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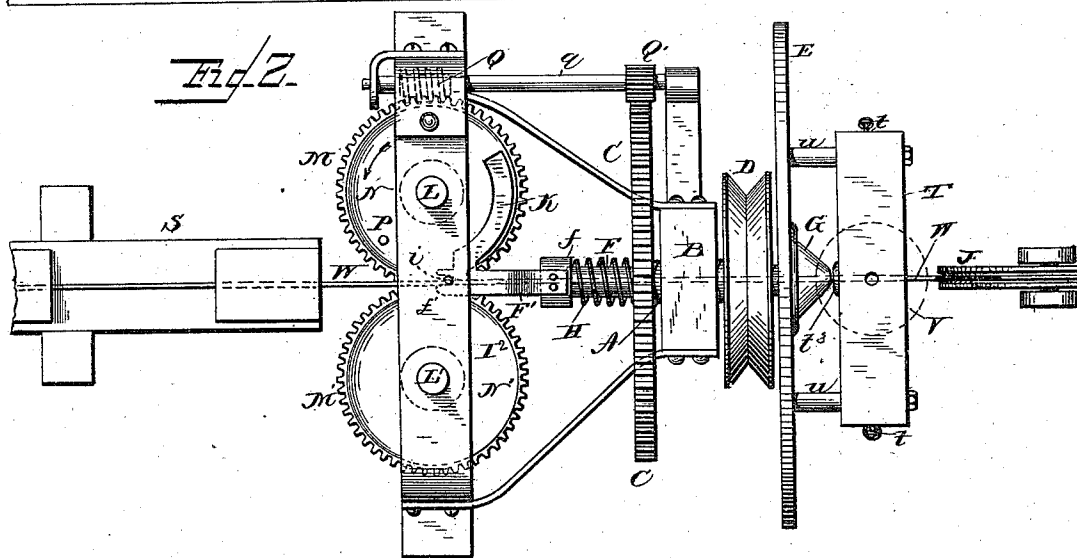
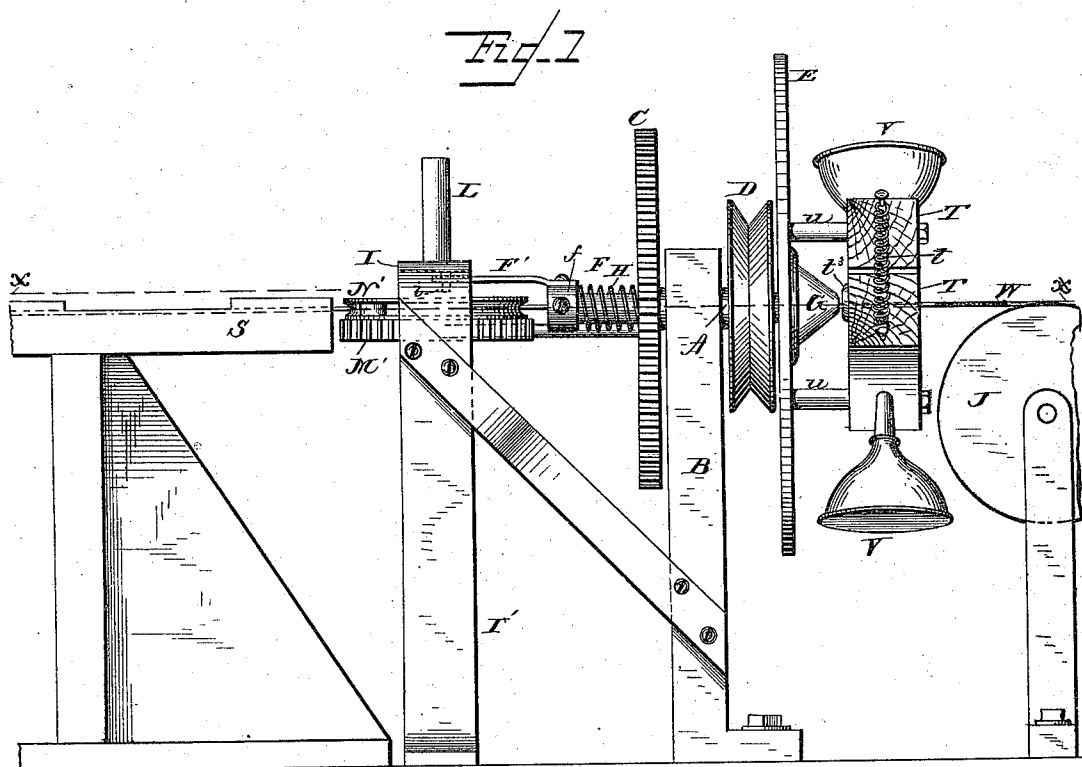
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W. H. SAWYER.

