(No Model.) 4 Sheets—Sheet 1.

C. CORRON.

APPARATUS FOR DYEING SKEINS.

No. 437,173. Patented Sept. 30, 1890.

FIG. 1.

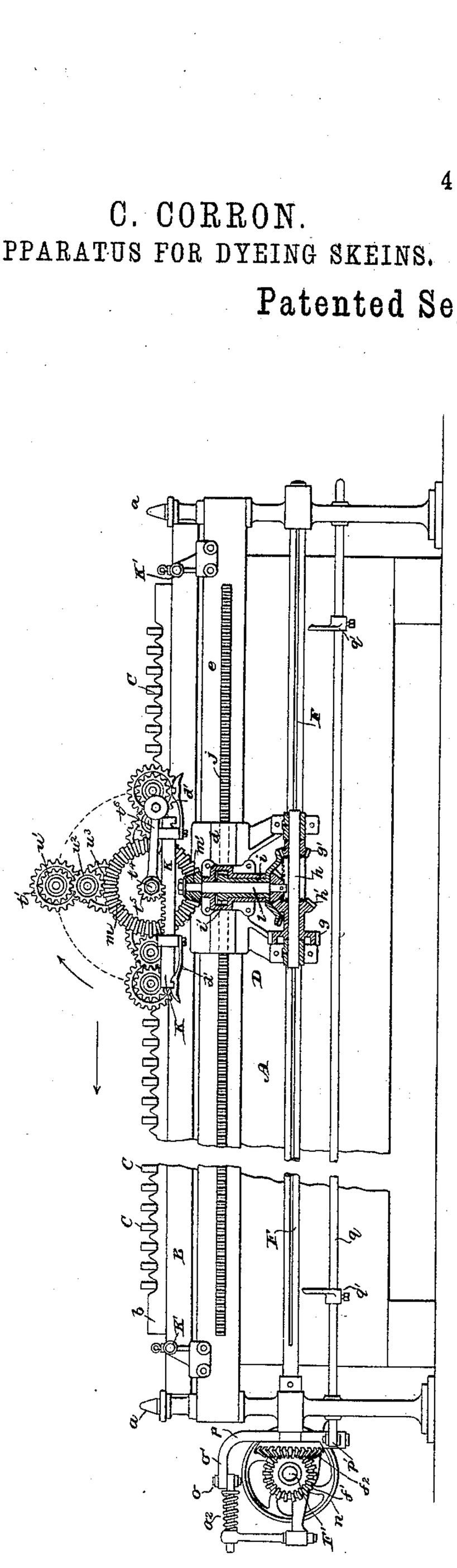
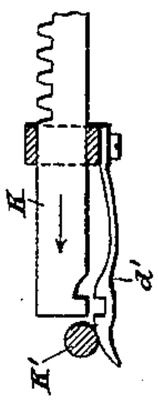


FIG. 1a.



WITNESSES:

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C. K. Fraser.

INVENTOR:

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(No Model.)

4 Sheets—Sheet 2.

C. CORRON.

APPARATUS FOR DYEING SKEINS.

No. 437,173. Patented Sept. 30, 1890.

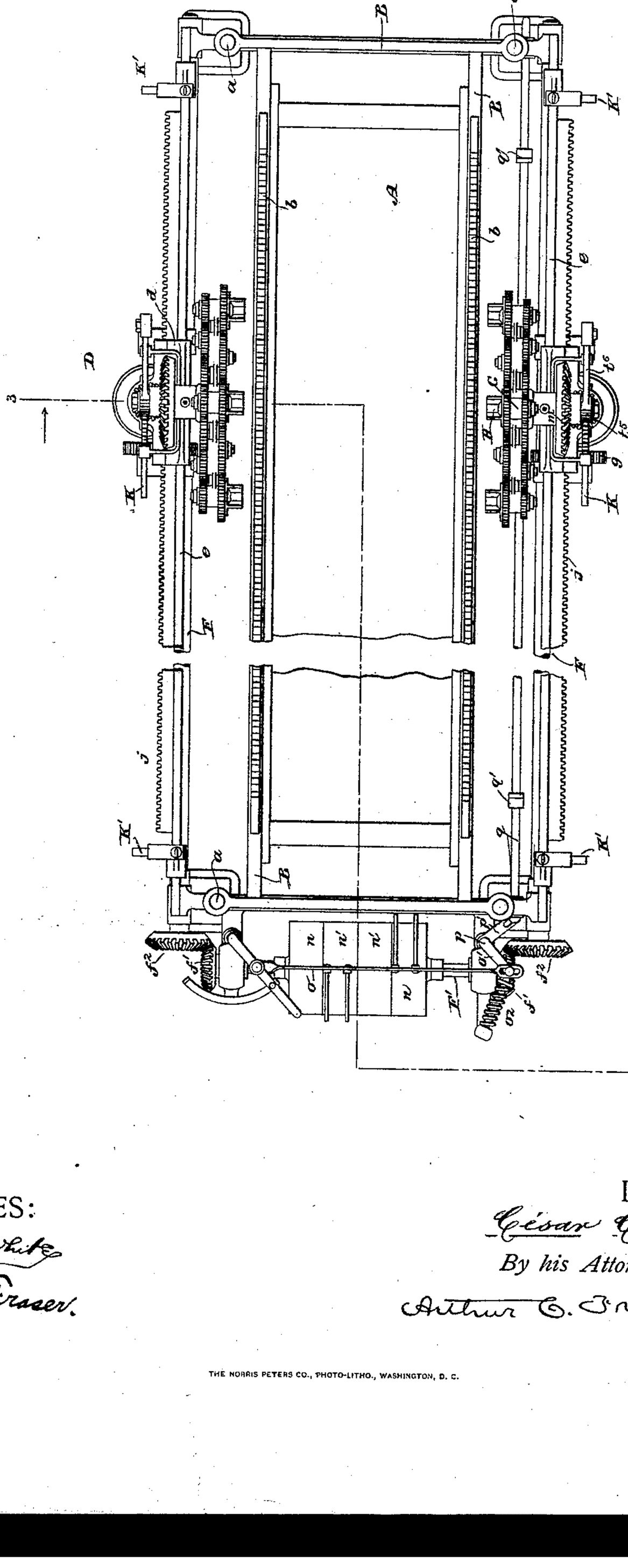

FIG. 2.

