

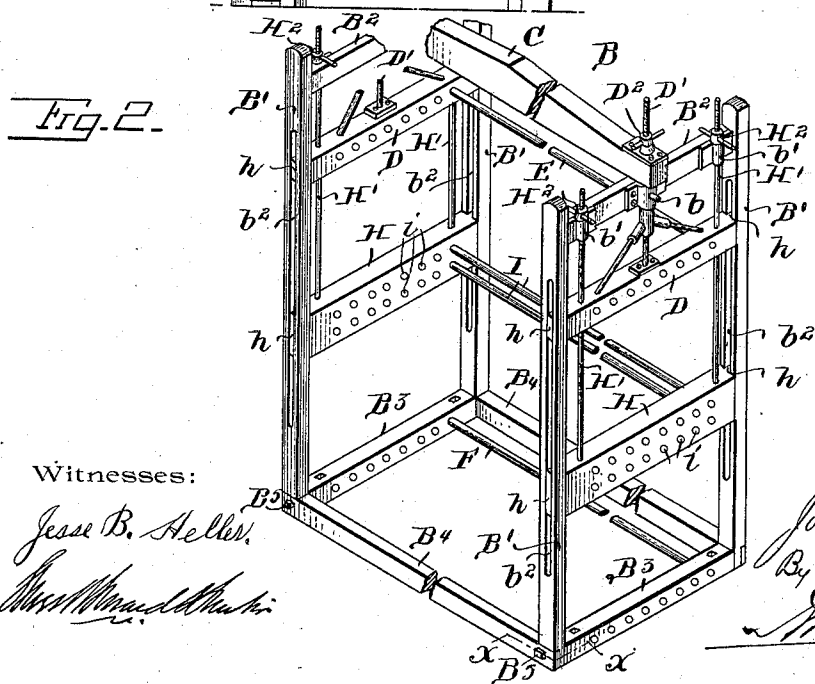
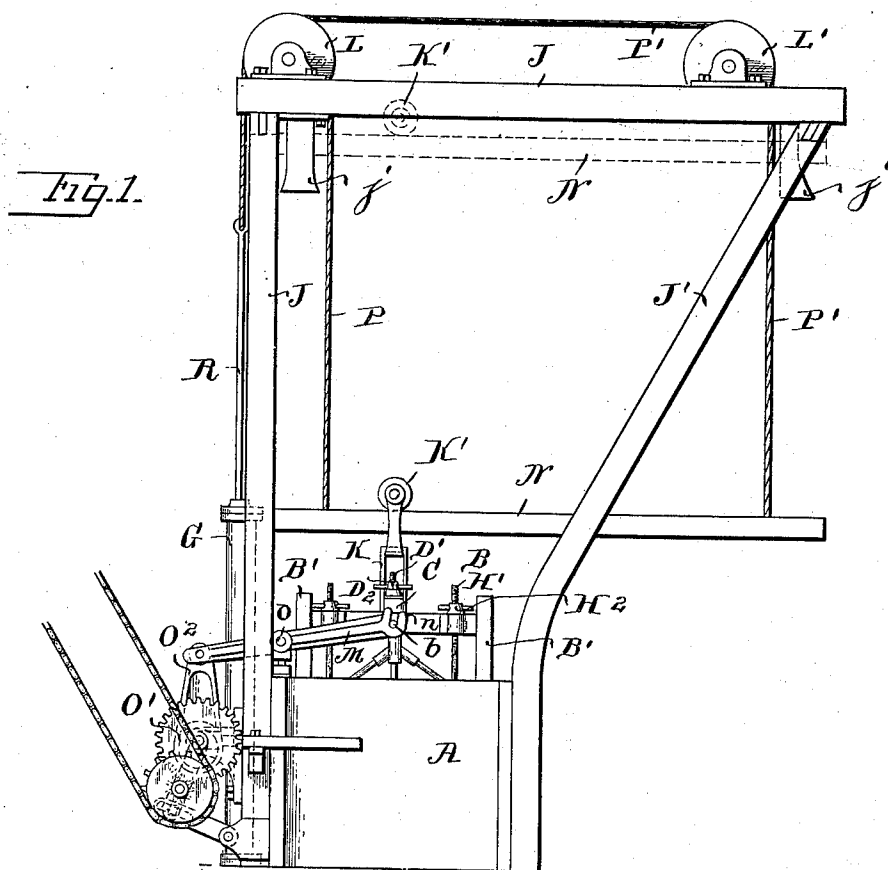
(No Model.)