MACHINE FOR COLORING COVERED WIRE.

No. 293,095.

Patented Feb. 5, 1884.



WITNESSES
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(No Model.)

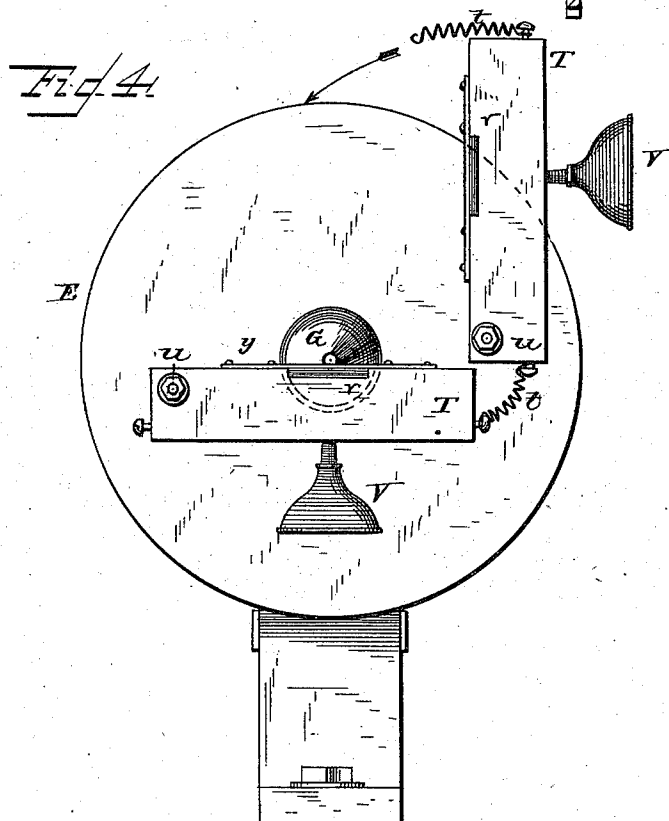
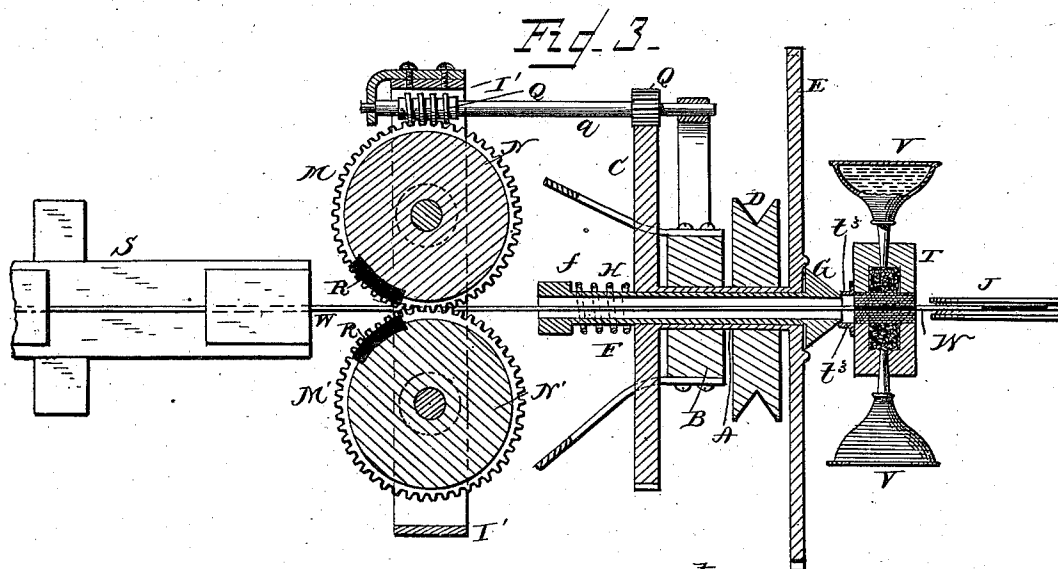
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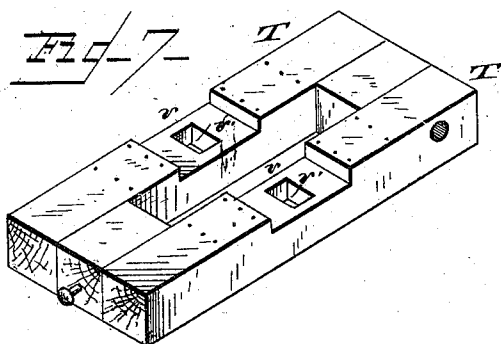
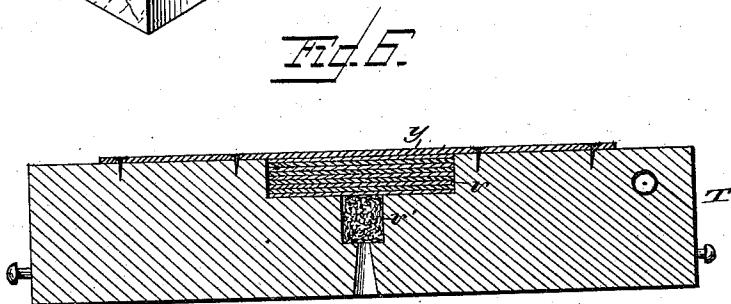
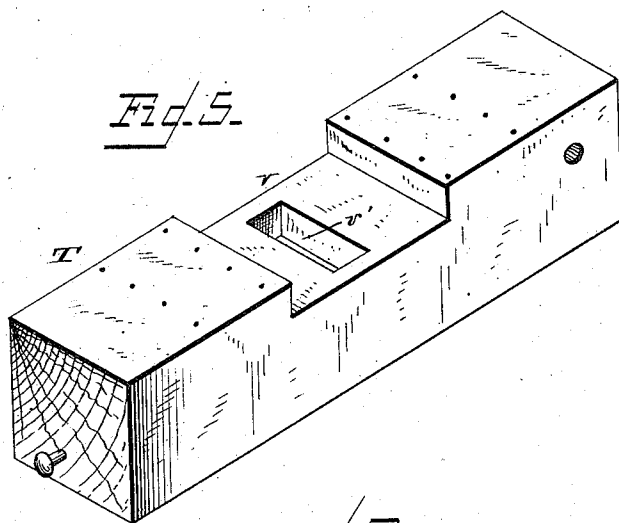
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WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM H. SAWYER, OF PROVIDENCE, RHODE ISLAND.