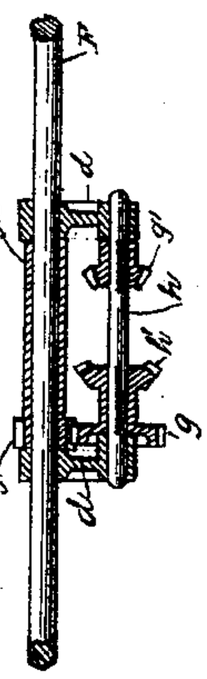

FIG. 2a.

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(No Model.) 4 Sheets—Sheet 3.

C. CORRON.

APPARATUS FOR DYEING SKEINS.

No. 437,173. Patented Sept. 30, 1890.

FIG. 4.

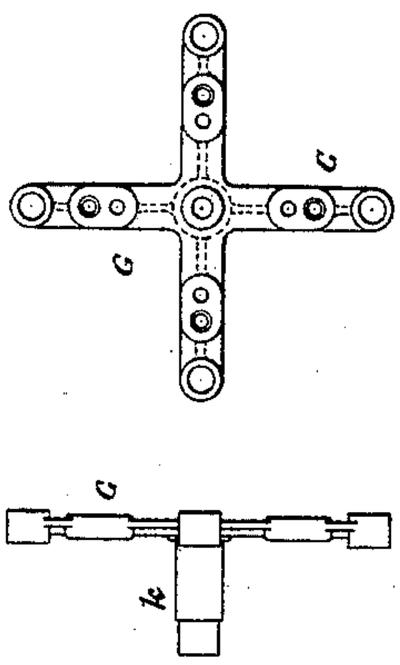


FIG. 5.

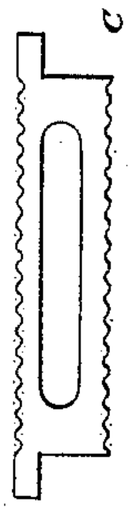


FIG. 6.

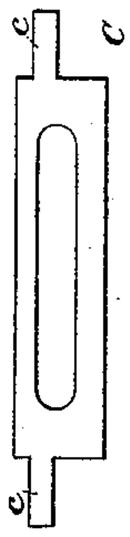
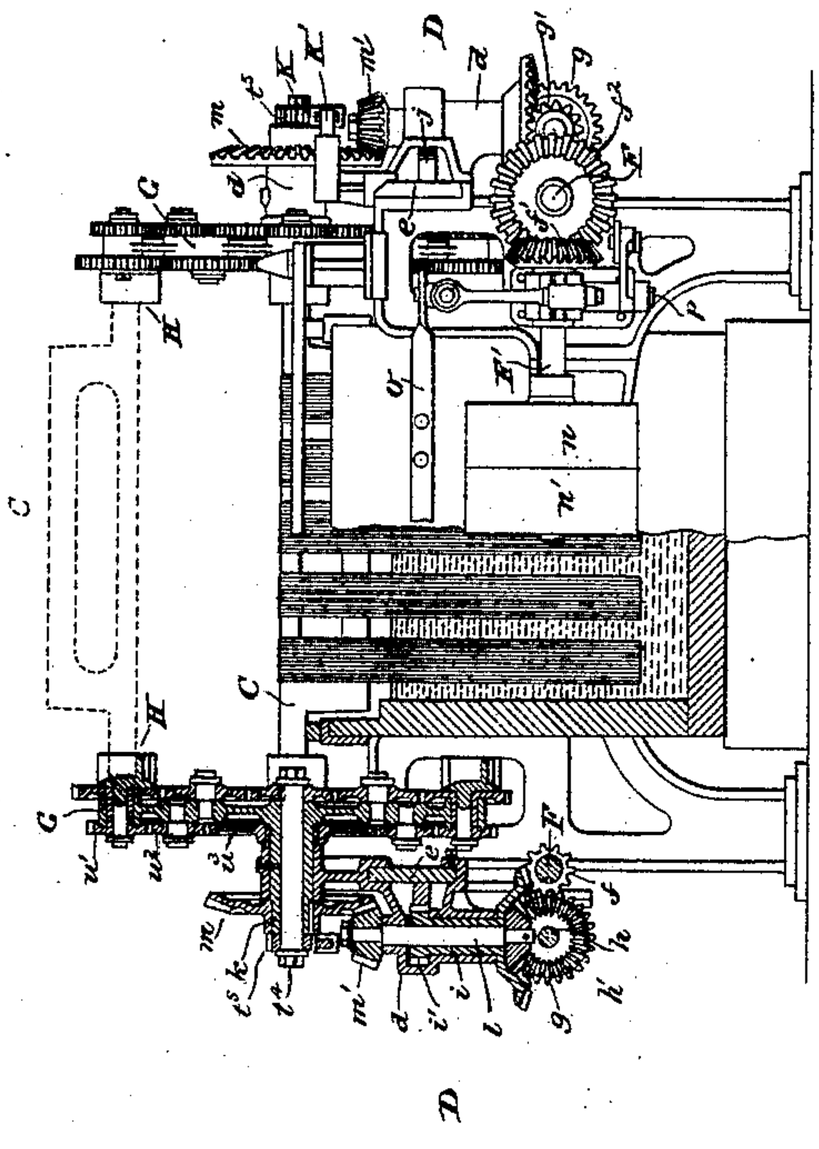


FIG. 3.



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(No Model.) 4 Sheets—Sheet 4.

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APPARATUS FOR DYEING SKEINS.

No. 437,173. Patented Sept. 30, 1890.

FIG. 10.

