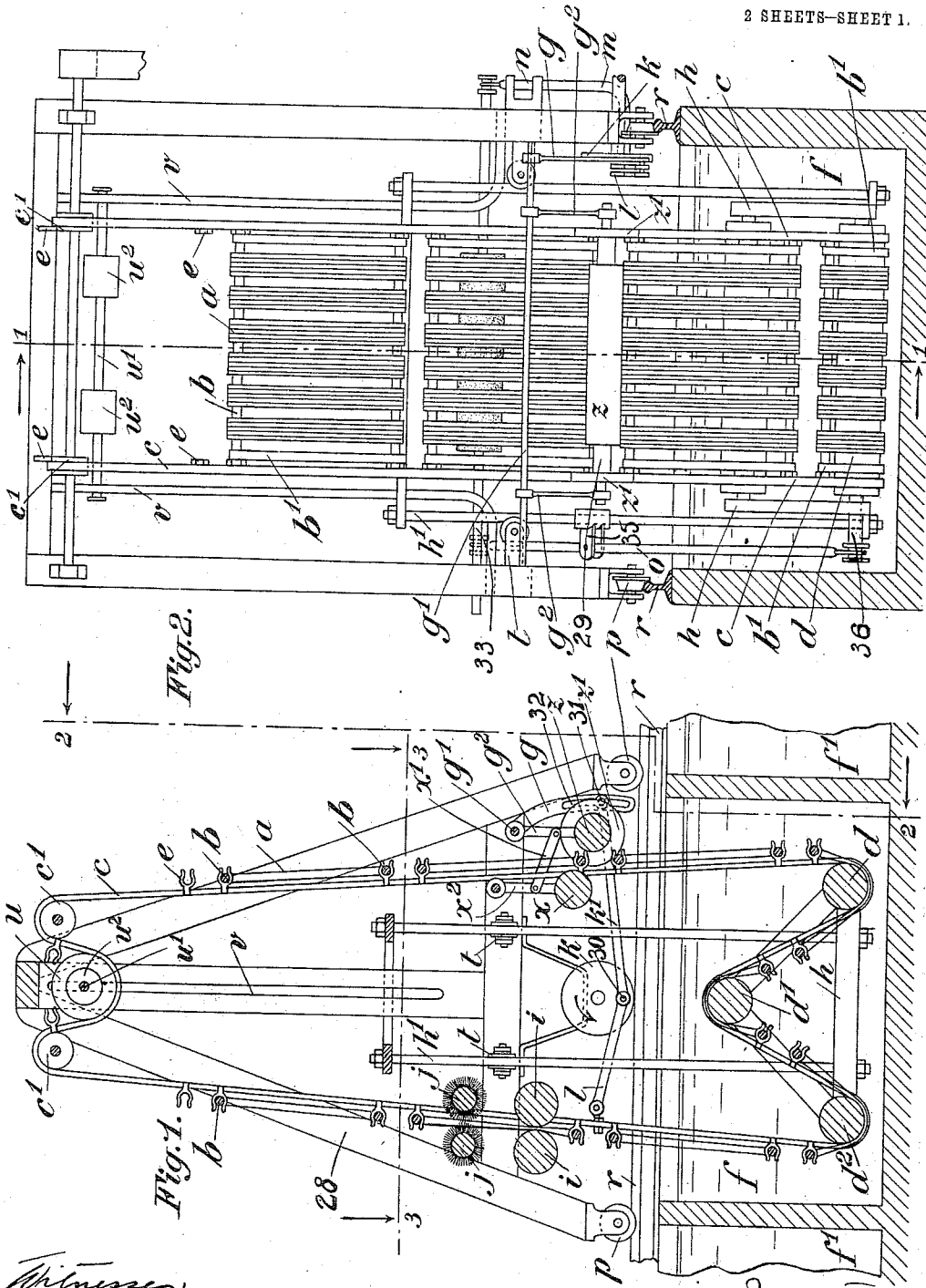


J. & L. REGORDOSA.
 APPARATUS FOR DYEING SKEINS.
 APPLICATION FILED JAN. 4, 1910.

985,936.

Patented Mar. 7, 1911.

2 SHEETS—SHEET 1.



Witnesses:
 J. S. Givens
 A. M. Nale, Jr.

