(No Model.)

2 Sheets—Sheet 1.

C. CORRON.

DYEING APPARATUS.

No. 363,949. Patented May 31, 1887.

Fig. 1.

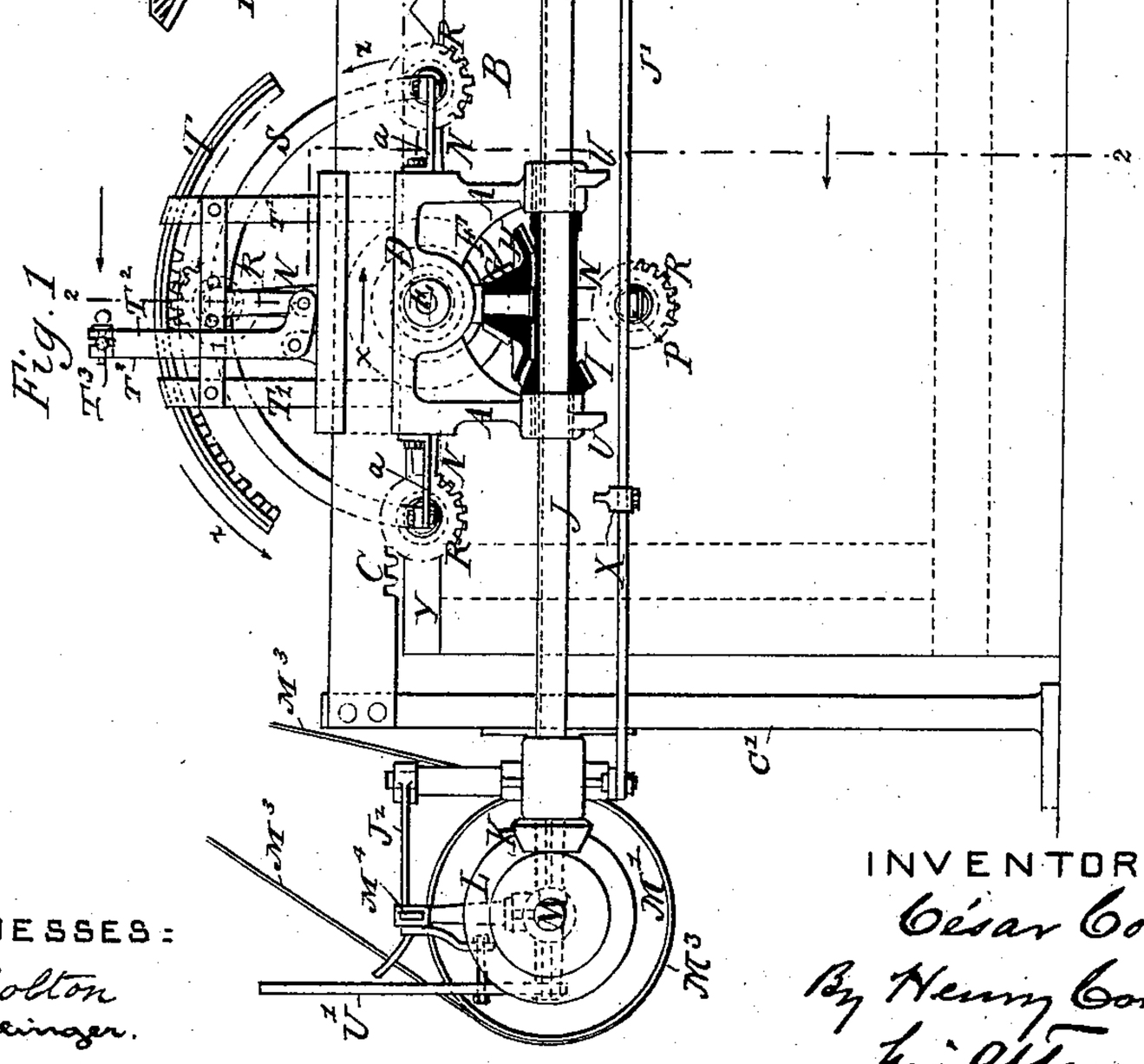


Fig. 1a

Scale double Fig. 1.