3 Sheets—Sheet 1.

J. G. HASLAM.
DYEING APPARATUS.

No. 535,005.

Patented Mar. 5, 1895.



Witnesses:

Jesse B. Heller.
Wm. M. M. M. M.

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By

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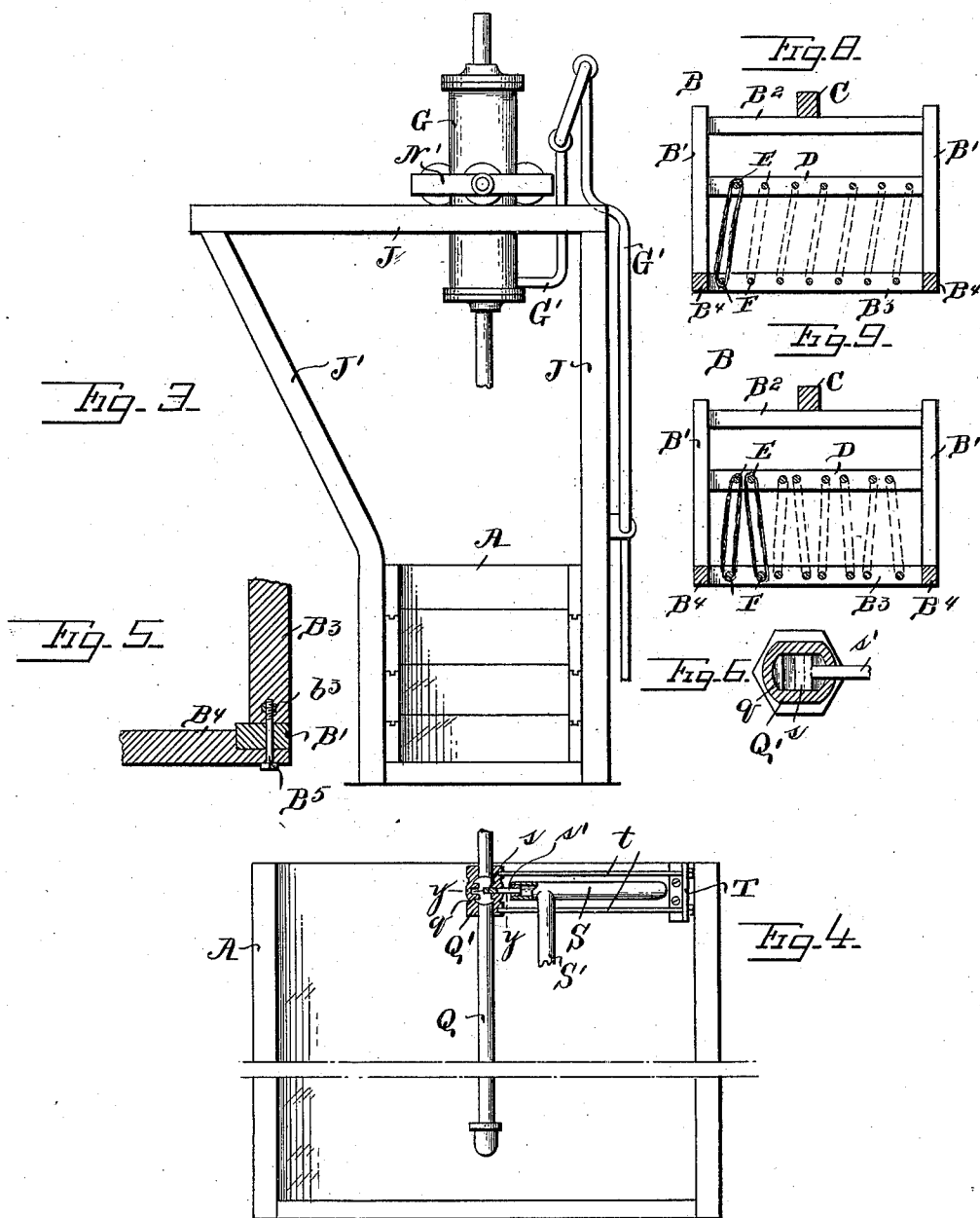
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3 Sheets—Sheet 2.

