

J. STEENBERGHE.  
MACHINE FOR DYEING.

(No Model.)

(Application filed Oct. 18, 1900.)

2 Sheets—Sheet 1.

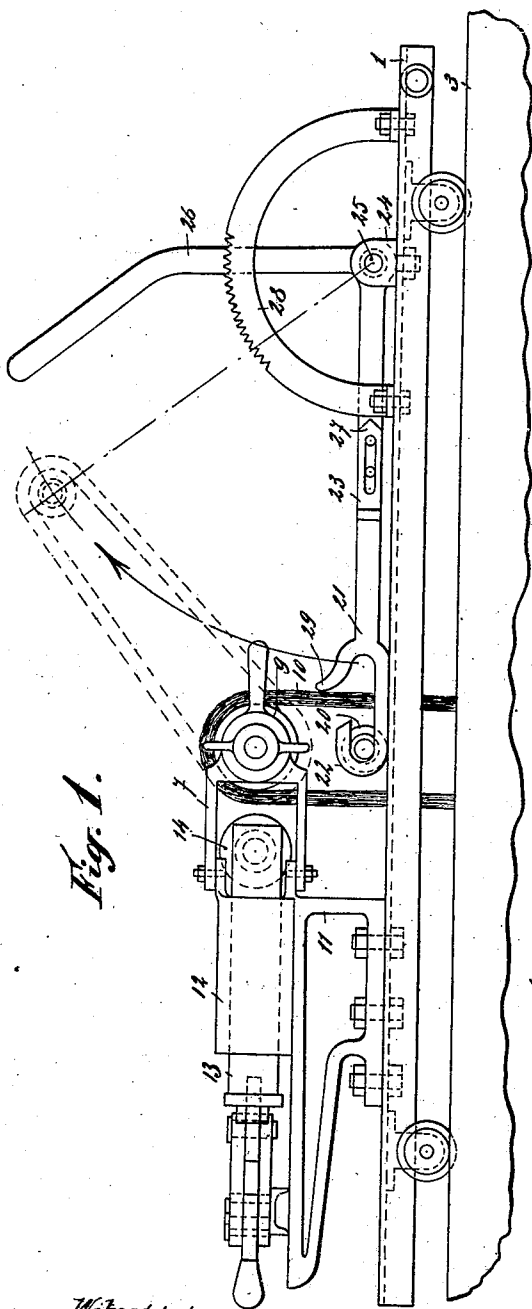


Fig. 1.

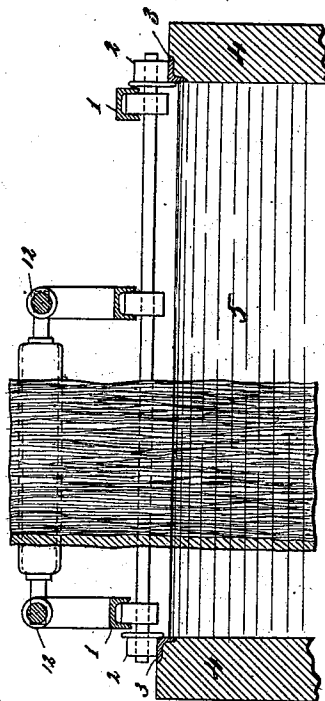


Fig. 3.

Witnesses.

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Roland J. Grant.

