spaced apart and held in position on the rods 23 and shaft 1 by cotter pins or similar fastenings 25 which are engaged with apertures in the rods on opposite sides of the rings.

The ends of the slats 22 and 22^a are engaged with the notches 10 in the heads 5 and 7 of the beam between the lugs 11, said lugs closely engaging the opposite sides of the ends of the slats, said lugs together with the close engagement of the ends of the slats with the notches 10 prevents the dye liquor from channeling or working around the ends of the slats, thus causing the dye liquor to pass through the yarn wound on the beam. It will be noted that the notches 10 with which the ends of the slats 22 and 22^a are engaged are of greater depth or length than the width of the slats thereby permitting the slats to collapse or retract when released by the adjustment of the expanding rings 17, as will be hereinafter more fully described.

The expanding mechanism for the slats 22 and 22^a comprises in addition to the expanding rings 17 a series of cam shaped or beveled expanding blocks or plates 26 and 26^a. The expanding blocks 26 which are secured to each alternate narrow slat 22 are of less width than the blocks 26^a of the slats 22^a and the outer working edges of said blocks 26 are formed in one long continuous bevel or angle extending from one end to the other of the working portion of the block. The blocks 26^a of the slats 22^a have their outer working edges for a portion of the length of the block straight or parallel with the inner edges of the slats, while the outer portion of the working edge of said block 26 is formed at a sharp or abrupt angle as shown.

The blocks 26 and 26^a are disposed in the notches 21 of the expanding rings 20 and the inner edges of the blocks are engaged with the inner edges of the notches 21 whereby the expanding rings are adjusted longitudinally in one direction on the shaft 1. The engagement of the inner ends of the notches with the edges of the blocks will expand or force the slats 22 and 22^a outwardly to a greater or less extent for receiving the yarn wound thereon and when said rings are shifted in the opposite direction the slats will be permitted to retract or collapse and thus relieve the pressure of the slats on the yarn wound thereon. By forming the inner or working edges of the blocks 26 and 26^a in the manner described it will be seen that

when the expanding rings are shifted in the proper direction for permitting the slats to retract, that the slats 22 having the blocks 26 will be permitted to retract before the slats 22^a having the blocks 26^a are released and permitted to retract. As will be readily understood the prior retraction of the slats 22 is due to the fact that the beveled edge of the blocks 26 carried by these slats extends throughout the entire length of the working portion of the block, so that the retraction of these slats begins the moment the expanding rings are shifted inwardly or toward the narrower ends of the blocks. In this retracting movement of the rings it will be seen that the latter will be shifted to a considerable distance before the ends of the notches therein disengage the straight or parallel inner edges of the blocks 26^a, said blocks and the slats 22^a to which they are attached being thus held in a projected position until the ends of the notches in the expanding rings come into engagement with the inclined or beveled edges of the blocks 26^a. When the ends of the notches in the expanding rings reach the beveled or inclined edges of the blocks 26^a these blocks and the slats 22^a to which they are attached will also be permitted to retract.

By permitting the slats 22 to retract before the slats 22^a, the dye liquor will be permitted to flow through and thoroughly saturate the portion of the yarn which was previously engaged by the outer edge of the slats 22 after which the retraction of the slats 22^a will permit the dye liquor to pass through and thoroughly saturate the part of the threads which were engaged by the outer edges of said slats 22^a. It will be seen that while the slats 22 are shown and described as being of greater width than the slats 22^a the combined width of the slats 22 and the blocks 26 is the same as the width of the slats 22^a and blocks 26^a, the difference between the width of the slats being compensated for by the greater width of the blocks 26^a so that when the slats are expanded to their greatest extent by the rings 20 the outer edges of the slats will be the same distance from the center of the shaft 1, as shown in Fig. 2 of the drawing.

It will be observed that an important feature of my invention resides in the cam or wedge blocks on the independent series of slats extending in the same longitudinal direction but offset from each other circumferentially around the beam. This causes one series to be collapsed and to remain collapsed during and after the collapsing of the other series. I thus take care of the shrinkage of the yarn and permit it to retain its tensile strength because by the collapsing of all of the slats the tension of the yarn is relieved.

The slat expanding rings are shifted to

expand or permit the slats to retract by means of a ring adjusting or shifting screw 27 which is revolubly mounted in the head 7 of the beam and has its inner threaded end in operative engagement with a threaded aperture 28 in one of the spokes 19 on the adjacent end slat expanding ring. The screw 27 is revolubly secured in the head 7 and held against longitudinal movement therein by a flange 29 arranged on the screw adjacent to the outer side of the head 7 and by a collar 30 fixed on the screw adjacent to the inner side of the head. The outer end of the screw 27 is squared as at 31 to receive a wrench or handle, whereby the screw may be turned in one direction or the other. By arranging the screw 27 as herein shown and described, it will be readily seen that when the screw is turned in one direction the engagement of the threaded end thereof with the threaded passage 28 in the end expanding ring will draw said ring, together with the other rings connected therewith toward the head 7 of the beam, thus engaging the inner end of the notches 21 in said rings with the beveled edges of the expanding blocks 26 of the slats and thereby forcing the latter outwardly. It will also be seen that the reverse movement of the screw will shift the entire set of expanding rings in the opposite direction, thereby permitting the slats to retract or collapse.