J. G. HASLAM.
DYEING APPARATUS.

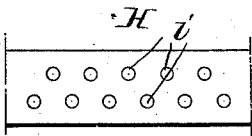
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(No Model.)

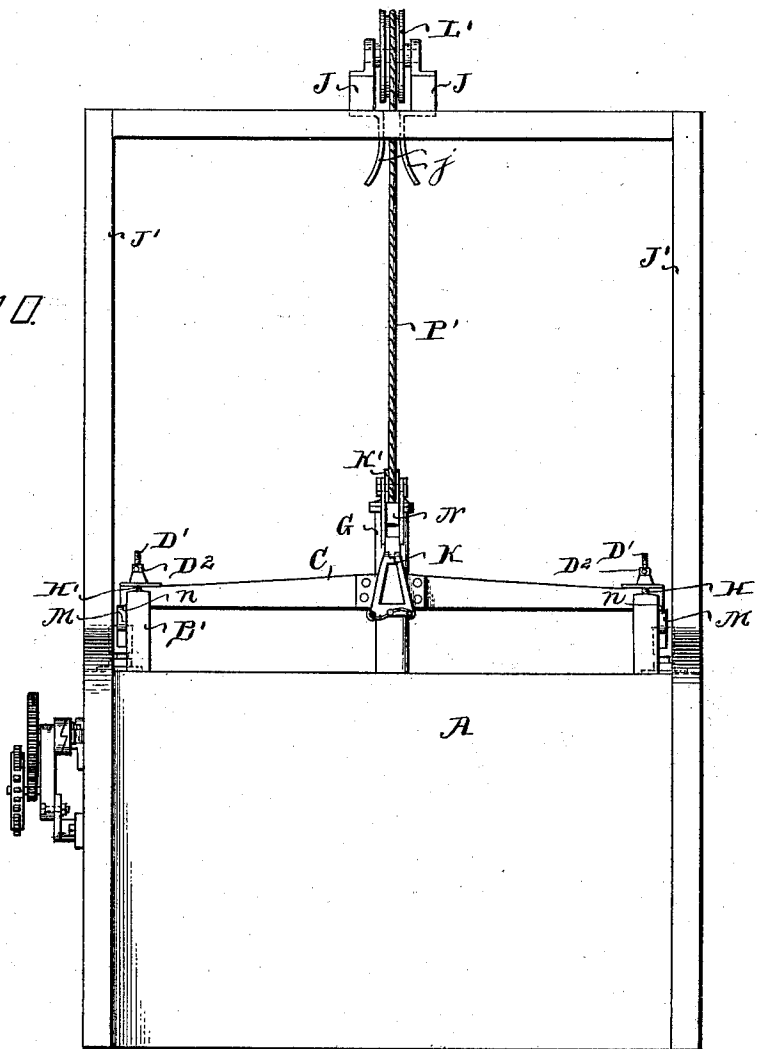
3 Sheets—Sheet 3.

