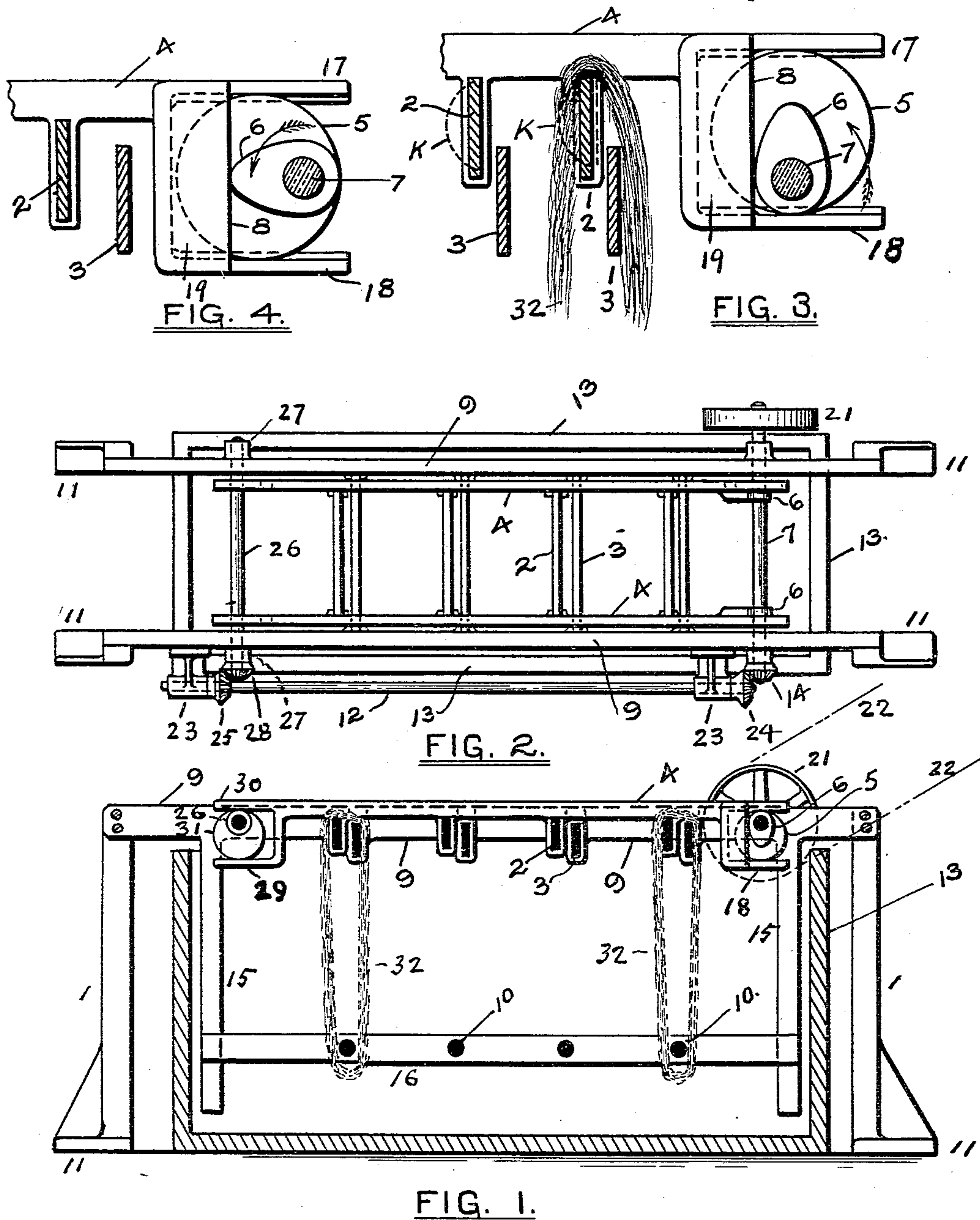


(No Model.)

J. C. BLUNDELL.
APPARATUS FOR DYEING YARN.

No. 560,019.

Patented May 12, 1896.



WITNESSES.

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UNITED STATES PATENT OFFICE.

JOHN C. BLUNDELL, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE
GREENWOOD DYEING MACHINE COMPANY, OF MAINE.

APPARATUS FOR DYEING YARN.

SPECIFICATION forming part of Letters Patent No. 560,019, dated May 12, 1896.

Application filed December 18, 1895. Serial No. 572,498. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. BLUNDELL, of the city and county of Providence, in the State of Rhode Island, have invented a certain new and useful Improvement in Clearing Devices for Yarn-Sticks of Dyeing-Machines; and I declare the following to be a specification thereof, reference being had to the accompanying drawings.