MACHINE FOR COLORING COVERED WIRE.

SPECIFICATION forming part of Letters Patent No. 293,095, dated February 5, 1884.

Application filed October 27, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. SAWYER, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Machines for Coloring Covered Wire, of which the following is a specification, reference being had therein to the accompanying drawings.

10 My invention relates to a machine for applying coloring-matter to the insulating-coverings of wire used for electrical purposes, the object being to apply coloring-matter in bands to the covering after it has been placed upon the wire by braiding, winding, or any other process; and it is an especial object to apply the bands or belts of coloring at equal distances or predetermined distances apart, so that the finished wire will throughout its length be striped or banded around at equal intervals, or any desired intervals between bands of given colors. If, for instance, it is desired to produce a wire having bands of red or any other color separated by intervals or 25 bands of white, the white covering would be first placed upon the wire by any known process, and afterward the bands of the other color would be applied by my coloring-machine.

30 The invention consists in certain novel combination of devices, which will be fully understood from the following particular description, in connection with the accompanying drawings, and its novel features will be definitely pointed out in the appended claims.

35 In the drawings, Figure 1 is a side elevation of my improved wire-coloring machine. Fig. 2 is a plan view thereof. Fig. 3 is a horizontal section on the line *xx* of Fig. 1. Fig. 40 4 is a front view of the machine, looking toward the color-applying devices. Fig. 5 is a perspective view of one of the coloring-blocks with its pad removed. Fig. 6 is a longitudinal section of the block and pad. Fig. 7 45 is a view of a modification of the block and pad.