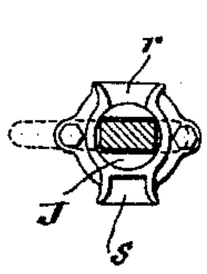


FIG. 7.

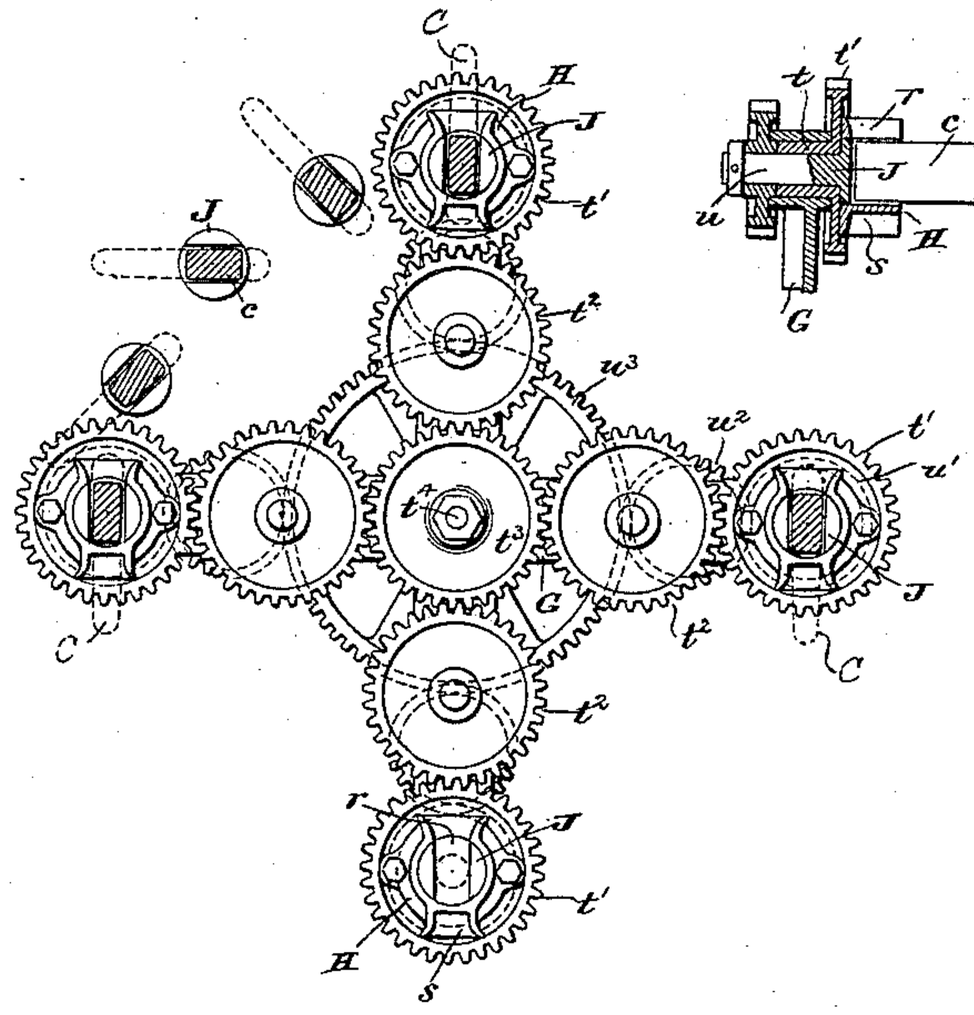


FIG. 8.

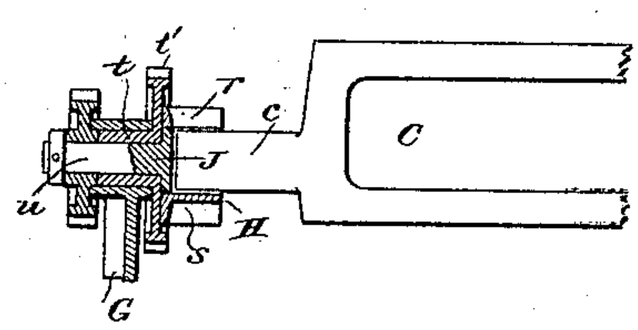


FIG. 9.

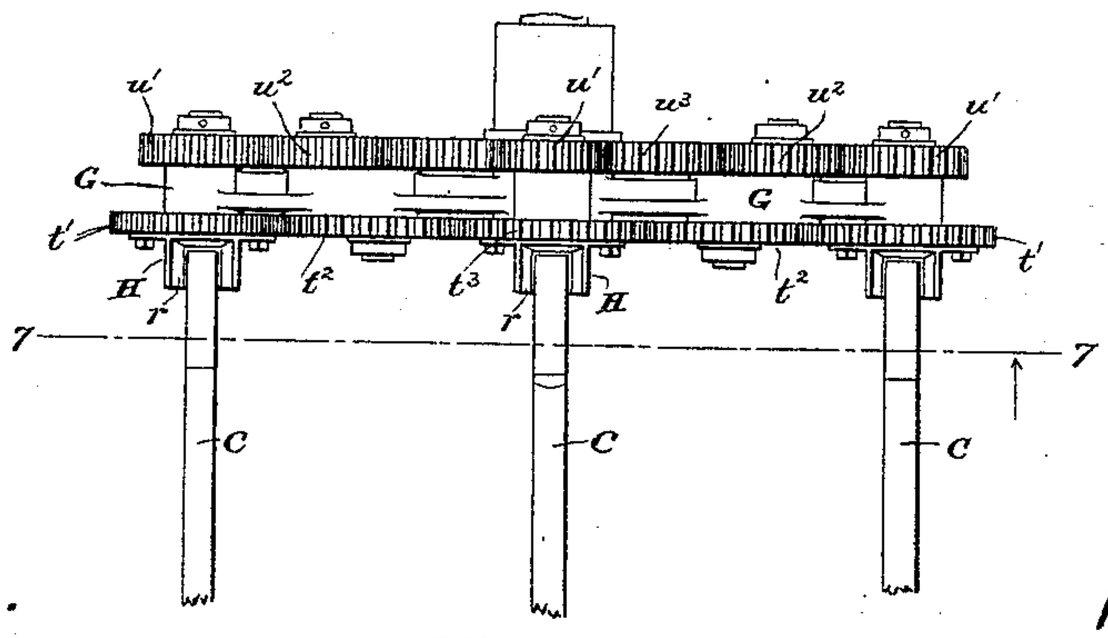
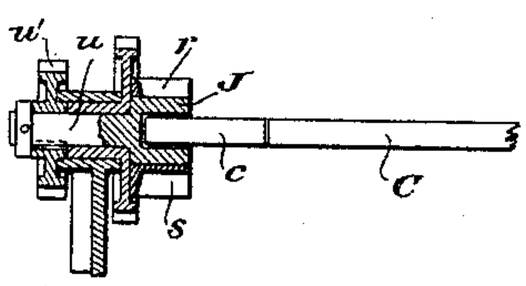
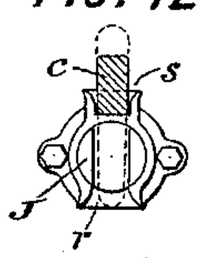