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Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN G. HASLAM, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JOHN W. CARSON, JOHN G. HASLAM, SAMUEL H. QUERNER, AND THOMAS WOLSTENHOLME, OF SAME PLACE.

DYEING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 535,005, dated March 5, 1895.

Application filed March 7, 1894. Serial No. 502,637. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. HASLAM, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Dyeing Apparatus, of which the following is a specification.

My invention relates to dyeing apparatus and consists of certain improvements which are fully set forth in the following specification and are shown in the accompanying drawings.

My invention is particularly adapted for dyeing yarn in the skein, and relates partly to improvements upon the apparatus disclosed in my Letters Patent No. 505,984, dated October 3, 1893.

A part of my improvements relate to the yarn carrying frame, whereby the efficiency and capacity of the machine may be increased.

In addition to the usual upper and lower sets of yarn sticks I employ an additional or intermediate set of sticks between the upper and lower sticks, with suitable supports therefor, by means of which two sets of skeins may be simultaneously dyed in the machine. By providing the sets of yarn stick supports with capacity of relative adjustment, the sets of sticks may be adjusted to suit sets of skeins of different sizes, so that large and small skeins may be dyed simultaneously.

My invention also embraces improvements in the construction and arrangement of the lifting devices for raising and lowering the yarn frame with reference to the vat, and also other improvements in construction and combinations of parts which are more fully set forth hereinafter.

Another part of my invention relates to the employment of an automatic valve device for controlling the supply of steam to the vat, whereby, whenever the dye liquor is in danger of boiling over, the valve is automatically closed and the steam supply shut off, until the excessive ebullition has subsided.

I shall now refer to the accompanying drawings for the purpose of particularly describing my improvements.

Figure 1 is an end elevation of a dyeing machine embodying my improvements. Fig.

2 is a perspective view of the yarn frame. 50
Fig. 3 is an end elevation of a dyeing machine illustrating a modification of the devices for lifting and lowering the yarn frame. Fig. 4 is an elevation of the dye vat with the valve for automatically controlling the supply of 55
steam shown in vertical section. Fig. 5 is a horizontal view of the corner of the yarn frame taken on the line $x-x$ of Fig. 2 on an enlarged scale. Fig. 6 is a horizontal sectional view of the automatic valve for controlling the steam supply taken on the line 60
 $y-y$ of Fig. 4 on an enlarged scale. Fig. 7 is a front view of a portion of the yarn stick supporting frames. Figs. 8 and 9 are transverse vertical sectional views of yarn frames 65
illustrating modifications in the arrangement of the yarn sticks. Fig. 10 is a front elevation of the dyeing machine shown in Fig. 1.

A is the dye vat.

B is the yarn frame which is preferably of 70
the general construction shown, consisting of the uprights B' , the end cross pieces $B^2 B^2$ and $B^3 B^3$, connecting the uprights at the top and bottom, the longitudinal side pieces B^4 , B^4 , at the bottom and the central longitudinal 75
cross piece C at the top. The lower cross pieces $B^2 B^2$ may be used as the supports for the lower set of yarn sticks.

D, D, are the supports for the upper yarn sticks and are vertically adjustable upon the 80
uprights B' , B' , by means of the upright threaded rods D' , D' , extending through the ends of the cross piece C, and the adjusting nuts B^3 upon the threaded ends of the rods.

E are the upper yarn sticks carried by the 85
frames D, D, and F are the lower yarn sticks carried by the frames B^2 , B^2 .

The yarn frame is supported by the cross bar C in a frame K within which the bar C may reciprocate when the frame B is moved up 90
and down in the liquor, so that it is not necessary to detach the yarn frame from the supporting frame while it is being reciprocated in the liquor.

To raise the yarn frame from the vat and 95
to lower it therein suitable lifting devices connected with the supporting frame K are employed. These lifting devices are prefer-

ably operated by a hydraulic, air, gas or steam lift G.