In order to limit or regulate the movement of the expanding rings 17 and the consequent expansion or retraction of the slats 22, I provide a gage screw 32, the inner end of which is threaded and is engaged with a threaded aperture 33 in the spoke of the expanding ring opposite to the spoke having the threaded aperture 28. On the screw 32 adjacent to the outer side of the head 7 is arranged a stop flange 34 which is adapted to engage said outer side of the head and to thereby limit the inward or retracting movement of the expanding rings. On the screw 32 is arranged an adjustable stop collar 35 which is adapted to be secured in its adjusted position on the screw 32 by a set screw 36. The collar 35 when adjustably secured to the screw 32 in the manner described will engage the inner side of the head 7 when the expanding rings are shifted outwardly or to operative positions for expanding the slats 22 and will thereby limit this movement of the expanding rings and the resulting projection or expansion of the slats.

In the head 7 of the beam within the central portion thereof surrounded by the flange 16 are a series of passages 37 through which the dyeing liquor is admitted to the beam from the tubular journal (not shown) but which is adapted in practice to be connected with the annular flange 16. By

means of my improved adjusting mechanism it will be seen that the expanding rings may be readily adjusted to expand and to permit the yarn supporting slats to collapse and that by providing the gage screw and adjustable stop collar as herein shown and described, the expanding movement of the rings can be readily regulated to cause the rings to expand the slats to the desired extent. By providing the slat engaging lugs 11 and forming the ends of the slats to closely fit the notches or recesses 10 in the heads of the beam the dye liquor admitted through the openings 37 in the head 7 will be prevented from channeling or working around or between the ends of the slats and the adjacent parts of the head thus causing the dye liquor to pass through the yarn wound on the slats.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention, as claimed.

Having thus described my invention, what I claim is:

1. In a revolving collapsible dyeing beam, the combination with a plurality of slats forming the periphery of the beam and mounted to move radially away from the axis thereof, independent series of wedges arranged on alternate slats, the wedges of both series having their inclines extending in the same longitudinal direction but the inclines of the wedges of one series of slats being offset circumferentially from the other, longitudinally movable expanding means on the beam and arranged to successively engage the inclines of said wedges of the two series as said means is moved longitudinally in one direction, whereby the first series of slats collapsed will remain so while the next series is collapsed, and means for moving said expanding means.

2. In a revolving collapsible dyeing beam, the combination of a plurality of radially movable slats forming the periphery of the beam and arranged in two independent series, the slats of one series being interposed between those of the other, two independent series of expanding blocks each of which is composed of a straight portion and an inclined portion, the inclined portions of the blocks on one series being disposed circumferentially opposite the straight portions of the blocks on the other series of slats and the inclined portions of the blocks of both series extending the same direction longitudinally of the beam, expanding means movable longitudinally of the beam to co-act

with the straight and inclined portions of said blocks, and means for actuating said expanding means.

3. In a revolving collapsible dyeing beam, 5 series of suitably mounted yarn supported slats, one series of which are of less width than the other series, of different widths slats being arranged alternately around the beam, slat expanding blocks arranged on the 10 slats, the blocks of one series of slats having their inner edges inclined throughout the length of the block while the blocks of the other series have their edges for a portion of the length of the block parallel with 15 the inner edges of the slats and the other portion of the edges at a sharper angle than the beveled edges of the other blocks whereby one series of said slats is retracted prior to and independently of the other series of 20 slats, and means whereby said slats are expanded and permitted to retract.

4. In a revolving collapsible dyeing beam, a supporting shaft, heads fixed thereon, a plurality of slat expanding rings slidably 25 mounted on said shaft having therein radi-

ally disposed notches, series of yarn supporting slats slidably engaged with said heads and with the notches in said rings, one series of said slats being of less width than the other series, slat expanding blocks secured to the inner edges of said slats, the 30 blocks of one series of said slats being of less width than the blocks of the other series and having their inner edges beveled or inclined throughout the entire surface of the blocks, 35 said wider blocks having their inner edges for a portion of their length extending parallel with the inner edges of the slats whereby when said rings are shifted in one direction one series of said slats are permitted to retract prior to and independently of 40 the other set.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK MELVIN MORTON.

Witnesses:

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GEO. A. HAYS.

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