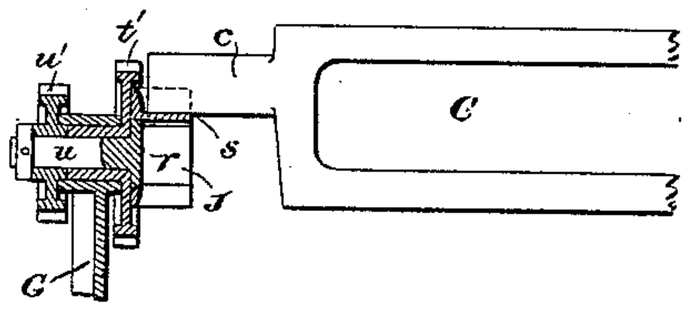
FIG. 11.

FIG. 12.

FIG. 13.







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UNITED STATES PATENT OFFICE.

CÉSAR CORRON, OF PARIS, FRANCE.

APPARATUS FOR DYEING SKEINS.

SPECIFICATION forming part of Letters Patent No. 437,173, dated September 30, 1890.

Application filed May 29, 1890. Serial No. 353,564. (No model.) Patented in France September 4, 1888, No. 192,712, and in Switzerland December 24, 1888, No. 202.

To all whom it may concern:

Be it known that I, CÉSAR CORRON, a citizen of the Republic of France, residing in Paris, France, have invented certain new and useful Improvements in Apparatus for Dyeing Skeins, of which the following is a specification.

This invention is the subject of a patent in France, No. 192,712, dated September 4, 1888, and in Switzerland, No. 202, dated December 24, 1888.

In the dyeing of silk, wool, and other fibrous matter in the form of skeins or hanks it is customary to hang the skeins over bars or skein-carriers, which are laid horizontally across the top of a long vat, so that the skeins hang into the dye contained in the vat while the bars or skein-carriers are held in notches at the top of the vat. A portion of each skein is consequently not immersed in the dye. In order to immerse these portions and at the same time to agitate the skeins in the dye the workmen move the bars, successively displacing each one to a position a few notches in the rear, and simultaneously they grasp the skeins and slide or draw them around over the bar to bring a new portion thereof into the bath of dye. This operation of shifting the skeins is known to the French dyers as "lisage." The workmen perform these operations—the displacement of the bars and the lisage of the skeins—in succession upon the bars from one end to the other of the vat, and then back again, and so on alternately from end to end.

In my United States Patent No. 363,949, dated May 31, 1887, is disclosed a machine comprising mechanisms for seizing the bars in succession, lifting them out of their notches, carrying them back to a suitable distance in the rear, and dropping them into other notches. Mechanism is also provided for turning the bars during the act of lifting and displacing them in order to effect the lisage of the skeins. Means is provided for throwing this turning mechanism into and out of operation at the will of an attendant. My said machine comprises two carriages traveling on opposite sides of the vat and carrying revolving arms, on the ends of which are seizing devices for grasping the ends of the skein carriers or bars. As the carriages advance, each bar is engaged and carried upwardly and backwardly or in the opposite direction to the advance of the carriages, being moved through a semicircular arc, and finally dropped into notches in the rear. When the turning mechanism is in operation, the bars are rotated during the operation of carrying them over. The carriages travel back and forth from end to end of the vat.

My present invention provides an improved machine which more perfectly performs the operations essential to the manipulation of the skeins by hand, and is entirely automatic, requiring no hand labor whatever from beginning to end of the dyeing operation, and only such supervision as any dyer must necessarily give to the progress of the dyeing.

To these ends my invention provides a displacing mechanism adapted to move the carriers successively from one position to another over the top of the vat, a turning mechanism for rotating the carriers during their displacement, and mechanical connections constructed to automatically bring the turning mechanism into action during the action of the displacing mechanism in one direction, and for moving it out of action or rendering it impotent to turn the carriers during the travel of the displacing mechanism in the other direction. By reason of this feature of my invention the lisage of the skeins occurs at every alternate displacement of the carriers, and each lisage takes place in the same direction, so that the skeins are caused, as it were, to revolve by intermittent movements upon the carriers, and a new portion of the skein is brought out of the dye at every lisage independently of any attention on the part of the operator, and without the possibility of the lisage occurring in the contrary direction, which would bring again out of the dye the portion which, prior to the previous lisage, had been out of the dye, which would result in uneven coloring.

My invention also relates to improvements in devices for seizing or engaging the skein-

carriers, which are rendered more simple and positive in their operation than in the construction shown in my previous patent.

It further relates to improvements in the construction of the turning mechanism, and to the specific means for throwing this mechanism into and out of action, and to other details and improvements, which will be fully hereinafter set forth.