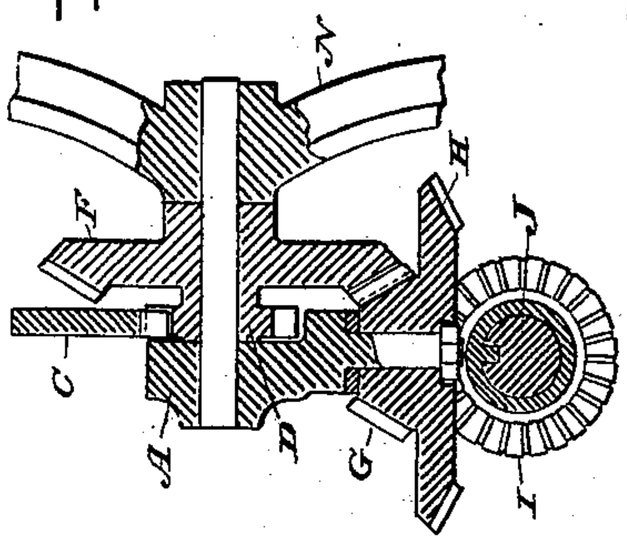


Fig. 2.

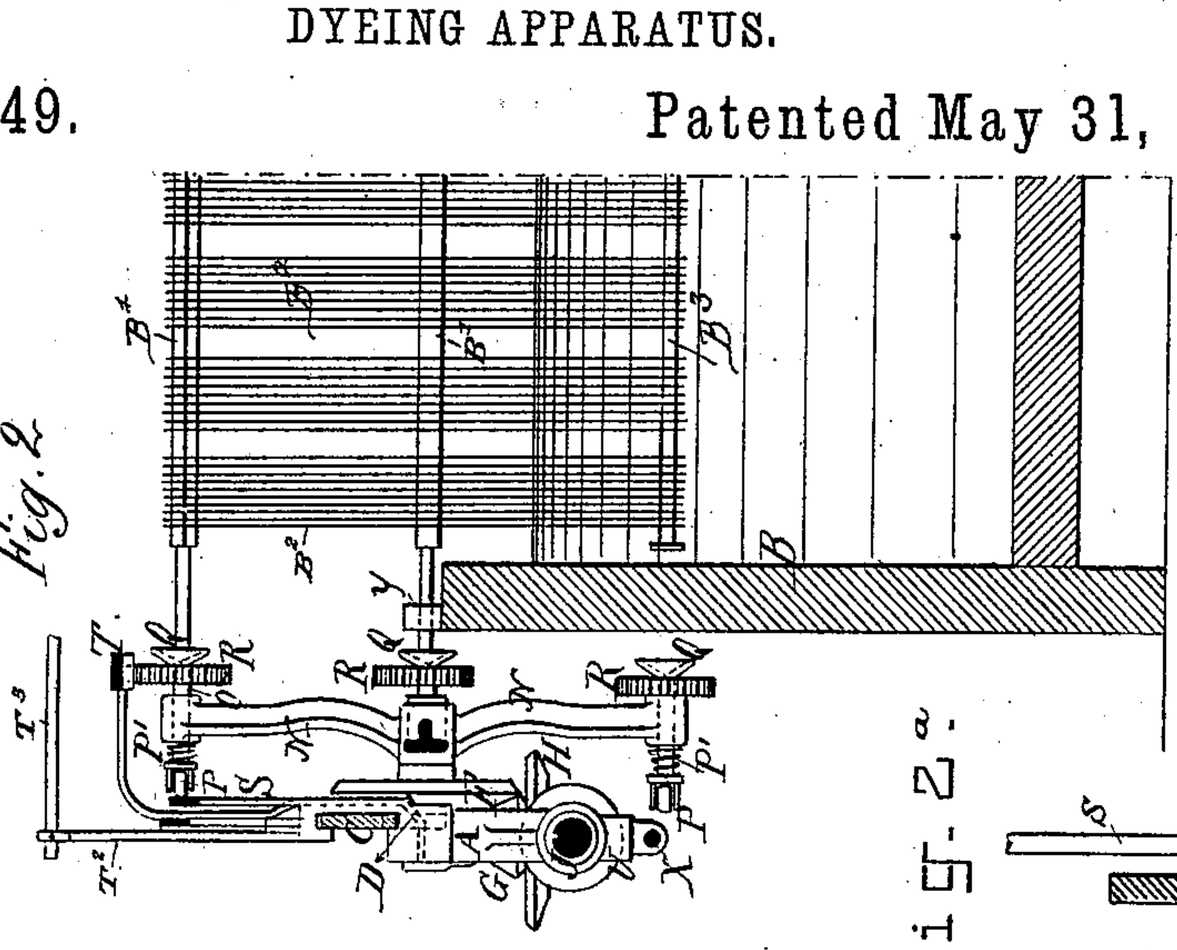
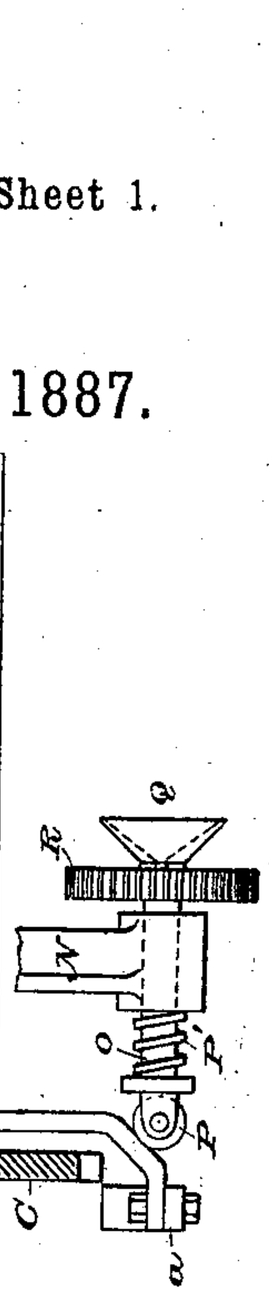