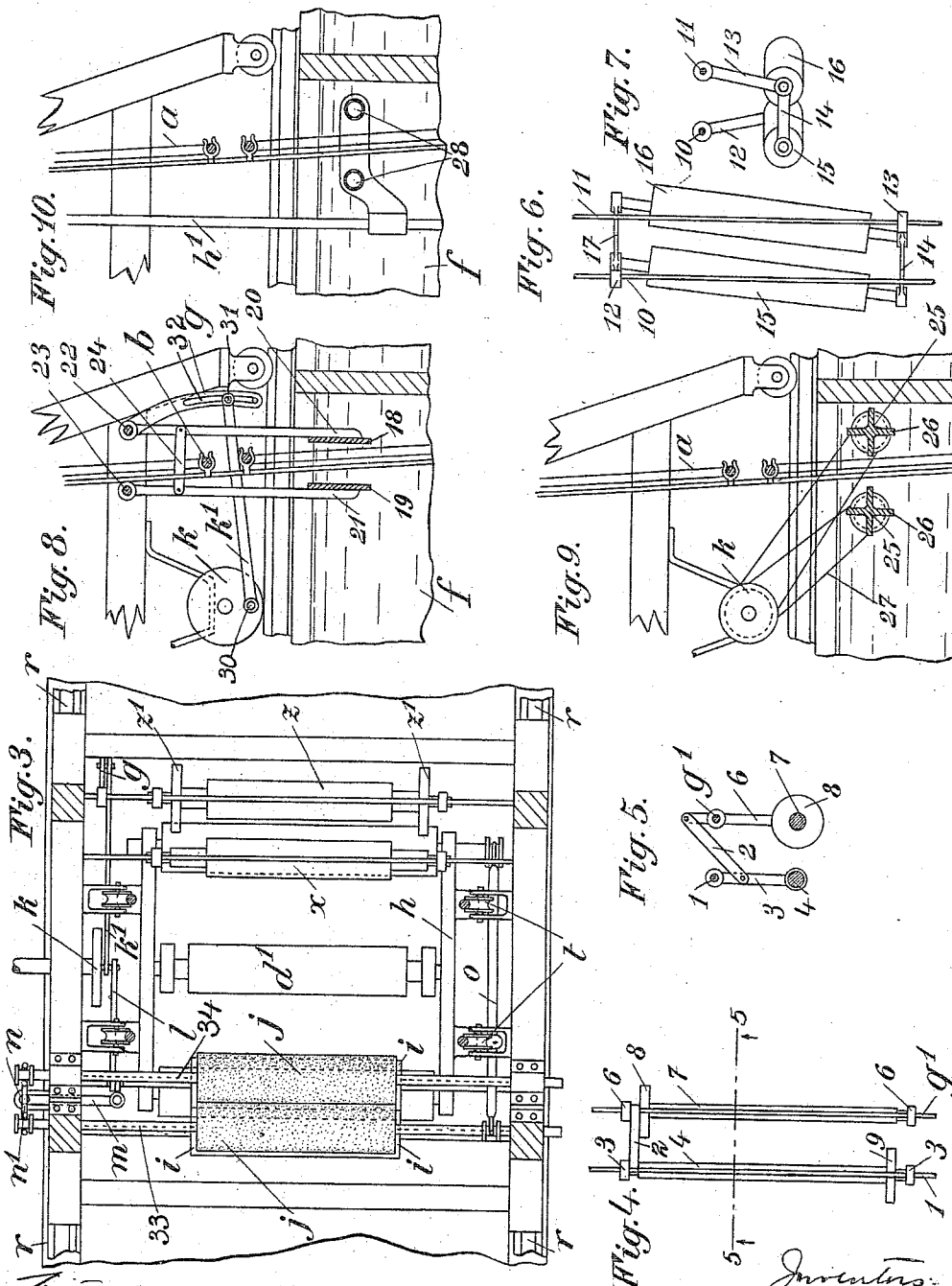
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JUAN REGORDOSA AND LUIS REGORDOSA, OF BARCELONA, SPAIN.

APPARATUS FOR DYEING SKEINS.

985,936.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed January 4, 1910. Serial No. 536,342.

To all whom it may concern:

Be it known that we, JUAN REGORDOSA and LUIS REGORDOSA, manufacturers, subjects of the King of Spain, residing at Barcelona, in the Province of Barcelona and Kingdom of Spain, have invented certain new and useful Improvements in Apparatus for Dyeing Skeins; and we 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.