In the preferred embodiment of my present invention, I provide two carriages traveling on opposite sides of the machine, in the same general manner as in my previous patent, these carriages carrying rotative radial arms, which in turn carry the devices for engaging the ends of the skein-carriers. The two carriages and the revolving arms thereof operate in unison, the arms picking up simultaneously the successive bars and carrying them over in a semicircular path backwardly and finally dropping them into suitable notches formed in a frame placed over the top of the vat. The seizing devices or holders are provided with epicycloidal gearing, by which they remain always with the same side up during the revolution of their carrying-arms. The holders are formed with two pockets or compartments, in one of which turns the rotating chuck of the turning mechanism. This chuck receives rotation through epicycloidal gearing, being constructed to make one revolution from the instant of picking up a skein-carrier to the instant of redepositing it. The other pocket is empty, and serves only to lift the skein-carriers without turning them. The pockets open at diametrically-opposite sides of the clutch, so that when the latter is turned one side up the empty pocket engages the skein-carriers and simply displaces them without turning, while when the holders are turned the other side up the opposite pockets receive the skein-carriers and the latter are turned during their displacement by the action of the revolving chucks.

To throw the turning mechanism into or out of action it is simply necessary to invert or revert the holders. This operation is performed automatically at each end of the travel of the carriages through the medium of a throw-over stop mechanism, which communicates motion to the central wheel of the epicycloidal train, which is thereby turned far enough to communicate the half-revolution simultaneously to all the holders. While the carriages are traveling in one direction the holders simply lift and transfer the skein-carriers without turning them; but at the end of the travel of the carriages and the instant before their driving mechanism is reversed to move them back in the opposite direction the holders are inverted, thereby bringing the turning mechanism into effective action, and during the return travel of the carriages the skein-carriers are rotated during their displacement.

Such is, in general, the construction of the preferred embodiment of my invention; but it is to be observed that my invention in its broader aspect is not limited to any particular special construction or embodiments, but is susceptible of being greatly varied, so long as the same general operations are performed upon the skein-carrying bars—namely, that during their displacement in one direction they are not turned, and during their displacement in the contrary direction they are rotated to perform the lisage of the skeins.

In the accompanying drawings, which show the preferred construction of my machine, Figure 1 is a side elevation thereof, partly in vertical section. Fig. 1^a is an enlarged fragmentary detail of a part of the mechanism shown in Fig. 1. Fig. 2 is a plan of the apparatus. Fig. 2^a is a fragmentary horizontal section in the plane of the axes of shafts F and *h*. Fig. 3 is half an end elevation and half a transverse section on the line 3 3 in Fig. 2. Fig. 4 is an elevation of one of the carrying-arms detached. Figs. 5 and 6 are elevations of two different constructions of skein-carrying bars removed. Fig. 7 is an enlarged detailed view of the clutches carried by one carriage and their gearing and appurtenances viewed from the inner side or middle of the machine, the skein-carriers being in section on the line 7 7 in Fig. 9. Fig. 8 is a fragmentary vertical transverse section of the uppermost holder in Fig. 7. Fig. 9 is a plan of the parts shown in Fig. 7. Fig. 10 is a view of one of the holders alone in different position. Fig. 11 is a transverse section of the holder in the position shown in Fig. 10. Fig. 12 is a face view of one of the clutches inverted, to show the turning mechanism, and Fig. 13 is a side view thereof in vertical transverse mid-section.

A designates a dyeing-vat; B, a frame mounted thereover, removable therefrom, and centered when in place thereon by having eyes which drop over conical pins *a a* at the corners of the vat, and provided with notched bars *b b* on opposite sides.

C C are skein carriers or bars, which rest in notches in these bars *b b*. The skein-carriers are preferably of the construction shown in Figs. 5 and 6, having end projections *c c*, which enter the notches and project beyond far enough to be seized by the holders of the displacing mechanism, their intervening portion consisting of bars or wings, one of which projects preferably farther from the center than the other. These two bars or wings of the skein-carriers are placed wide enough apart, by preference, so that by turning the skein-carrier one revolution the skeins will be shifted sufficiently around the carrier to bring that portion which then was out of the die into or nearly into immersion therein. The skein-carriers are hence essentially flat reels, being made flat in order that they may lie close together, so that as many skeins may be dyed simultaneously in a vat of given length as possible. They are made eccentric or projecting farther to one side of the end

portions *c c* than the other in order to bring the center of gravity below the under side of these end portions and thereby cause the skein-carriers to hang vertically when deposited in the notches and without tending to tilt or oscillate therein. This construction of the skein-carrier is that which is preferably employed in connection with my present invention by reason of its important practical advantages; but it is not essential thereto.

The displacing mechanism for lifting and transferring the skein-carriers is carried by two carriages D D, which travel on longitudinal guides or ways on opposite sides of the vat. The two carriages are arranged exactly opposite one another and travel simultaneously and at the same speed. The main frame *d* of each carriage is constructed to slide on a bar *e* and a shaft F, both extending longitudinally of the vat and constituting the guiding-ways for the carriages. The shafts F revolve and constitute the driving-shafts for communicating motion to the carriages. On each shaft F is a pinion *f*, Fig. 3, connected to the shaft by a spline or feather, so that it can slide longitudinally. This pinion is mounted on a sleeve f^3, Fig. 2^a, engaged at its opposite ends by downwardly-projecting arms, forming part of the carriage-frame *d*, by which it is caused to slide longitudinally on the shaft as the carriage travels. The pinion *f* gears with a gear-wheel *g*, fixed on a shaft *h*, which is mounted in bearings carried by the frame of the carriage, Fig. 1. Fixed to this shaft are two beveled pinions *g'* and *h'*, of which the former meshes with a bevel-gear on a tubular shaft *i*, having bearings in the carriage-frame, and having fixed at its upper end a pinion *i'*, which meshes with a rack *j*, which is conveniently mounted on the guide-bar *e*. The rotation thus communicated from the shaft F through the gears *f g g'* to the pinion *i'* causes the latter, by engagement with the rack, to impart a traveling movement to the carriage in one direction or the other, according as the shaft F is turned in one direction or the other. Each carriage carries in a bearing at its top a transverse tubular shaft *k*, Figs. 3 and 4, the shafts *k k* of the two carriages being exactly in line. On the inner end of this shaft are formed or fastened four (more or less) radial carrying-arms G G. On its outer end is fixed a bevel-gear *m*. The bevel-gear *h'* on the shaft *h* drives a bevel-gear fixed on the lower end of a shaft *l*, which turns within the tubular shaft *i*, and on the projecting upper end of this shaft is fixed a pinion *m'*, which drives the gear *m*. Consequently as the carriage D advances the radial arms G G revolve.