The letter A indicates a horizontal hollow shaft, having an intermediate bearing in a standard, B, and carrying at one end a gear-wheel, C, and at the other end a belt-wheel, D, to which is concentrically secured a disk or face-plate, E, this face-plate and the gear-

wheel C having central openings in line with the bore of the shaft A. Through the shaft A, face-plate E, and gear-wheel C is arranged 55 a tubular rod, F, about which the shaft will easily turn. This rod has in front of the disk E the conical head G, and its portion on the other side of the gear-wheel is provided with a shoulder, *f*, between which and said wheel 60 a spiral spring, H, encircles the rod, with one end bearing against the wheel and the other against the shoulder with such force that if unopposed it will draw the base of the conical head G toward the disk E. The rod F has 65 an arm, F', which extends beyond its shoulder *f*, and in its end is a slot, as shown at *f'*, through which projects a pin, *i*, downward from a horizontal bar, I, which is supported by standards I' I', and from one side of the 70 rod F projects a segmental plate, K, having its convex edge turned toward the gear-wheel C. The function of this segmental plate will presently appear.

The letters LL' designate two vertical shafts, 75 having their upper bearings in the bar I' and their lower bearings in a suitable base. These bars respectively carry gear-wheels M and M', which mesh together, and have fixed to their upper sides sheaves N and N', having deep 80 peripheral grooves. The segmental plate K lies directly above the sheave N, and from the flat face of said sheave, near its margin, projects a stout vertical pin, P, which, as the sheave revolves in the direction indicated by 85 the arrow, will strike the end of the segmental plate K, and thus drive the rod F, so that the conical head G will be carried outward from the disk E a given distance, and when the pin P passes off of the end of the segmental plate 90 and comes against its concave edge the head G will remain at the point to which it has been moved as long as the pin remains in contact with the concave edge of the plate during its revolution, and the rod F will fly back to its 95 original position as soon as the pin escapes from the plate. Motion is communicated to the gear-wheels M M' and sheaves by a worm, Q, which meshes with one of the gear-wheels, and is carried by a shaft, *q*, mounted in suitable bearings, and carrying at its opposite end a pinion, Q', which meshes with the gear-wheel C. The sheaves N and N' are designed to feed forward intermittently the wire which is to be 100

treated, and the grooves in said sheaves are made sufficiently deep to allow the wire to pass freely, except when clamped between certain portions of the peripheries of the sheaves provided with devices for that purpose. These devices consist of elastic lugs R, of vulcanized rubber or similar material, which are inserted in the peripheries of the sheaves, respectively, and project to such extent that the said lugs of the two sheaves will approach each other closely enough to grip a wire, as at W, which is stretched between the two sheaves. The segmental space occupied by the elastic lugs in each sheave depends upon the distance to which the wire is to be fed forward at each feed—that is, if the wire is to be fed forward two and a half inches the segmental space occupied by the gripping-lugs in each sheave will be nearly two and a half inches. The letter S indicates the feed-table, which is simply a block supported by a suitable standard, and having in its top a covered groove, through which the wire passes.

I will now describe the devices by which the color is applied to the wires.

The letters T T indicate two blocks, preferably of wood, oblong in shape, and held together side by side by means of springs *t*, the ends of which are attached to pins projecting from the ends of the blocks. These blocks are arranged in front of the disk E, and each is pivoted at one end upon a pin, *u*, projecting from said disk, said blocks being pivoted at opposite ends, respectively, their adjacent edges being parallel to, and very nearly coincident with, the diameter of the disk. The pins *u* are shouldered, so as to hold the blocks out at a suitable distance from the face of the disk. Each block has a recess cut transversely across its inner face, as shown at *v*, Fig. 5, and from the bottom of this recess an oblong chamber, *v'*, is cut into the block to a suitable depth—say an inch or less—and from the bottom of this chamber a small hole is bored through the block. Into this hole is inserted and secured the spout of a spring-bottom sheet-metal can, V, similar to the ordinary spring-bottom oil-can, the can standing on the opposite side of the block from that in which the recess *v* is cut. As shown in Fig. 6, the chamber *v'* is filled with coarse worsted yarn or similar loose fibrous material, and the recess *v* is filled with superposed strips of coarse woolen cloth, while upon the surface of the block and covering the recess is a woolen tape, *y*, stretched tight and firmly secured to the block by tacks. The can V is to be filled with a freely-flowing liquid coloring-matter or dye, and when the two blocks, provided with pads and cans, as described, are arranged in connection with the disk, as shown in Fig. 3, the rotation of the disk will cause the cans to alternately have their spouts turned downward, so that a constant supply of the dye will be furnished to the pads. If the supply of dye should show signs of exhaustion, a slight pressure upon the bottoms of the cans