Inventor

Joseph Steenberghe  
per Herbert Sifton Jones  
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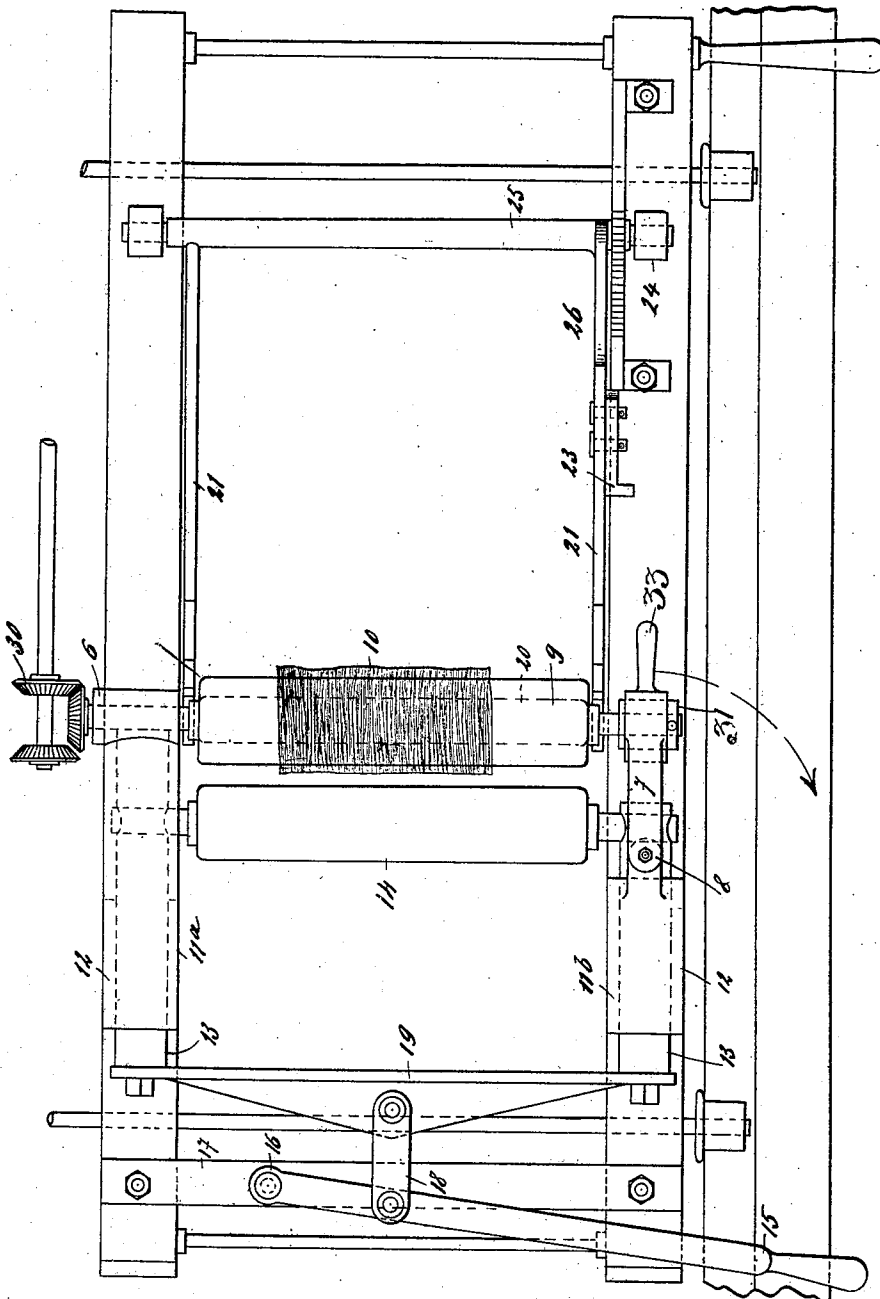
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Fig. 2.



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# UNITED STATES PATENT OFFICE.

JOSEPH STEENBERGHE, OF MOLENBEEK, NEAR BRUSSELS, BELGIUM.

## MACHINE FOR DYEING.

SPECIFICATION forming part of Letters Patent No. 668,694, dated February 26, 1901.

Application filed October 18, 1900. Serial No. 33,465. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH STEENBERGHE, a subject of the King of Belgium, residing at No. 61 Rue Piers, Molenbeek, near Brussels, in the Kingdom of Belgium, have invented a new and useful Machine for Dyeing and Wringing Yarn, of which the following is a specification.

The machine for dyeing hanks of yarn which forms the object of the present application for Letters Patent is devised especially for the dyeing of cotton yarn in indigo-vats, and it admits of the practical realization of this delicate operation, which has hitherto always necessitated very skilled dyers whose hands were repeatedly attacked by the dye liquid.