The shafts F F are driven by the driving-shaft F' at the end of the machine through bevel-gears *f' f²*. The shaft F' carries fast and loose pulleys *n n n' n'*, being driven in one direction or the other by two belts—the one direct and the other crossed—which are shifted alternately onto the fast pulleys by means of a belt-shifting device of ordinary construction, consisting of a rod *o*, carrying two forks and connected by a shaft *p*, having elbow-arms *o' p'*, with a shipping-rod *q* extending longitudinally along one side of the vat, this rod carrying adjustable stops *q' q'*, to be encountered by the carriage at the opposite ends of its movement, and thereby to displace the rod *q* longitudinally, oscillate the shaft *p*, and throw over the bar *o*. As the latter passes the center, the completion of its movement is assured by the action of a spring o^2, mounted on a bar jointed toggle-fashion to the arm *o'*.

The construction thus far described does not differ to any material extent from that shown in my said previous patent, which also comprises traveling carriages with rotative shafts and sliding gearing for driving them, and each carriage carrying a transverse shaft with radial arms. The seizing devices carried by these arms, consisting in my former construction of coned disks for grasping the ends of the skein-carriers, are substituted in my new machine by essentially different devices for performing, although in a better manner, approximately the same function.

The devices for engaging and lifting the skein-carriers I prefer to designate as "holders." These holders H H are carried by the ends of the carrying-arms G G. Each holder consists, according to the preferred construction, of a shell or casting formed with two pockets opening at diametrically-opposite sides of the holder—namely, a deep pocket *r* and a shallow pocket *s*. The holder is mounted on a hollow shaft *t*, which has bearings in the end of the arm G. (See Fig. 8.) The inner portion of the deep pocket *r* is made circular or cylindrical and concentric with the axis of this shaft, and within this concentric chamber is arranged a rotative boss or chuck J, which is mounted on a shaft *u*, having bearings within the hollow shaft *t*, Fig. 8.

The holders H H are constructed to be non-rotative during the revolution of the carrier-arms G G. This may be accomplished in several ways, of which the most convenient is to connect them by epicycloidal gearing, as shown best in Fig. 7. To each holder is fixed a gear *t'*, which meshes with an idler-gear t^2, which in turn meshes with a stationary central gear t^3, which is fixed on a central shaft t^4, that passes through the upper end of the hollow shaft *k*. The wheels t^3 and *t'* having both the same number of teeth the rolling of the idler planet-wheels t^2 around the stationary wheel t^3 communicates a relative backward rotation to the wheels *t'* at the same speed as the forward rotation of the arms G G, so that the wheels *t'* and the holders remain non-rotative. By this means the holders H H always stand the same side up during the rotation of the carrying-arms, although they may be inverted at the end of that rotation, as will be presently described. In Fig.

7 they are shown with the top pockets *r* turned uppermost and in Fig. 12 with the shallow pockets *s* uppermost. Assuming the latter position, in which the action is more simple, the operation will be described. The speed of travel of the carriages is such that while the arms G G are making one complete revolution the carriages advance the space of four notches in the bars *b b*, or one notch to each carrying arm or holder. (If a different number of carrying-arms were provided, a different relative speed would be necessary—for example, for six arms the carriage should advance six notches to a revolution.) As each arm in its revolution moves upwardly, its holder moves up directly beneath the end *c* of one of the skein-carriers, so that its pocket *s* engages this end of the carrier, and as the other end of the carrier is simultaneously engaged by a holder on the opposite carriage the carrier is lifted bodily by the holders, as shown in Figs. 12 and 13. It is thus carried up and rearwardly—that is, in the opposite direction to the travel of the carriage—and downwardly in approximately the arc of a circle, and as the two holders descend they bring the opposite ends of the carriers into coincidence with two empty notches in the bars *b b*, into which they drop the carrier, and descending beneath it leave it suspended therein. This operation is performed successively upon all the carriers during the travel of the carriages from one end of the vat to the other. Thus each carrier is lifted, carrying its skeins partly out of the dye. Its skeins are dragged backwardly within the dye, and the carrier is redeposited, having thereby agitated the dye and placed the skeins in a new position without, however, shifting them around the carriers. At the end of the travel of the carriages the holders H H are automatically inverted, bringing them to the position shown in Fig. 7. To accomplish this they are turned simultaneously a half-revolution in either direction. This is easily done by giving a half-turn to the central gear-wheel t^3 through its shaft t^4. To this end a pinion t^5 is fixed on the opposite end of this shaft and meshes with teeth on a sliding rack-bar K, movable in bearings formed on the frame of the carriage. Just before the carriage reaches the end of its travel the end of this bar encounters and is stopped by a stop or buffer K′, mounted on the fixed frame of the apparatus. The continued movement of the carriage causes the pinion t^5 to roll along this now stationary rack, thereby imparting to it a half-revolution. To insure that it shall complete its movement after passing over the first quarter, a weighted arm t^6 is fixed to the shaft or pinion, the weight of which after passing the center is sufficient to complete the semi-rotation of the shaft even if the carriage should stop (by the action of the belt-shifting mechanism) before it has carried the pinion to the end of its movement against the rack. To prevent any accidental movements of the rack (which would result in partial rotation or tilting of the holders H H which might be sufficient to interfere with their correct operation) I provide locking springs or catches *d′*, fastened to the frame of the carriage and their free ends constructed to engage alternately with the rack, as shown in Fig. 1. Each spring is constructed with beveled ends projecting beyond the rack, so that it will first encounter the stop K′ and be pressed down thereby to release the rack, as shown in Fig. 1ª, before the latter encounters the stop.