Our invention relates to improvements in apparatus for dyeing skeins, in which the skeins are arranged in continuous rows and are passed through the baths steadily.

The object of the present invention is to separate the threads of each skein as it enters the bath, thus forcing the liquid to circulate between the threads, which results in a more uniform and satisfactory dyeing of the same.

Other objects will appear in the detailed description.

In the accompanying drawings—Figure 1 is a section of a portion of an apparatus adapted to carry out our invention, taken on the line 1—1 of Fig. 2. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a horizontal section, looking downwardly, taken on the line 3—3 of Fig. 1, with the chains and the skeins removed. Fig. 4 is a horizontal view, showing the mechanism for producing alternate oscillations of the chains. Fig. 5 is an end view thereof. Fig. 6 is a plan view of a modified form for producing the same movement. Fig. 7 is an end view of the parts shown in Fig. 6. Figs. 8, 9, and 10 are vertical sectional views of a part of a machine, with various forms of mechanism for agitating the liquid.

The dyeing operation is carried on in vats such as *f*, *f'*. Along the sides of these vats are parallel rails *r*, on which is mounted the skein carrying part of the apparatus, being supported on rollers *p*, whereby the whole apparatus may be easily moved from one vat to another to take advantage of the different baths, when desired. On these rollers *p* is mounted a frame, preferably triangular in

form, which supports the shafts and other means for holding the traveling chains.

c represents the traveling chains, of which there are two, arranged parallel with each other and furnished at intervals with spring clips *e*. In these clips, cross pieces *b* are adapted to be slipped, carrying the skeins *a*, and the cross pieces *b* are united by elastic connections *b*¹, in order to keep them in place. The clips *e* on the chains are arranged parallel to each other, so that practically the whole space between the chains may be filled with skeins, as indicated on the lower part of Fig. 2. These chains run at the bottom over supporting rollers *d*, *d*¹, and *d*², mounted in a triangular frame. This frame includes horizontal cross pieces *h* and vertical guiding rods *h*¹, which engage with grooved rollers *t* carried by the main supporting frame, so that the entire frame supporting the rollers *d*, *d*¹, and *d*² may rise freely, being guided by the four rollers *t*, and tends to return to its normal position, as shown in Fig. 1, by its own weight. At the top, the chains *c* run over rollers *c*¹, supported in suitable bearings in the main frame 28, and between these rollers, though on a lower plane, is arranged a shaft *u*¹, provided with weights *u*². The shaft *u*¹ is loosely supported in slots in the uprights *v*, carried by the main triangular supporting frame 28. Any suitable means may be employed for causing the chains to travel continuously into and out of the bath in the vat *f*. On the shaft *u*¹ rollers *u* are mounted, under which the chains *c* pass. The combined weight of the parts *u*², the shaft *u*¹, and rollers *u* is sufficient to counterbalance the weight of the chains *c* and parts carried thereby. As the chains *c* emerge from the bath, the skeins pass between squeezing rollers *i* and between brushes *j*, which have both a rotary and a reciprocatory movement. The rollers *i* and brushes *j* are for the purpose of preventing dripping. As the skeins enter the bath, they are agitated in the following manner: *z* represents a roller bearing against the skeins and mounted on a suitable shaft 29, which shaft has enlargements *z*¹, engaging the chains *c*.

The roller z is agitated in the following manner: Its supporting shaft is supported by arms g^2 , loosely mounted on a fixed horizontal shaft g^1 , and the parts g^2 are also
 5 connected to curved arms g . k represents a disk driven by any suitable motor (not shown) and having on it a crank pin 30 to which is fixed an arm k^1 , which bears on its end a roller 31 engaging a slot 32 in the bent
 10 arm g . By this connection, it is obvious that the rotation of the disk k will swing the roller z and the chains c in a substantially horizontal direction. To make the movement more effectual, another roller x
 15 on the inside of the chains c is preferably employed, which is supported on arms x^2 , pivotally mounted on a part of the main supporting frame 28. Links x^1 connect the supporting arms g^2 with the supporting
 20 arms x^2 , so that the rollers z and x will be vibrated in unison.