The industrial use of this machine, which can be operated by any workman and which gives a color of any desired shade and absolutely uniform for all the hanks of yarn operated upon, constitutes an improved step forward and effects a very considerable economy in labor.

In order better to set forth the advantages of the new invention in all respects, it should be remembered that the operation by hand in the indigo-dye vats involves a certain number of operations or successive dyeings, according to the shade required, each of these immersions being effected in a different bath and involving a dipping followed by a wringing, then a pressing and stretching of the yarn.

According to my improved system the machine is mounted upon a traveling frame above a series of vats containing the graduated baths. The machine effects the dipping and then expresses the excess of the dye absorbed by the yarn by squeezing the same without twisting it and without disturbing the threads, so that the subsequent pressing or straining of the said yarn is no longer requisite.

My apparatus includes the following essential parts, namely: first, a dipping-roller rotated above the bath and arranged to pass through the hank of yarn to be dipped; second, a stretching-roller also passing through the yarn and capable of being moved away from the dipping-roller for the purpose of stretching the said yarn out of the bath and

above the vat, and, third, a compression-roller which can be caused to approach the dipping-roller for the purpose of squeezing the yarn between these two rollers, so as to express the excess of dye taken up.

In order to make my invention more clear, I have illustrated the same in the accompanying drawings, in which is represented by way of example a machine according to my system.

In the drawings, Figure 1 shows a longitudinal elevation of the machine capable of traveling above the dye-vats. The mechanism thereof is represented in the position of dipping. Fig. 2 shows a plan view of the same apparatus and partly of its driving-gear. Fig. 3 illustrates an elevation, partly in vertical transverse section and upon a reduced scale, in order to show the general arrangement of the machine above each dye-vat.

The mechanism is operated upon a horizontal frame or carriage formed of the longitudinal beams 1, united by cross-bars and capable of traveling above the dye-vats upon the little wheels 2 on the rails 3, secured along the lateral edges 4 of a vat 5, divided into as many compartments or vats as are requisite for the different baths. Upon the two longitudinal beams which support the machine proper are bolted two iron frames 11<sup>a</sup> and 11<sup>b</sup>, having cylinders 12, in which can be displaced simultaneously two sliding pistons 13, firmly connected together behind by a cross-piece 19 and supporting in front the compression-roller 14, which may in this manner be adjusted horizontally when the said pistons are operated by means of the lever 15, pivoted at 16 upon the cross-bar 17 and connected to the piece 19 by the rod 18. The dipping-roller 9 is of a diameter sufficient to insure that the surface of contact with the hank 10 will suffice to cause said hank to revolve. The roller 9 is journaled in two supports, of which the one, 6, of larger dimensions, is fixed and forms part of the frame 11<sup>a</sup>, whereas the other support, 7, forms part of a mechanism pivoted laterally at the point 8 upon the frame 11<sup>b</sup> and permits the corresponding end of the said roller to be completely liberated by the movement of the piece 7 by means of the handle 33 for the purpose of inserting or with-

drawing the hank of yarn 10 at the commencement or the end, respectively, of each operation.

Upon the front of the frame carrying the machine is mounted a transverse shaft 25, revolving in two bearings 24, provided upon the frame. This transverse shaft 25 presents two extensions or arms 21, arranged laterally, and of which the end forms an open support 22, with a fork 29, in which support rests each pivot of the stretching-roller 20, which may then be easily removed in order to be inserted in the hank 10. A controlling-lever 26, in one piece with the axle 25, enables the operator to bring the stretching-roller into the raised position, as indicated in dotted lines in Fig. 1, while the catch 23, with its point 27 sliding upon one of the supporting-arms 21, will engage by its own weight in the teeth of a semicircular ratchet-bar 28, along which the said arm travels, and thus maintains the roller 20 in the position required to effect the tension of the hank. (See Fig. 1.) The dipping-roller 9 is revolved in either direction, according as it may be required to dip the hank or to express from it the excess of dye liquid. This is effected by means of a reversible gear mechanism 30, the driving-shaft whereof is operated by manual or preferably by electric or other power, which permits of the mechanism being made absolutely independent and perfectly mobile along the whole length of the vat. In the case of electric driving the electric motor can be supplied by means of a trolley receiving current from a conductor placed longitudinally above the vat.