The stops K′ are duplicated at the opposite ends of the apparatus, so that the shafts t^4 are turned a half-revolution in one direction at one end of the travel of the carriages, and are turned back to the same extent at the other end of their travel; hence the holders H H, which remain always the same side up during the travel of the carriages, are inverted at the end of their travel in one direction and are reverted at the end of their travel in the opposite direction. The inversion of the holders brings their deep pockets *r* uppermost, so that in engaging the carriers the ends of the latter drop down to the bottom of these pockets, as shown in the cross-sectioned portions in Fig. 7. The carrier ends are consequently entirely within the concentric portions or chambers of the pockets, and are confined at their opposite sides between the cheeks of the rotative chucks J J, as best shown in Fig. 11. Immediately upon being lifted out of the notches in the bars *b b* the carrier begins to be turned by the rotation of the chuck J, which revolves, preferably, in the same direction as the carrier-arms G G, although this is not essential. The speed of rotation of the chucks is such that, by preference, a single rotation shall be imparted to the carrier from the time it is lifted out of one pair of notches until it is deposited in the other pair. If the rotative axis of the arms G G is arranged at the same height as the centers of the carrier ends, as in the construction shown, so that the carriers are picked up and redeposited when the carrying-arms are horizontal, the speed of the chucks J will be just twice that of the arms G G. A faster speed, however, is admissible, so that the carriers might be turned over twice, or even three or more times, during their displacement from one pair of notches to another. With the proportions shown, however, a single revolution of the carriers is sufficient and preferable. The action of the chucks in turning the carrier ends within the concentric portions of the deep pockets is shown by dotted lines in Fig. 7 and more clearly in Figs. 10 and 11, in which latter figures the carrier has been turned a quarter-revolution, so that it stands in a horizontal plane. The top carrier in Figs. 7, 8, and 9 has been turned a half-revolution. The rotative movement can be imparted to the chucks in several different ways, of which the preferable one is by means of epicycloidal gearing, as shown. On the

outer end of the chuck-shaft u is fixed a pinion u', which meshes with an idler-pinion u^2, which in turn meshes with a gear-wheel u^3, which is fastened fixedly to the carriage-frame d, so as to remain always non-rotative. Thus during the travel of the carriages in the contrary direction to that first described the holders serve to pick up, transfer, and redeposit the skein-carriers in the same manner as before, but at the same time the chucks or turning mechanisms are rendered operative to effect the turning over of the carriers and consequently the lisage of the skeins. If the turning mechanism were rendered operative at all times, the carriers would be turned over in one direction during the travel of the carriages forward, and would be turned in the contrary direction during their travel backward along the vat. There would be, consequently, a lisage of the skeins first in one direction and then back in the reverse direction, bringing the same portion of the skeins again out of the dye as before, so that this portion would be insufficiently dyed. Heretofore the direction and periods of the turning of the carriers to produce the lisage have been left to the discretion of the operator, who could throw the turning mechanism into or out of action at will. By my present invention this function is rendered automatic and independent of the care or discretion of the workman. Consequently the lisage of the skeins occurs only at every alternate displacement of the carriers, and occurs always in the same direction, so that the portion of the skeins which is out of the dye remains out for the same duration for all the skeins, thereby insuring uniformity of dyeing.

In case of need the operator can invert the holders at any time by pressing down the spring d' to release the rack K and then throwing over the weighted arm t^6. As soon, however, as the carriages have traveled to two successive ends of their stroke, the automatic operation of this mechanism is automatically re-established.

The employment of traveling carriages moving along opposite sides of the vat, although the most convenient means for supporting and operating the mechanism for displacing the skein-carriers, forms no novel part of my present invention, (being already disclosed in my said previous patent,) and may be substituted by any suitable means for supporting and driving the displacing mechanism and the turning mechanism.

By the expression "displacing mechanism" as used in this specification I mean the holders H H and means for imparting to them the necessary revolving and advancing movements, whereby they are adapted to pick up the successive skein-carriers, transport them to a suitable distance, and redeposit them, or any other equivalent mechanism for accomplishing the same result, such, for example, as that shown in my said previous patent. So far as the broader features of my present invention are concerned this displacing mechanism may be greatly varied and is not essentially confined to the exact construction shown or any close approach thereto.

By the expression "turning mechanism" as I have used it broadly throughout this specification, I mean the chucks J J and means for revolving them, so that during the displacement of the skein-carriers these chucks may engage them and turn them over one or more times, or any other or equivalent mechanism by which the skein-carriers may be turned over to perform the lisage of the skeins during the operation of displacing them, such, for example, as the mechanism for that purpose shown in my said previous patent.

The holders H H, as devices for seizing or engaging the ends of the skein-carriers, constitute a novel and important feature of my present invention. The throwing of the turning mechanism out of action by inverting the holders is also an important feature. The same may be said of the specific means for inverting and reverting the holders, and of other novel details of construction. It will be understood that it is not essential that the holders H shall be constructed to be turned one hundred and eighty degrees to bring the shallow pockets s into action, as these pockets might be constructed to open at any other angle relatively to the deep pockets, in which case the holders should be turned only to the extent of the intervening angle. It is also apparent that in lieu of separate radial arms G G continuous disks may be employed for carrying the holders.

By the construction of the skein-carriers shown in Fig. 5, being notched or serrated, they are adapted to separate the strands or filaments during the turning of the carrier. The carrier shown in Fig. 6 has plain straight edges instead of being thus notched.

At the end of the dyeing operation the skeins may all be removed simultaneously from the dye by connecting a windlass or any suitable mechanism to the frame B in order to lift it bodily above the vat, so that the skeins may drain. Before thus lifting the frame the carriages should be moved to the extreme end of their travel and entirely beyond the skein-carriers, so that all of the skein-carriers shall have been deposited on the frame B. The carriages and holders in nowise interfere with the lifting of this frame.