Pivotally connected to the crank pin 30 on the disk k is an arm l , the upper end of which is connected to a bent arm m , which
 25 arm is in turn connected to the shaft n of the rocker n^1 , which is pivoted between the ends of the shafts 33 and 34 carrying the brushes j , so that by the construction just described the brushes j will have a reciprocatory
 30 movement in opposite directions. These brushes are mounted to run loosely so that they revolve by the motion of the chains. They comb out the threads, part them from each other, and leave them quite separated
 35 and almost dry.

In order to increase the efficiency of the movements of the skeins in the liquid, the roller d is reciprocated longitudinally by the following means: On one of the rods h^1 is
 40 secured a bracket 35, in which is pivotally mounted a lever o , which is located between the shaft 36 of the roller d and the shaft 33 of one of the brushes j . It is provided with forked ends, which engage in recessed
 45 collars on these shafts.

The operation is as follows: The skeins a being stretched upon the chains c , these are united by the elastic bands b^1 and slipped into the spring clips e . The chains c are
 50 then set in motion, by any suitable means, and the skeins are carried first downwardly into the bath, then across over the rollers d , d^1 , d^2 , and then up between the squeezing rollers i and the brushes j , this operation being
 55 repeated as often as desired. As they pass downwardly into the vat f , the chains carrying the skeins are reciprocated back and forth, thus agitating them and insuring a thorough dyeing of the threads thereof.
 60 Then as they pass over the rollers d , d^1 , and d^2 , they are bent and therefore subjected to tension, which tends to spread the threads and insures that any undyed portion shall be saturated. After passing through the

squeezing rollers i to remove the excess of dye, the skeins are combed and the threads thoroughly separated by the rollers j , and this operation being repeated as often as desired insures that every thread, and each
 70 part of every thread, shall be thoroughly impregnated with the dye.

Any means for producing relative motion between the dye liquor and the skeins as they are passed through it may be used, as shown in the modified forms, Figs. 4 to 10.
 75 For example, the rollers z could be reciprocated in the direction of its axis, if desired. Furthermore, alternate movements in opposite directions of the parallel chains could be produced so as to produce a semicircular
 80 movement of the skeins. In Figs. 4 and 5, an arrangement for producing this movement is illustrated, and in this modification a bar 4 is placed behind or inside the skeins, carrying a roller 9, opposite one chain, and
 85 a bar 7, parallel to the bar 4, is placed in front or on the outside of the chains, carrying a roller 8, opposite the other chain. The bar 4 is hung from the shaft 1 by means of links 3, and the bar 7 is hung from the shaft
 90 g^1 by links 6, the links being connected by rods 2, one end above and one below the point of suspension, as shown in Fig. 5. The result of this construction is that as these
 95 parts are swung back and forth, as already described in connection with the rollers x and z , the roller 8 pushes one chain out of line, while the roller 9 pushes the other chain in the opposite direction, producing a
 100 semicircular movement of the chains. In Figs. 6 and 7 is illustrated another form for producing this agitating movement. In this modification, an oscillating arm 10 rocks an
 105 arm 12, which by means of a connection 17, carries on one end the trunnions or bearings of the rollers 15 and 16. A second shaft 11, oscillating in the opposite direction, has an arm 13 connected thereto, which arm carries a shaft 14, in which are located the other
 110 bearings of the ends of the rollers 15 and 16. Instead of agitating the chains carrying the skeins, the liquid in the bath may be agitated, or both the liquid and the chains may be agitated, if desired. In Fig. 8 is
 115 shown one means of agitating the liquid, in which the rollers x and z , shown in Fig. 1, are replaced by horizontal paddles 18 and 19, the oscillatory movement of which forces the dyeing liquid through the skeins carried by the chains c . The paddles 18 and
 120 19 are mounted on arms 20 and 21, pivotally mounted on shafts 22 and 23 and connected together by links 24, the whole being operated by the curved arm g , moved by the arm or rod k^1 , pivotally connected thereto
 125 and to a crank pin 30 on the revolving disk k . In Fig. 9, still another means of agitating the liquid is shown, consisting of shafts 25,

provided with paddles 26, which are revolved by cords or belts 27, driven by the disk *k*.