Figure 1 is a side elevation of my invention in position in a dye-vat, which is shown in central longitudinal section. Fig. 2 is a top plan view of the same. Figs. 3 and 4 show in side elevation the eccentric and cam in their different relations and movements with respect to the yarn-sticks and the means for supporting the same, said yarn-sticks being seen in cross-section.

Like numerals indicate like parts.

My invention is a clearing device for the yarn-sticks of dyeing-machines and is designed to give a proper, slow, and progressive movement to the skeins of yarn supported on said sticks, so that the yarn may be uniformly advanced and subjected to the action of the liquid dye in the vat, over and in which said yarn is supported.

It consists in the combination, with a dye-vat, of a frame to which are fastened permanent upper and lower yarn-sticks and a movable frame having yarn-sticks mounted therein and supported on four circular disks eccentrically mounted on transverse shafts near the end of said fixed frame and capable of a reciprocating movement vertically and horizontally by the force of said cams cooperating with oval cams also eccentrically mounted on said shafts, respectively, said shafts being moved by power, as hereinafter particularly described.

In the drawings the dye-vat is shown at 13 and is of the usual or any approved construction. Standards or posts 1 are erected, as shown, and rest upon bases 11. On each side lengthwise of the machine are top rails or bars 9, fastened to the tops of said standards 1, as seen in Fig. 1, and constituting a fixed frame. From the top rails 9 the vertical bars 15 fastened thereto extend downward into the vat 13, and on each side lengthwise of the machine bottom rails or bars 16

are supported by the vertical bars 15. Top yarn-sticks 3, preferably rectangular in cross-section, are fastened to the top rails 9, beneath the same, and bottom yarn-sticks 10, preferably cylindrical in shape, are mounted in the bottom rails 16. These yarn-sticks 3 10 extend crosswise and are supported in a fixed position by the rails 9 16.

Two reciprocating bars 4 are provided with yarn-sticks 2, fastened thereto on the under side of said bars 4. At the ends of the reciprocating bars 4 they have parallel flanged ways 17 18, connected by a cross-piece 19. The parts 17 18 19 are fastened to the reciprocating bars 4 at each end.

A cam-shaft 7 is mounted in bearings 20 beneath the top rails 9 and has a pulley 21, by which it is rotated by power communicated by a belt 22 or otherwise. The cam-shaft 7 carries two cams 5 5, fastened thereto, which are a true circle in shape, but are mounted eccentrically, as shown in Figs. 3 and 4. Said shaft 7 also carries two cams 6 6, of oval shape, fastened to said shaft and mounted eccentrically thereon, as seen in Figs. 3 and 4. Each cam 5 travels within the flanges of the respective ways 17 18 and is partially covered at the side by the cross-piece 19, as shown. The edge of each cam 6 lies in contact with the edge 8 of the cross-piece 19 adjacent thereto.

The cam-shaft 7 has at the end opposite to the pulley 21 the bevel-gear 14. A shaft 12 is mounted on one side of the vat 13 in the bearings 23 and has at its ends the bevel-gears 24 25. Near the end of the vat 13, opposite to the end where the cam-shaft 7 is mounted, there is a cross-shaft 26, mounted in bearings 27, beneath the top rails 9. The cross-shaft 26 has the bevel-gear 28. The bevel-gear 14 of the cam-shaft 7 engages with the bevel-gear 24 of the shaft 12, and the bevel-gear 25 of the shaft 12 engages with the bevel-gear 27 of the cross-shaft 26. At the ends of the reciprocating bars 4, adjacent to the cross-shaft 26, they are also provided with flanged ways 29 30, and on the cross-shaft 26 two circular disks 31 31 are eccentrically mounted similar to the eccentric circular cams 5 5; but there are no cams on said shaft 26 like the cams 6 on the shaft 7.

The yarn skeins are shown at 32, passing around the yarn-sticks 2 3 and 10.

Having thus described the several parts of my device, I will now explain its operation.