Fig. 2a.



WITNESSES:

E. B. Bolton

Jos. Casperinger.

INVENTOR:

César Corron

By Henry Connett

his Atty.

(No Model.)

2 Sheets—Sheet 2.

C. CORRON.

DYEING APPARATUS.

No. 363,949. Patented May 31, 1887.

Fig. 4

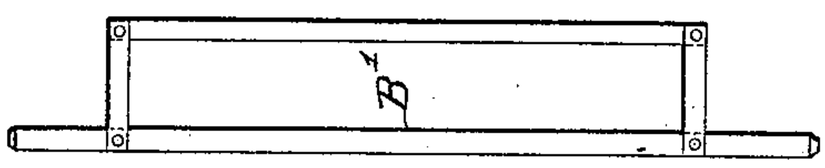
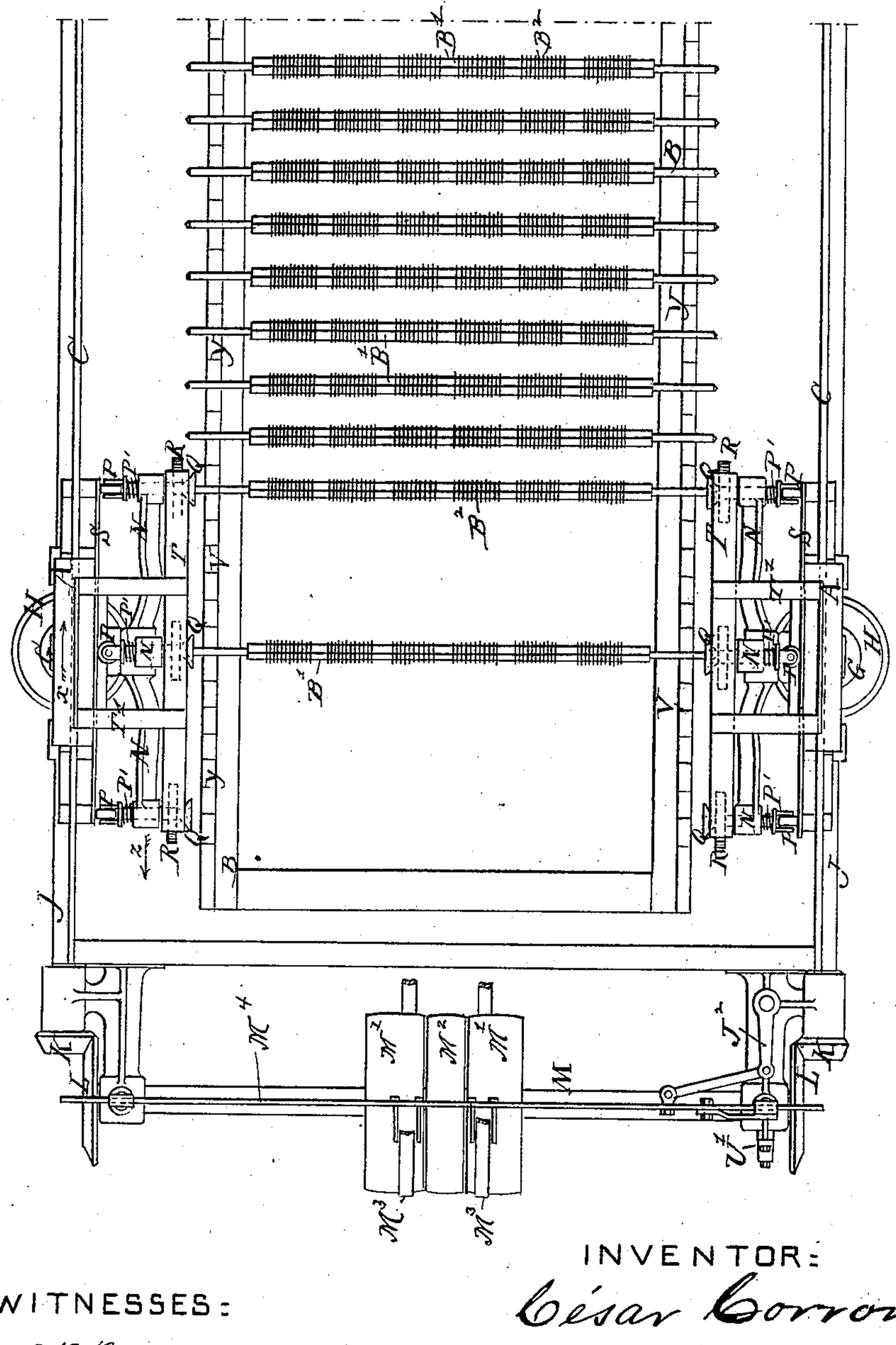