In the modification shown in Fig. 10, the paddles are dispensed with and the liquid agitated in the following way: 28 represents pipes located on opposite sides of the chains *c* and each provided with a series of small openings directed toward said chains. A pump (not shown) sucks in the liquid and forces it through the pipes 28 in the form of a series of jets thrown against the skeins *a* carried by the chains. After the dyeing operation in one vat, *f*, has been finished, the frame carrying the rollers *d*, *d*¹, and *d*² is raised above the top of the vat, sliding on the pulleys *t*, and the whole apparatus may then be moved over another vat *f*¹, containing, if desired, a different dyeing liquid. The frame is then allowed to fall to the position indicated in Fig. 1 and the dyeing operation continued in the vat *f*¹, as already described.

We claim:—

1. In an apparatus for dyeing skeins, the combination of chains on which the skeins are adapted to be secured and travel through the bath, a frame supporting said chains at the top, a movable frame supporting said chains at the bottom, and means for producing relative movement between said chains and the liquid as the chains descend into the bath, substantially as described.

2. In an apparatus for dyeing skeins, the combination of chains to which the skeins are adapted to be secured in continuous rows, a frame supporting the upper part of said chains, a movable frame supporting the lower part of said chains, a series of vats, and devices movably supporting the whole apparatus, whereby it may be moved from one vat to another, substantially as described.

3. In an apparatus for dyeing skeins, the combination of a series of vats placed in line with each other, a series of rails supported on said vats, a frame provided with rollers mounted on said rails, said frame being provided with supports near its upper end, fixed in relation to said frame, chains passing over said supports, and a movable frame supporting the lower part of said chains and adapted to slide up on said main frame, substantially as described.

4. In an apparatus for dyeing skeins, the combination of a frame having stationary supports at its upper end, a movable frame supported by said first named frame, chains passing over said supports and said movable frame and adapted to carry the skeins to be dyed, a vat containing dyeing liquid, into which said chains are adapted to pass, and means for producing relative motion between the liquid in the vat and the skeins

carried by said chains, substantially as described.

5. In an apparatus for dyeing skeins, the combination of a vat, a frame resting thereon and having supports at its upper end, a second frame having a plurality of rollers mounted therein, said second named frame being adapted to slide in said first named frame, parallel chains passing over said rollers and said supports, skein holding means carried by said chains, and means for swinging said chains laterally as they pass down into the liquid in the vat, substantially as described.

6. In an apparatus for dyeing skeins, the combination of a vat, a frame resting thereon and having supports at its upper end, a second frame having a plurality of rollers mounted therein, said second named frame being adapted to slide in said first named frame, parallel chains passing over said rollers and said supports, skein holding means carried by said chains, means for swinging said chains laterally as they pass down into the liquid in the vat, and squeezing rollers between which said chains pass, substantially as described.

7. In an apparatus for dyeing skeins, the combination of a vat, a frame resting thereon and having supports at its upper end, a second frame having a plurality of rollers mounted therein, said second named frame being adapted to slide in said first named frame, parallel chains passing over said rollers and said supports, skein holding means carried by said chains, means for swinging said chains laterally as they pass down into the liquid in the vat, and reciprocating brushes adapted to engage the skeins soon after they emerge from the vat, substantially as described.

8. In an apparatus for dyeing skeins, the combination of a vat, a frame resting thereon and having supports at its upper end, a second frame having a plurality of rollers mounted therein, said second named frame being adapted to slide in said first named frame, parallel chains passing over said rollers and said supports, skein holding means carried by said chains, means for swinging said chains laterally as they pass down into the liquid in the vat, squeezing rollers engaging said skeins as they leave the vat, and reciprocating brushes engaging said skeins as they leave the squeezing rollers, substantially as described.

9. In an apparatus for dyeing skeins, the combination of a vat adapted to contain dyeing liquid, a main frame carried thereby, guide pulleys and guide rollers carried by said main frame near its top, a second frame supported by said main frame and adapted to slide up and down on said rollers, said second named frame being provided

with a plurality of guide rollers, parallel chains passing over said guide rollers and pulleys and provided with spring clips, skein holding means adapted to be held by
5 said clips, vibrating rollers between which said chains pass as they descend into the vat, squeezing rollers between which the skeins pass as they emerge from the vat, reciprocating brushes between which the skeins pass
10 after leaving the squeezing rollers, and

means for reciprocating said vibrating rollers and said brushes, substantially as described.

In testimony whereof, we affix our signatures, in presence of two witnesses.

JUAN REGORDOSA.
LUIS REGORDOSA.

Witnesses:

CONSTANTINO LUPER CUAL,
HENRY MARTINS.

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