The yarn frame is reciprocated in the liquor by means of rocking levers M having notched ends n which engage trunnions b on the end of the yarn frame. The levers which are pivoted to the vat as at o , are operated by eccentrics O' and eccentric rods O^2 .

So far as I have described the apparatus it is substantially the same as the apparatus shown in my Letters Patent No. 505,984, heretofore referred to, to which reference may be made for greater particularity.

A part of my present improvements relate particularly to the construction of the yarn frame. To enable a single yarn frame to be employed for the purpose of simultaneously dyeing two sets of skeins, I employ an additional pair of yarn stick supports II located between the upper supports D and the lower supports B^3 . These additional or intermediate frames H may be made adjustable upon the uprights B' , as by the upright rods H' , H'' , extending up through the cross pieces B^2 , or guides b' thereon, and carrying adjustable nuts H^2 on their threaded ends.

I are the yarn sticks carried by the frames H, H. The yarn frame thus contains at each end three supporting frames for the yarn sticks located one above the other and capable of adjustment to vary their relative distances apart.

One set of skeins may be supported by the upper sticks E, and the intermediate sticks I, and a second set by the sticks I and the lower sticks F. The intermediate frames H, H, are preferably provided with two sets of supports or holes z to receive two sets of sticks I, so that there may be a separate row of sticks I for each of the upper and lower sets of sticks E and F. This, however, is not necessary to the invention, as the intermediate sticks I may all be arranged in one row if desired.

While I have shown the lower supports B^3 stationary and the upper and intermediate supports D and H adjustable, it is apparent that this arrangement may be varied, and all of the supports may be adjustable or either the upper or intermediate supports may be made stationary, or two of the supports may be made stationary and one adjustable. I prefer the construction shown, however, as it enables the adjustment of the yarn sticks to be made from the top of the frame and without raising the frame from the vat, and this is particularly desirable when the skeins are to be supported loosely upon the sticks so that they may rise and fall upon the sticks during the reciprocations of the frame.

I prefer to arrange the pairs of sticks between which any skein is supported out of a direct vertical line, as is shown in Figs. 8 and 9, so that the skein will receive a more or less inclined position. This will cause the dye liquor to act more or less laterally upon the skein, and thereby to open the skein at the middle and permeate the fibers more evenly

and quickly. For this purpose the supports in the two frames should be arranged out of a vertical line as shown.

The upright B' may be provided with slots or grooves b^2 to form guideways for the ends of the adjustable frames, which may be provided with tenons b fitting the slots.

In Figs. 2 and 5 is shown my preferred construction for uniting together the pieces B' , B^3 , B^4 , of the yarn frame. The ends of the pieces B' and B^4 are lap jointed and the bolt B^5 is passed directly through the joint and into the end of the piece B^3 where it is secured by a nut b^3 let into a recess.

In my former patent, No. 505,984, the lifting cylinder G is shown suspended from a movable carriage on a fixed independent rail above the vat. In the present improvement the apparatus is supported from the vat by means of an overhanging frame, which permits the yarn frame to be lifted from the vat and moved laterally away from it. The yarn frame may then be lowered to the floor outside of the vat.

In the construction shown in Figs. 1 and 10 J is a frame extending above the vat A and having overhanging arms J' which extend materially beyond the front of the vat. L, L' are guides or idlers journaled in the upper part of the frame J at the front and rear. N is a rail carried by cables or chains P, P' , which pass up over the idlers L, L' , respectively and connect with the piston rod R of the lifting cylinders G which may be fastened directly to the vat A or to the frame J. The operation of the lifting cylinder G will raise and lower the rail N. The frame K is provided with a trolley K' which runs upon the rail N. The rail N is of sufficient length to extend laterally beyond the vat A as shown. When the rail N is raised by the lift G, the yarn frame B is lifted with it from the vat. When the rail is properly elevated, as indicated in dotted lines in Fig. 1, the yarn frame may be moved upon the rail N until it reaches a position beyond the vat. The rail N may then be lowered permitting the yarn frame to descend to the floor. To raise the yarn frame from the floor and introduce it into the vat these operations are reversed. To steady the rail N when it has been elevated, the frame J may be provided with seats j , into which the rail is received when it reaches its highest position.