5 The vat 13 is partially filled with the dye liquor. The yarn is hung in skeins upon the yarn-sticks, as illustrated in Fig. 1, the lower half or other proper portion of the skeins being submerged in the dye liquor and absorbing the same. Power applied by the belt 22
10 turns the pulley 21 and with it the shaft 7 and its cams 5 5 6 6. We will suppose that all the parts of the device are in the relative positions shown in Fig. 1. It is there seen
15 that the yarn-sticks 2 3 lie side by side and that the reciprocating bars are in their lowest position, nearly in the plane of the top surface of the top rails 9. The rotation of the shaft 7 turns the cross-shaft 26 by reason of
20 the bevel-gearing 14 24 25 28, and as these bevel-gears have the same number of cogs the circular eccentric-cams 5 5 and 31 31 move at the same time and with the same speed. The action of said cams 5 5 31 31 is to periodically and regularly lift and lower the bars
25 4 4 and their connected yarn-sticks 2 2. The cams 6 6 on the shaft 7 turn with the cams 5 5 and are fast on said shaft and may be either fast on the cams 5 5 or made integral therewith. The cams 6 6 abut the edge of
30 the cross-pieces 19, as shown in Figs. 3 and 4, and the rotation of the shaft 7 and said cams 6 6, bearing forcibly against the edges of said cross-pieces 19, cause the bars 4 4 to move
35 longitudinally to such a distance as is determined by the longest radius of the cam 6. The combined action of the lifting-cams 5 5 and the reciprocating cams 6 6 is to cause each yarn-stick 2 first to rise from the position
40 shown in Fig. 1 to the position shown in Fig. 3, at which point the radius of the cams 6 6 begins to increase, and the bars 4 4 are then moved longitudinally to the position shown in Fig. 4, where it is seen that the yarn-sticks 2 and 3 are in vertical planes considerably apart. The return or reverse motion of
45 the bars 4 4 is caused by the weight of said bars and of the yarn with which they are loaded on said yarn-sticks 2 and also by the frictional drag of the cams 5 5 31 31 upon the ways 18 29, which thus automatically carry back the parts from the position shown in Fig. 4 to the position shown in Fig. 3. The movement of each of the yarn-sticks 2 2,
50 caused by the combined action of said cams 5 5 6 6 and said spring, is indicated by the dotted curves K K in Fig. 3. The effect of this movement of the yarn-sticks 2 2 upon each of the yarn skeins 32 is as follows: The skein is
55 first lifted off the fixed yarn-stick 3 (see Fig. 3) and the top of the skein is moved a distance equal to that of the longest radius of the cams 6 6, so moving the whole skein bodily without any rotation of the yarn-sticks, as heretofore
60 has always been necessary. It will be observed that by this bodily lifting of the skein from the yarn-sticks 3 by the yarn-sticks 2,

(illustrated in Fig. 3,) followed by the bodily lowering of said skeins, as described, dispenses with the frictional drag of the yarn
70 upon the yarn-sticks, as heretofore, and so prevents any wear or waste of the yarn from this cause during the dyeing operation. The lowering of the yarn-sticks 2 brings down the yarn skeins so that they rest upon the tops
75 of the yarn-sticks 2 3, as before. In this way the yarn skeins are gradually and regularly moved upon the sticks and are immersed and drawn through the dye liquor in such a manner as to secure uniformity of color and to
80 prevent all entangling of the skeins with each other, thereby avoiding the breakage and damage which have heretofore been experienced in the dyeing of yarn.

I claim as a novel and useful invention and
85 desire to secure by Letters Patent—

1. In combination with a dye-vat, the fixed upper and lower rails, having yarn-sticks mounted thereon, respectively, from side to side, two cam-shafts, mounted transversely
90 beneath said upper rails near the ends thereof, the reciprocating or movable frame or bars, provided with and connected by yarn-sticks, extending crosswise, circular disks, two on each of said shafts, mounted eccentrically
95 thereon, respectively, and adapted to support said reciprocating frame or bars and to impart to them a vertical reciprocating movement, a pulley on one of said shafts, a bevel-gear on the end of each shaft, respectively, a
100 shaft mounted on said vat, and having bevel-gears at its ends engageable, respectively, with the bevel-gears first aforesaid, substantially as shown.

2. In combination with a dye-vat, the fixed
105 frame, having yarn-sticks mounted thereon, from side to side, a shaft mounted transversely on said frame near the end thereof, the reciprocating or movable frame or bars properly mounted and provided with and connected by yarn-sticks extending crosswise,
110 two oval cams, mounted on said shaft, and extension-piece upon each of the movable bars against which, respectively, said cams are adapted to lie in forcible contact and to impart
115 to said movable frame or bars, a horizontal movement, a pulley on said shaft, adapted to receive power, and means adapted to give the return horizontal movement to said frame after the extreme action of the
120 cams has ceased, substantially as specified.

3. In combination with a dye-vat, the fixed upper and lower rails, having yarn-sticks mounted thereon, respectively, from side to side, two cam-shafts mounted transversely
125 beneath said upper rails and each having a bevel-gear at one end, the reciprocating or movable frame or bars, provided with and connected by yarn-sticks, extending crosswise, circular disks, two on each of said
130 shafts, mounted eccentrically thereon, respectively, two oval cams on one of said shafts with their major diameter in line with the major diameter of the circular cams, next ad-

5 jacent, parallel flanged ways extending from the ends of said movable bars and supported by said circular cams, cross-pieces connecting said parallel ways at two corresponding ends of said movable bars and adapted to receive on their edges respectively, the pressure of the oval cams, a pulley on the shaft on which are the oval cams, a shaft mounted

on the vat and having at its ends bevel-gears, respectively engaging the adjacent bevel- 10 gears of the two shafts first aforesaid, substantially as specified.

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Witnesses:

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