Fig. 3



WITNESSES:

E. B. Bolton

J. Schapringer.

INVENTOR:

César Corron

By Munn & Co

his Attys.

UNITED STATES PATENT OFFICE.

CÉSAR CORRON, OF ST. ETIENNE, LOIRE, FRANCE.

DYEING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 363,949, dated May 31, 1887.

Application filed January 12, 1887. Serial No. 224,109. (No model.) Patented in England December 17, 1886, No. 16,596.

To all whom it may concern:

Be it known that I, CÉSAR CORRON, a citizen of the French Republic, and a resident of St. Etienne, Loire, France, have invented certain Improvements in Machines for Dyeing, of which the following is a specification.

My invention relates to a machine to be employed in dyeing fibrous materials, and especially such materials when in the form of hanks or skeins; and the object of my invention is to provide an automatic mechanism whereby each skein carrier or rod is moved or shifted individually, and has imparted to it simultaneously three distinct movements—that is to say, each carrier is lifted and carried forward and at the same time rotated. This latter rotative movement is to effect that shifting of the skein or filaments known to French dyers as "lisage," the object of which is to subject all parts of the skein equally to the effects of the bath, and which is done by suspending the skein in the manner of an endless belt on a bar arranged over the bath and then rotating said bar, causing one side of the skein-belt to move down into the bath and the other to move up out of the bath.

My invention will be hereinafter fully described, and its novel features carefully defined in the claims.

In the drawings which serve to illustrate my invention, and which form a part of this specification, Figure 1 is a side elevation of my improved dyeing-machine broken across to indicate that it may be of any length, and the gear-wheels H and I shown in section for their better illustration. Fig. 2 is a transverse section taken in the plane indicated by line 2 2 in Fig. 1. This view only shows one side of the machine, both sides being constructed alike, as seen in Fig. 3. Fig. 3 is a plan of the machine, the right-hand end being omitted for lack of room and for the reason that it is not required for illustration. Fig. 4 is a view of the preferred form of skein-carrier detached.

B represents an ordinary rectangular oblong tank or tub to contain the dyeing-bath. On the upper edge of the sides of this tank are fixed strips *y y*, in which are formed notches V, to provide end bearings or supports for the skein carriers or bars B′, which have, as shown in Figs. 1, 2, and 3, square bodies and cylindrical ends. On these carriers are suspended the skeins of fibrous material B^2. (Seen only in Fig. 2.) Where the bath is in a state of ebullition particularly, and preferably under all circumstances, rods B^3 are placed in the lower "bights" of the skeins, as seen in Fig. 2, to keep them suspended "taut." As the notches V are equally spaced, the carriers B′ will also be equally spaced, as seen in Fig. 3.