In the construction shown in Fig. 3 instead of employing the movable rail N, the cylinder G is carried by a movable carriage N' which may be moved laterally upon the top of the frame J. In this case the cylinder must be connected with its source of power by a jointed or flexible pipe G' .

In Figs. 4 and 6 are shown the valve devices for automatically controlling the supply of steam to the dye vat. When steam is supplied excessively to the vat, the dye liquor is liable to boil over. It has been usual to provide the vat with an overflow pipe or

outlet to permit that liquor to escape which boils above the normal level. This is objectionable because it does not affect the steam supply, although that is the cause of the difficulty, and also because it results in waste and materially reduces the quantity of dye liquor in the vat. My improvements are designed to obviate these objections by providing the steam pipe with a valve device which shall automatically shut off the steam supply whenever the liquor boils above the proper level. For this purpose I employ a valve in the steam supply pipe connected with an expansible pipe or piece subjected to the liquor.

Q is the usual steam pipe entering the vat near the bottom. This pipe is provided with a valve case Q', in which is located a valve s adapted to a seat q in the case. The stem s' of the valve extends through the case Q' and is carried by the closed end of an overflow pipe S, which leads from the vat at the usual overflow level. The particular construction of the valve s is immaterial. I have shown it as a gate valve adapted to a seat q in the case.

Q. The overflow pipe S may be provided with an outlet S'. Whenever the dye liquor boils above the level of the overflow outlet, the boiling liquor will pass into the pipe S and heating it will cause it to expand. This expansion of the pipe S will move the valve s carried by it into the seat q, and will thus shut off the steam supply to the vat through the pipe Q. Such liquor as passes into the pipe S may escape through the outlet S'. The quantity of liquor thus wasted will, however, be very little, compared with the amount that is lost with the ordinary overflow.

When the temperature of the liquor becomes reduced by the shutting off of the steam supply, and ceases to boil into the pipe S, that pipe becomes cooled and contracts, thus withdrawing the valve s from the seat q and opening the steam supply through the pipe Q. The pipe S should of course be constructed of metal having a high coefficient of expansibility.

To insure the greatest expansion of the pipe S taking place in the direction toward the pipe Q the rear end of the pipe S may be held to the case Q' by a cross piece T and rods as shown in Fig. 4. By this means the rear end of the pipe S will be held in a more or less fixed relation with reference to the valve seat q, while the front end which carries the valve s, will be free to expand and move forward. The amount of movement for the opening and closing of the valve need be very slight.

Such minor details of construction as I have shown for the purpose of illustrating and explaining my invention may be varied as may be desired and are not to be taken as limitations of the invention.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a yarn dyeing machine, a yarn frame provided with upper lower and intermediate stick supporting frames located on opposite

ends or sides of the yarn frame respectively and each provided with a series of stick supports, so that each pair of upper, lower or intermediate frames is adapted to support a series of yarn sticks at the opposite ends.

2. In a yarn dyeing machine, a yarn frame provided with upper lower and intermediate stick supporting frames located on opposite ends or sides of the yarn frame respectively and each provided with a series of stick supports, so that each pair of upper, lower or intermediate frames is adapted to support a series of yarn sticks at the opposite ends, one or more of said stick supporting frames being adjustable with reference to the others.

3. In a yarn dyeing machine, a yarn frame having upper and lower stick supporting frames located on opposite ends or sides of the yarn frame respectively and each provided with a series of supports for supporting a series of yarn sticks, provided with a pair of adjustable stick supporting frames located one at each end or side of the yarn frame between the corresponding upper and lower supporting frames, and means extending to the upper portion of the yarn frame for adjusting the two intermediate stick supporting frames relatively to the corresponding upper and lower stick supporting frames from the top of the yarn frame.