My improved apparatus may be used not only in the dyeing of skeins, but in the bleaching and washing thereof, and for such purposes will have advantages which will be obvious to those skilled in the art.

I claim as my invention the following-defined novel features or improvements, substantially as hereinbefore specified, namely—

1. In a machine for dyeing skeins, the combination, with skein-carriers, of a displacing mechanism therefor, adapted to move the successive carriers rearwardly, a turning mechanism for turning the carriers during their

displacement, and means for automatically throwing the turning mechanism out of operation during the action of the displacing mechanism in one direction and for throwing it into action during the displacement in the other direction, whereby the lisage of the skeins occurs at alternate displacements and is successively in the same direction.

2. In a machine for dyeing skeins, the combination, with a vat and skein-carriers, of a displacing mechanism for the skein-carriers, constructed to travel along the vat and adapted in its travel to seize the carriers successively and move them rearwardly, a turning mechanism carried by the displacing mechanism and adapted to turn the carriers during their displacement, and means for automatically throwing the turning mechanism out of operation during the travel of the displacing mechanism in one direction and for throwing it into action during the travel thereof in the other direction, whereby the lisage of the skeins occurs at alternate displacements and is successively in the same direction.

3. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers, and supporting parts for carrying and moving the holders, the holders constructed to be non-rotative in their movement and having pockets to receive the skein-carriers.

4. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers, and supporting parts for carrying and moving the holders, the holders constructed to be normally non-rotative in their movement, and means for turning them to present different sides thereof for engagement with the skein-carriers.

5. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers, and supporting parts for carrying and moving the holders, the holders constructed with pockets opening at opposite sides to receive the skein-carriers and mounted to be normally non-rotative in their movement, and means for inverting or reverting the holders to bring one pocket or the opposite one into position to engage the skein-carriers.

6. In a machine for dyeing skeins, a displacing mechanism comprising revolving arms and holders for engaging and lifting the skein-carriers borne by said arms, and epicycloidal gearing in connection with the holders for retaining the latter the same side up during the rotation of the arms.

7. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers, in combination with a turning mechanism comprising rotative chucks carried by the holders, and means for rendering said chucks at times impotent to engage the carriers while the latter are lifted by the holders.

8. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers, formed each with two pockets for receiving the skein-carriers, in combination with a turning mechanism comprising rotative chucks carried by the holders arranged each within one of the pockets of its holder, and means for causing the holders to present one or the other of their pockets to receive the skein-carriers according as the skein-carriers are to be rotated or not.

9. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers, constructed each with two pockets opening at different sides and with means for retaining the holders normally non-rotative in their movement, in combination with a turning mechanism comprising rotative chucks carried by the holders, each turning within one of the pockets of its holder, and means for turning the holder to present one pocket or the other to receive the skein-carriers.

10. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers, and revolving arms carrying said holders, in combination with a turning mechanism comprising rotative chucks turning within the holders, epicycloidal gearing for rotating the chucks relatively to the holders, and means for rendering the chucks at times impotent to engage the carriers while the latter are lifted by the holders.

11. In a machine for dyeing skeins, a holder for engaging and lifting the end of a skein-carrier, constructed with two pockets opening at different sides, the one shallow and the other deep, and formed with its inner portion as a chamber concentric with the axis of the holder, and a rotative chuck mounted to turn within said concentric chamber and constructed to engage the end of the carrier when the latter enters said chamber.

12. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers and revolving arms for carrying the holders, in combination with a turning mechanism for revolving the carriers, and means for throwing said turning mechanism into or out of action automatically, comprising a rack-bar mounted to travel with the displacing mechanism, and stops arranged to encounter and displace said bar at the opposite ends of its travel.

13. In a machine for dyeing skeins, a displacing mechanism comprising holders for engaging and lifting the skein-carriers, revolving arms for carrying said holders, traveling carriages on which said arms are mounted, a shaft concentric with the axis of rotation of said arms and connected to the holders to hold the latter normally stationary in their movement, and means for turning the holders at the opposite ends of the travel of the carriages, comprising a movable part

in connection with said shaft, and stops arranged to be encountered by said part at the opposite ends of its travel and to displace it, and thereby communicate an angular movement through said shaft to the holders.

14. In a machine for dyeing skeins, the combination of a traveling carriage D, a tubular shaft *k*, carried thereby, arms G G, mounted on said shaft, holders H H, pivoted in said arms, gears t', fixed to the respective holders, and idler-gears t^2, in mesh with said gears, central gear t^3, in mesh with the idler-gears, shaft t^4, within said tubular shaft, and means for imparting angular movements to said shaft t^4 and for holding it stationary while the arms revolve, whereby the holders are held normally non-rotative, but are turned by the turning of said shaft t^4.

15. The combination of a traveling carriage D, revolving arms G G, carried thereby, holders H, pivoted to said arms, gearing for retaining said holders normally non-rotative during the revolution of the arms, chucks J J, within the respective holders, gears u', connected to the respective chucks, idler-gears u^2, and central fixed gear u^3, for communicating rotation to the chucks.

16. The combination of carriage D, tubular shaft *k*, arms G G, carried thereby, holders H H, carried by the arms, shaft t^4, passing through said tubular shaft, gearing connecting it with the respective holders, a pinion t^5 on said shaft, a weighted arm t^6, connected thereto, a rack-bar K, meshing with said pinion, and opposite stops K′ K′, for displacing said rack-bar and thereby communicating motion through said shaft t^4 to turn the holders.

17. The combination of traveling carriage D, revolving arms G, carried thereby, holders H H, carried by said arms, a central shaft connected to said holders, a rack-bar K, geared to said shaft, stops K′ K′, for displacing said rack-bar, and spring-catches for locking the rack-bar in either position adapted to be withdrawn by the action of either stop to release the bar before the latter encounters the stop.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CÉSAR CORRON.

Witnesses:

ARTHUR C. FRASER,

GEORGE H. FRASER.