C are two toothed racks ranged along the sides of the tank B, and supported on a suitable frame, C′. Only a part of the teeth in these racks is shown.

J J are two shafts, also ranged along the sides of tank B, and mounted in bearings on the frame C′. On the one ends of shafts J are fixed bevel-pinions K K, which mesh with bevel-wheels L L on the opposite ends of a transversely-arranged driving-shaft, M. On shaft M are two loose pulleys, M′, and a tight pulley, M^2, whereby said shaft may be rotated in either direction by oppositely-running belts M^3.

The belt-shifting mechanism comprises a slide-rod, M^4, provided with pins to embrace the belts, and a slide-rod, J′, arranged alongside of the tank B under one of the shafts J, said rods M^4 and J′ being coupled together by a bell-crank, J^2.

I will now describe the mechanisms for imparting the three movements to the skein-carriers B′, premising that there are two of these, one at each side of the machine, but that, as they are like, a description of one will suffice for both.

A is the carriage, mounted to slide along horizontally on rack C and the shaft J as slide-bearings. In this carriage is mounted a shaft, E, on which is fixed a pinion, D, which meshes with the teeth on the under side of rack C. On this same shaft, E, is mounted a wheel, F, which meshes with a bevel-pinion, G, mounted on a vertical stud in carriage A. Pinion G is integral with a bevel-wheel, H, which meshes with a bevel-pinion, I, splined on the shaft J. Pinion I has a long boss, and is embraced between the two bearings of carriage A on shaft J, so that said carriage moves the pinion I along the shaft with it. Thus rotation of shaft J through the medium of the several gear-wheels causes the carriage A to slide along the rack C.

Fig. 1^a is a vertical section taken along the

axis of shaft E and showing the parts connected therewith more clearly than they are seen in Figs. 1 and 2.

On shaft E is a hub or boss provided with four equally-spaced radial arms, N N, which arms have, of course, the same axial velocity as pinion D when carriage A is driven. These arms N are all provided alike, and each carries at its extremity a rotatively-mounted spindle or shaft, O, bearing on its inner end, next tank B, a cone-disk, Q, and a pinion, R, and on its outer end a "bowl," P. A coil-spring, P′, is arranged between a collar on the outer end of shaft O and the shaft-bearing, which spring tends to draw pinion R up snugly against the opposite face of arm N. The diametrical distance between the centers of two opposite cone-disks, Q, is precisely equal to the space occupied by seven skein-carriers, B′, when they rest in notches V. This will be seen by inspection of Fig. 3—that is to say, the "pitch" of the notches in bar *y* is commensurate with the diametrical measurement between the said cone-disks; but the included number of carriers need not necessarily be seven.

S is a semicircular cam-plate borne by carriage A. The curve of this plate coincides with the path traversed by the bowls P on arms N, and during the upper half of their orbital movement said bowls bear on this cam-plate. The lower attached ends of this plate S are bent outward or away from tank B, and (see Fig. 2) they are attached to lateral branches *a a* on carriage A. The arrow *x* in Figs. 1 and 3 indicate the direction in which the carriage A is supposed to be moving, and the arrows *z* indicate the direction (backward) in which arms N move.

So far as described the operation is as follows: Rotation of shaft J sets carriage A in motion in the direction indicated by arrows *x* and the arms N in motion in the direction indicated by arrows *z*. When a cone-disk Q, in rising, is brought opposite the extremity of a carrier B′, resting in a notch V, the incline at the end of cam-plate S suddenly acts on bowl P and pushes cone-disk Q against the end of said carrier, so as to engage and form a socket-bearing therefor. This is illustrated in detached sectional view, Fig. 2ª, which shows the incline on the cam-plate. As the two cones on opposite sides of the machine are simultaneously pressed up to the ends of the carrier, it follows that the carrier will be lifted and carried over backward, as the plate S keeps spring P′ compressed during the entire half-revolution; but when the carrier thus borne over has descended into a notch V behind the carriage A the bowl P passes off that end of cam-plate S, and the cone-disk Q is drawn back by spring P′ far enough to clear the end of said carrier and passes on.

In order, however, to impart an axial rotation to skein-carrier B′, while it is being borne over, as above described, I mount on the carriage A a curved rack, T, with the teeth on its under or concave side, which teeth mesh with the teeth on the pinion R on the shaft O, borne by arm N. When the carriages A have reached the end of their travel in one direction, and shall have transferred or shifted the last skein-carrier B′, a pendent lug, U, on carriage A strikes a tappet, X, on the belt-shifting slide-rod J′ and shifts belts M^3 on the pulleys, thus reversing the motion of shafts J and starting the carriages A back again. Thus these latter are caused to travel back and forth automatically, always carrying the skein-carriers over backward and depositing them behind.