4. In a yarn dyeing machine, a yarn frame having upper and lower stick supporting frames located on opposite ends or sides of the yarn frame respectively and each provided with a series of supports for supporting a series of yarn sticks, provided with a pair of adjustable stick supporting frames located one at each end or side of the yarn frame between the corresponding upper and lower supporting frames, and having two sets of supports one for a series of sticks corresponding to the series of sticks carried by the pair of upper supporting frames, and the other for a series of sticks corresponding to the series of sticks carried by the pair of lower supporting frames.

5. In a dyeing machine the combination of the yarn frame having pairs of upper and lower supporting frames each frame being provided with a series of supports for supporting a series of yarn sticks, a pair of adjustable stick supporting frames arranged one between the upper and lower supporting frames at each end or side of the yarn frame and provided with a series of supports for supporting yarn sticks between the sticks carried by the pairs of upper and lower supporting frames, uprights H' carried by the intermediate stick supporting frames and extending to the top of the yarn frame, and means for adjusting the uprights H' to raise and lower the pair of intermediate supporting frames and the sticks carried by them.

6. In a dyeing apparatus the combination of the dye vat, an upwardly extending frame projecting beyond the vat, the yarn frame, a movable carriage supporting the yarn frame,

a horizontal guide or rail for the carriage on which the said carriage may be moved, and means carried by the upwardly extending frame to raise and lower the horizontal guide
 5 or rail, whereby the carriage for the yarn frame may be bodily raised and lowered with its guide or rail and may be moved horizontally on the rail when the same is elevated.

7. In a dyeing apparatus the combination
 10 of a liquor vat, an upwardly extending frame projecting above the vat and having a lateral extension beyond the vat, a movable rail arranged transversely to the vat and suspended from the upwardly extending and overhang-
 15 ing frame, means to raise and lower the rail, a movable carriage carried by the rail, and a yarn carrying frame carried by the movable carriage.

8. In a dyeing apparatus the combination
 20 of a liquor vat, an upwardly extending frame projecting above the vat and having a lateral extension beyond the vat, a movable rail arranged transversely to the vat and suspended from the upwardly extending and overhang-
 25 ing frame, means to raise and lower the rail, a movable carriage carried by the rail, a yarn carrying frame carried by the movable carriage, and seats on the upwardly extending and overhanging rail to center and support the
 30 rail when the same is raised.

9. In a dyeing machine a yard frame consisting of uprights B', longitudinal side bars B⁴, B⁴, and transverse end pieces B³, B³, united

together at the corners by a single bolt whereby said parts may be disconnected and any
 35 pieces removed, and the upper transverse end pieces B², B², and longitudinal top piece C.

10. In a dyeing machine the combination with the dye vat, of a steam supply pipe entering the same, a valve in the steam supply
 40 pipe, and a metallic piece connected with said valve and subjected to the heat of the liquor in the vat whereby the expansion of said metallic piece will automatically close the
 45 valve and shut off the supply of steam through the steam pipe.

11. In a dyeing machine, the combination with the vat, of a steam supply pipe entering the same, a valve in the said steam supply
 50 pipe, and an expansible overflow pipe leading from the vat and connected with the valve in the steam pipe, whereby the heat of the overflow liquor will expand the overflow pipe and
 close the valve in the steam pipe.

12. In a dyeing machine, the combination
 55 with the vat, of a steam supply pipe entering the same, a valve in said steam supply pipe, and an expansible overflow pipe S, having a waste outlet S', and connected with the valve
 60 in the steam pipe.

In testimony of which invention I have hereunto set my hand.

JOHN G. HASLAM.

Witnesses:

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 H. L. MOTHERWELL.