will cause it to be replenished. From the edges of the blocks next the disk E project plates *t'*, between which extends the tip of the conical head G, and such plates are at such a distance apart that when said head is forced in farther between them the blocks T T will be separated, swinging away from each other on their pivot-pins. In front of the blocks is a grooved wooden guide-wheel, J, the upper edge of the periphery of which is in line with the aperture through the conical head G, so as to hold a wire passing from said head in a relatively central line as it passes between the pads. This guide-wheel is made of light porous wood—such as dry poplar—which will freely absorb the liquid dye which is imparted to it by freshly-dyed passing wire, and is of such diameter that the time required for it to make a revolution will be sufficient for such imparted dye to dry, or be so far absorbed that it will not stain an uncolored portion of the wire with which it may come in contact.

The operation of my invention as now described is as follows: The cans are first filled with a freely-flowing liquid dye, preferably aniline, of the desired color, and pads caused to absorb a sufficiency thereof. The wire to be colored is then led from a reel through the groove in the guide-table S between the sheaves N and N', through the hollow rod F and between the pads of the blocks T T, said wire being preferably extended beyond the pads over the guide-wheel to a reel, to which its end should be affixed. Motion is then imparted to the pulley D by a belt from a suitable motor, and the said wheel, the hollow shaft A, and gear-wheel C revolve together, motion being transmitted from the gear-wheel through the pinion Q', shaft *q*, and worm Q to the horizontal gear-wheels M M' and sheaves N N', said sheaves not touching the wire until such times as the elastic lugs R R meet and grip the wire between them. In the meantime the wire remains stationary, the part in front of the conical head G being clamped between the pads, and as the disk E revolves the blocks T T are revolved with it, and the pads are thus caused to rub around the wire and impart the dye to the covering thereof, the length of wire colored being equal in extent to the width of the pads. This rubbing action has been found to be necessary in order to thoroughly color the covering of the wire with sufficient rapidity from an economical point of view. A light brushing will not answer for most kinds of wires which are provided with fibrous coverings applied by braiding or winding, as such coverings will not absorb the dye properly to produce bands or stripes with even edges, unless the dye is forced in by rubbing. When the pads have performed a sufficient number of revolutions in contact with the wire, the pin P of the sheave N strikes the end of the segmental plate K, and drives the rod F forward, so that the conical head of said rod is forced between the plates *t'* *t'*, projecting from the blocks T T, forcing said blocks apart and dis-

engaging the pads entirely from the wire. This having been accomplished, the pin P passes from the end of the segmental plate to its concave edge, which is concentric with the sheave; and as the pin traverses this edge the conical head will be held at the point to which it was driven, the pads continuing to revolve without touching the wire. Just as the pin P passes from the end of the plate K to its concave edge, the rubber lugs R of the respective sheaves grip the wire between them and feed it forward the required distance, and just as these lugs release the wire the pin P passes off of the edge of the plate K, and the spring H forces the rod F rearwardly to its original position, withdrawing the conical head G from between the plates t^t , and allowing the blocks T T to come together, so that the pads of said blocks will clasp the wire between them and give it another rotary rubbing.

If the wire is to be colored in bands one inch and a quarter wide separated by uncolored spaces of the same extent, the pads will have a width of one inch and a quarter, and the rubber lugs of the sheaves will each occupy a segmental space of nearly two and one-half inches, so that at each feed the last-colored band will be moved not only clear of the pads, but an inch and a quarter beyond the same, so that an uncolored space will be left between it and the portion of the wire which is next clasped between said pads. As long as the machine is kept in operation the wire will be intermittently fed forward and colored in separated bands or circumferential stripes equal in extent to the uncolored spaces between them. If at any time the color appears faint, a slight pressure on the bottoms of the cans will cause the pads to be replenished with dye sufficiently to bring up the color properly.