I have shown a hand-lever, U′, coupled to slide-rod M^4, for shifting the belts and reversing the motion of carriages A independently, if desired, and I have also shown the curved rack T mounted on a sliding frame, T′, on carriage A, and said frame provided with a lever, T^2, whereby the said rack may at any time be raised out of mesh with pinions R, so as to prevent rotation of the shafts O, which bear said pinions; and in order that one lever T^2 may operate both racks T simultaneously, I connect the levers on both sides of the machine with a tie-rod or traverse, T^3.

In order to keep the strands of the skeins B^2 apart, so that they will not tangle and wrap around the bars during the lisage or shifting, I have devised the form of skein-carrier B′ seen in Fig. 4, which shows an ordinary rod or bar with a frame built on its side. This carrier in its rotation spreads the strands of the skeins, as will be well understood.

The ends of the skein-carriers are by preference provided with conical, square, or prismoidal metal tips to engage the cone-disks Q. I prefer to employ a cone-disk, as shown, for the reason that it guides and "centers" the carriers when it moves up to them; but any form of socketed seizing device may be used instead. The bowls P are not essential. Balls may be substituted for them arranged like balls in ball-casters.

My apparatus may be employed with tanks of various kinds, and the frame C′, supporting the racks C, need not, of necessity, be actually attached to the tank B.

Of course the lengths of the arms N and the spaces between the notches V, in which the carriers B′ rest, may be varied. The construction herein shown is such that the carriages A advance a distance equal to that between two adjacent notches V while the shaft E is making one-fourth of a revolution, there being four arms N; but there may be one or more arms N.

Having thus described my invention, I claim—

1. The combination, with a tank to contain the dyeing-bath, provided at its upper edge with bearings for the skein-carriers, of the said skein carriers or bars, the two carriages A, mounted at the sides of said tank on ways or

tracks, mechanism for moving these carriages along said ways, rotatively-mounted shafts E in said carriages, and mechanism for imparting rotation to said shafts, arms N, carried by said shafts, and seizing mechanisms carried by said arms N and carriages A, for seizing the skein-carriers, whereby the said arms, in their rotation as the carriages advance, are caused to seize, carry over, and deposit said skein-carriers, substantially as set forth.

2. The combination, with the carriage A and its track, of the rotatively-mounted shaft E in said carriage, mechanism for imparting the proper motions to said carriage and shaft, the arm N, carried by shaft E, the shaft O, rotatively mounted in said arm, and provided with a pinion, R, a spring, P′, and a cone disk or socket, Q, the cam-plate S, mounted on the carriage, and the curved rack T, mounted also on said carriage, all arranged to operate substantially as and for the purposes set forth.

3. The combination, with the carriages A and their tracks and operating mechanisms, the shafts E and their operating mechanisms, the arms N, mounted on shafts E, the sliding shafts O, carried by said arms, and provided each with a spring, P′, a pinion, R, and a cone-disk, Q, the cam-plates S, the racks T, mounted in the respective carriages A, and means, substantially as described, for raising and lowering said racks, as set forth.

4. The combination of the rack C, the carriage A, mounted thereon, the shaft J, the pinion I, splined on said shaft J and embraced between parts of said carriage, the toothed wheels D, F, G, and H on said carriage, arranged and intermeshing as described, the shaft E, on which wheels D and F are mounted, the driving-shaft M and gears coupling it to shaft J, the tight and loose pulleys on shaft M, the driving-belts, and the automatic reversing mechanism whereby the motion of the carriages A is reversed.

5. As a means of seizing the skein-carriers, the combination of the radial arm N, the sliding shaft O, mounted in the said arm, the cone-disk Q on the end of said arm, the bowl on the opposite end of said arm, the spring P′, and the cam-plate S, all arranged substantially as described.

6. The combination, with the skein-carrier B′, provided with a frame attached to its side and projecting therefrom, of means, substantially as described, for lifting said carrier and carrying it forward, and means, substantially as described, for simultaneously rotating said carrier axially.

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

CÉSAR CORRON.

Witnesses:
ANDRÉ ROUX,
FERRIOL.