The operation of the machine above described is as follows: The pressure-roller 20 is first raised in the direction indicated by the arrow in Fig. 1 by means of the lever 26, and its axle automatically places itself in the hooks 29 on the supporting-arms 21. One of the ends of this axle is then released from its hook, and the hank is passed upon the roller, which is then replaced in its bearing and returned into the operative position underneath the roller 9. The hank is then passed upon the dipping-roller 9, its axle having been released from the movable support 7 by turning this latter in the direction of the arrow marked on Fig. 2, the removable bearing 31 having been taken away. After the replacing of the axle in the support 7 the said roller 9 is set in motion by means of the bevel-wheel gearing 30 in the desired direction and causes the hank to move, which then passes through the bath a certain number of times until the threads thereof are fully charged or dyed. The roller 20 is then again raised in order to lift the hank out of the bath and to effect the tension of the said hank, while the pressure-roller 14 is caused to approach the roller 9 by means of the lever 15, which is pressed in any convenient manner to effect the needful pressure upon the hank. By aid of the reversible gearing 30 the roller 9 is caused to

travel in the direction opposite to that for the dipping of the hank, which is then compressed while under tension between the aforesaid rollers 9 and 14, which has for its result the pressing out of the excess of dye which has been taken up. The coloring liquid is thus expressed without the need of twisting the hank—that is to say, without disturbing the threads—as would have been the case in the operation by hand. In order to obtain a regular color over all the hanks, it is obviously requisite that the duration of the dipping should be always the same at each dip—that is to say, that the roller 9 should effect the same number of revolutions. For this purpose the machine is provided with an indicating device having a dial, (not illustrated in the drawings,) and by looking at this the operator who has charge of the machine can stop the dipping at the required moment. The same indicator also serves to indicate the amount of wringing of the dipped hank. After the complete passage of all the hanks through the first dye-bath the machine is caused to travel to the second bath, and the hanks are then again dipped in the same order and subjected to the same treatment as before, the operation being repeated in the subsequent baths until the desired color is obtained.

It will be obvious that my invention is not limited to the precise arrangement of parts illustrated in the drawings and that I may make detail modifications in the different organs or mechanisms which compose the machine within the limits of the principle of the system set forth. For instance, the compression-roller might be arranged to operate vertically or by describing an arc of a circle instead of traveling horizontally. In like manner the removal of the stretching-roller might be obtained by horizontal displacement, &c.

What I claim is—

1. In apparatus for dyeing yarn a longitudinal frame, adapted to move to and fro in the direction of its axis, an upper roller horizontally and detachably supported in bearings at right angles to the frame-axis, rollers for extending and compressing the yarn and mechanism for revolving and for adjusting the position of said rollers.

2. In apparatus for dyeing yarn a longitudinal traveling frame, a roller horizontally supported on said frame, bevel-gearing connected to a prime mover and adapted to revolve said roller in either direction, a movable bearing capable of releasing one end of said roller, a tension-roller, doubly-forked adjustable lever-arms pivoted on a transverse shaft and adapted to carry said tension-roller, lever-handle and ratchet mechanism in operative connection with said shaft, a wringing-roller journaled on horizontal slides supported on the frame, and lever mechanism connected to said slides.

3. In apparatus for dyeing yarn the frame 1, the supporting-roller 9, the bearing 6, the

gearing 30, the bearing 31, the lever 33, and means for stretching and wringing the yarn.

4. In apparatus for dyeing yarn the frame 1, the extension-roller 20, the extensible levers 21, the forks 29, 22 on said levers adapted to support the axle of the roller 20 the horizontal axle 25 the lever 26 and the rack 28, in combination with means for revolving and wringing the yarn.

5. In apparatus for dyeing yarn the frame 1, the supports 11, the sleeves 12, the sliding

bars 13 the roller 14, the lever 15, the link 18, the cross-bar 19, and means for revolving and stretching the yarn.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH STEENBERGHE.

Witnesses:

T. PARETTO,  
GREGORY PHELAN.