The reels which deliver and receive the wire are not shown in the drawings, as they may be arranged in any suitable manner. I prefer that the rubber lugs of the sheaves shall draw the wire from the delivery-wheel, and the receiving-reel may be turned either by hand or automatically to take up the wire from the coloring-machine. I prefer that the receiving-reel shall be connected by belting in a well-known manner with the driving-shaft of the coloring-machine, and its movement so timed with relation to the movement of the machine that it will wind up the wire as fast as finished.

It will be readily understood that the blocks T T may be made wide enough to each hold a plurality of properly-spaced pads, and the feed of the wire regulated accordingly, so that two or more bands of color may be applied to the wire simultaneously. A block with two pads is shown in Fig. 7; or, instead of wide blocks, I may use two or more blocks with pads on each side of the wire, the blocks on each side, respectively, being pivoted to a common pin projecting from the disk, and said blocks being properly connected to swing together. Furthermore, instead of one guide-wheel, I

may use two placed edge to edge to guide the finished wire centrally from the pads.

Having now fully described my invention and explained the operation thereof, I claim—

1. In a machine for coloring wire, two dye-pads or wipers arranged to clasp a wire between them, in combination with mechanism for rotating such pads or wipers about the wire, and means for separating said pads and bringing them together intermittently and feeding the wire longitudinally between the pads while they are separated, substantially as described.

2. The combination, with the rotary disk mounted on a hollow shaft and carrying the blocks provided with dye-pads, as described, of means for feeding a wire through the said hollow shaft and between the pads intermittently, and means for rotating the disk and intermittently separating and bringing together the pad-blocks and pads, so that the pads will clasp the wire, substantially as described.

3. The combination, with the disk E, open at its center and mounted upon a hollow shaft, and carrying the pad-blocks provided with dye-pads and pressed together automatically, as described, of the hollow rod arranged through said shaft and provided with a conical head between the pad-blocks and disk, suitable means for feeding a wire through said hollow rod and its head to and between the dye-pads intermittently, and means for operating said rod intermittently to cause its conical head to enter between projecting portions of the pad-blocks and separate said blocks and pads while the wire is being fed, substantially as described.

4. The combination, with the rotary disk E, open at the center and mounted on a hollow shaft, of the blocks T T, provided with pads and pivoted upon said disk, as described, of the sheaves N N', arranged to feed a wire forward intermittently, means for imparting rotary motion from the hollow shaft of the disk to said sheaves, the hollow rod F, extending through the hollow shaft of the disk and provided with a conical head having an opening at its center, the segmental plate K, projecting from said hollow rod, the pin P, projecting from one of the sheaves and arranged to strike and traverse said segmental plate, and means for pressing the rod F toward the sheaves with a yielding force, substantially as described.

5. The combination, with the disk E, open at the center and mounted upon a hollow shaft, of the blocks T T, provided with dye-pads and connected to said disk, as described, being provided with the projecting plates t^t , of the hollow rod F, arranged through the hollow shaft of the disk and provided with a conical head in front of the disk, the sheaves N and N', provided with elastic lugs, and the pin P, projecting from one of said sheaves, the segmental plate K, projecting from the hollow rod F, the spring for forcing said rod toward the sheaves, and means for communicating mo-

tion to the hollow shaft of the disk and from said shaft to the sheaves, substantially as described.

5 6. The combination, with the color-applying and wire-feeding devices, as described, of the guide-wheel arranged to receive the colored wire, and constructed of absorbent material, substantially as and for the purpose set forth.

10 7. The combination, with the pad-blocks and dye-pads mounted thereon, of the cans connected with the blocks and arranged to supply a liquid dye or coloring-liquid to the pads, respectively, substantially as described.

8. The combination, with two absorbent 15 pads suitably supported and facing each other, of means for feeding a wire intermittently between said pads, and for alternately pressing the pads toward each other and separating them, substantially as and for the purpose set 20 forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. SAWYER.

Witnesses:

GILMAN E. JOPP;
E. C. WINN.